



PMI-PBA: Business Analysts and Project Managers

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Steve Fullmer applies more than thirty-seven years of technology, project management, and business analysis experience to the creation of courses and mentoring toward topic mastery. He has been employed as a leader, architect, and creative problem solver in the supercomputer, financial, security, telecommunications and Internet industries with



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Through his independent consultancies, Steven M. Fullmer, LLC and Blue Sphere Solutions, LLC he developed a love for guiding ideas and clients to new horizons. Mr. Fullmer began formally teaching for Interface Technical Training in 2007, and became a full time staff instructor in 2009. He continues to serve former and current students through Interface Technical Training, while contributing to

professional organizations, community groups, and private industry toward the enhancement of project management, human development, and technology capability.

Steve began his life-long learning, leadership and service to others while earning his Eagle Scout award (as well as his love of nature and navigation). He has been a Boy Scout leader for more than 45 years. His love for science and technology, and service to others were expanded while earning Chemistry (Biochemistry) and Biology (Zoology) degrees from Willamette University in Salem, Oregon. He completed post-graduate coursework in Neurochemistry at Arizona State University before returning for his MBA. Steve holds an MBA from the W.P. Carey School of Business Administration at Arizona State University, graduating first in his class.

He has applied his knowledge toward certifications that guide human change (Change Intelligence, Project Management Professional, Project Management Institute – Professional Business Analysis) and technology understanding (CompTIA Technical Trainer+, A+, Security+; Microsoft Certified Trainer, Microsoft Certified Technical Specialist, Microsoft Certified Systems Analyst; Certified Data Processor, Certified Computer Professional).

He is an established Project Management, Risk Management, and Operating Systems courseware author, and has contributed to articles, white papers, edited collections, and detailed statistical analysis for more than a dozen publishers across his fields of expertise and personal interests.

He currently resides in Phoenix, Arizona with his wife of twenty six years, Rhonda Fullmer who is also a nationally recognized project manager. Their two adult children practice as a successful electrical engineer and a marine biologist, both affecting positive change.

Introduction

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

Welcome, and thank you for selecting this course to learn about Business Analysis and project management or prepare for the PMI-PBA credential!

Business Analysis is a broadly growing career field. Demand for qualified business analysts increases while understanding of the qualifications remains clouded. Answers to the questions: “How would I get hired as a business analyst?” and “What skills do I list on my resume?” are difficult to specify. Toolsets may either be generally or only exclusively applied. Much like acquiring a college degree in business or an MBA, the knowledge and tools may be applicable to all industries and all businesses, or decidedly guide you towards a PhD in economics. By the way, many business analysis tools have evolved from the study of business administration. MBA related courses or knowledge can assist you in this arena, although a specific business related degree is not needed for the PMI-PBA credential. Business analysts may specialize based upon technique, or become subject matter experts within a single industry. Minor and major knowledge acquired and expanded through experience may or may not apply to every given situation.

The most powerful approach to business evolution is the ***integration*** of Business Analysis and Project Management. During a project, business analysts report to the project manager in order to facilitate requirements gathering and analysis, communications, and stakeholder relationship management. Business analysis extends further across a product or service life-cycle than project management, assessing and assuring business value by providing the continuity necessary for business success.

Business analysis is first and foremost a set of ***methodologies*** to **solve problems, identify and meet needs**, and to **foster creative solutions**. You have selected a framework that will enhance your ability to achieve this goal.

Context is critical within the field of Business Analysis. This bears repeating. CONTEXT is critical. Before you start to practice, this course will provide focus.

Background

Perhaps you selected this course as a return client. Or by researching alternative offerings. Or while reading a brief course syllabus prepared by our staff. Whatever drove you toward this material, thank you again. Now, before we begin to learn about the specifics of Business Analysis, I feel compelled to offer you some context that will aid you to both integrate and apply the knowledge gained; context that will also allow you to sort through other available materials as you seek additional tools and understanding that will allow you to best apply your personal business and leadership knowledge and skill.

As a Staff Instructor at Interface Technical Training, I was encouraged to create this course based upon client demand and the nature of unclear offerings across the subject matter area. We continue to offer a variety of courses that specialize in particular business analysis tools. Skills that a great business analyst needs, like root cause analysis, workshop facilitation, structured modeling, or Agile methodology. The courses are well attended, though often not repeatable or sustainable as a curriculum. Very few clients, including business analysts, seem able to identify what they need. So they grab what is available. The challenge is understanding a framework that will allow you to acquire the correct mixture of skills. Failing to understand the need (or root cause of a problem) is a common business challenge, and as such the role AND the interest of the business analyst.

The field needed a well-designed week-long course that sets the stage for adding skills in a logical and integrated fashion. This course provides the framework essential to PMI-PBA certification, and delivers immediate business analysis examples that you can integrate into your everyday activities. Additional tools references are provided in the courseware, though are not intended for course delivery or essential to PMI-PBA certification.

As I researched the options and prepared for my own PMI-PBA certification exam, I found clearly presented material to be extremely confusing and often contradictory. In other words, the content and examples were readily understandable, yet often poorly integrated or lacking viable context. Repetition alone is insufficient to provide mastery. Interface Technical Training instructors, whether staff or selected consultants, focus on aiding students to achieve MASTERY of a subject. Mastery requires strong foundational knowledge, aided by the ability to apply the knowledge, bolstered by practice layering skillsets and integrating concepts across subject areas. The concept called the “10,000 hour rule” in Malcolm Gladwell’s book ***Outliers*** is based on the research of Anders Ericsson. Research suggests that mastery relies on the **focused** repetition of specific, simple skills applied in a well-designed and integrated manner. You may be able to remember content through repetition, but application of memorized fact will not produce the same result as mastery. The goal of this course is to provide you clear, contextual information so that you can continue focused application on your own.

I met Barbara Carkenord (PMI-PBA, CBAP, PMP, PMI-ACP) and acquired her ***PMI-PBA Exam Prep*** premier edition at the 2016 PMI Global Congress while contemplating this course. Her book is an excellent self-study guide in business analysis toward the PMI-PBA exam. Ultimately, it was the framework in which she presented her material that created utility. This insight led to the creation of a course framework that enables instructional delivery and hopefully serves as guide toward understanding. Thank you, Barbara, for the insight your material generated.

The field of business analysis contains a wealth of simple knowledge and truths that are clouded by varied ownership, authority, and authorship.

There appears to be an elephant in the room. As I regularly present in my project management courses and keynote presentations, change is not affected until one clearly identifies that elephant and accepts that any solution must include consideration of the elephant.

The PMI-PBA credential was established by the Project Management Institute in 2015 through the publication of ***Business Analysis for Practitioners: A Practice Guide***. The aforementioned book is the foundation for the layout of the content in this course, though far from its sole source. Although relatively new, the PMI-PBA is based upon the work of the Project Management Institute which was established in 1969. The goal then and now is the ongoing work of establishing best practices and global standards in Project Management. The ***Project Management Body of Knowledge (PMBOK®) 6th Edition*** was published in the fourth quarter of 2017. Much of the content in ***Business Analysis for Practitioners: A Practice Guide*** references the PMBOK® as well as ***The Standard for Portfolio Management*** and ***The Standard for Program Management***, also published by PMI. ***The PMI Guide to Business Analysis***, containing ***The Standard for Business Analysis (ANSI/PMI-17-005-2017)*** was published at the end of 2017. All of these works are evolutionary, and focus on current, accepted best practices. As stated within the PMBOK®, the presented tools serve most of the people most of the time. The American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) have both recognized or adapted the PMI standards documents.

An alternate and only slightly longer-lived credential in business analysis is the Certified Business Analysis Professional (CBAP), established by the International Institute of Business Analysis (IIBA) in 2008. The CBAP is based upon content in ***A Guide to the Business Analysis Body of Knowledge (BABOK® Guide)***, first published by IIBA in 2008. IIBA was founded in 2004 with the intent to identify

best practices in business analysis as well as to promote the profession. The third edition of the BABOK® Guide was published in 2015 and is the basis for current IIBA certifications. IIBA focuses solely on advancement of and within the business analysis profession. Modification of the credential process to incorporate four-tiered certification levels in September 2016 reflects this goal. The BABOK® Guide is promoted as being a globally recognized standard in Business Analysis. Content referencing the BABOK® Guide is incorporated within this course as well.

My first exposure to PMI was in 2002, when my then employer asked two dozen of us to sit a Project Management Professional (PMP®) Certification course. This course introduced me to my mentor in formal, standardized project management, Ed O'Connor. Achieving the PMP® in 2004, I had the privilege of editing or co-authoring three editions of Ed's PMP® courses and serving with him as a director for the local PMI Chapter for better than six years. Ed set the example in project management mastery that I attempt to emulate in his memory. During this same period, I have had opportunity to attend multiple PMI Global Congresses so that I might contribute to and learn about industry standards.

In 2005, IIBA approached PMI chapters seeking business analysts and project managers interested in promoting business analysis through the establishment of local chapters. From 2006 through 2010, I had the privilege of serving as a founding officer of the Phoenix IIBA chapter. Many of the contributors and primary authors of the BABOK® Guide helped to found or rose through the ranks of the Phoenix chapter. Many of the templates, standards, models, principles, and guidelines for both operations and the BABOK® Guide are derived from these early works.

PMI and IIBA as organizations have different goals. A parting of the ways was inevitable as both groups adapt to growth and change. Both organizations provide valuable insight. The field of business analysis will prosper as a result.

Here is an examination element important to both IIBA and PMI business analysis certification: ***The greatest sources of conflict arise from perception and design.***

Herein stands the elephant.

IIBA and the BABOK® Guide focus on the promotion of Business Analysis as a powerful profession, including the exploration of new and exciting tools that enable business analysis success. Contributors to the BABOK® Guide are often on the leading (or bleeding) edge of business analysis tools and development. Authors of IIBA content regularly promote business analysts as the accountable, responsible, most talented leaders for today and tomorrow. IIBA certification and the BABOK® Guide are evolutionary and rapidly changing as a result. The progressively tiered credential levels offered by IIBA are just one representation of this effect. The BABOK® Guide provides a six container approach to the classification of business analysis tools, enabling rapid identification and placement of new tools, albeit often without a clear differentiation regarding selection, combination or best application.

PMI and the PMI-PBA focus on accepted best practices, promoting Business Analysis as a profession while recognizing that the most common application of business analysis tools across industries TODAY is a hybridized project manager/business analyst role. The PMI approach offers a framework for the selection of business analysis tools that integrates with existing operational and project standards. The framework clarifies the selection of tools and techniques based upon the product lifecycle, project lifecycle, stakeholder attributes, and expected business analysis deliverables. The first edition of ***THE PMI Guide to Business Analysis*** is in many ways cumbersome or complicated, perhaps due to its effort to fully integrate the common business analysis emphasis on **Products** with the project management emphasis on **Project Work**. While the concepts are complementary, and the time/space occupied by business analysis and project management co-exist, not all of the tools lend themselves to efficient

integration. A hybrid PM/BA doesn't have the time to use all of the tools and techniques, at least not in any formal manner. PMI recognizes this fact with the concept of **Tailoring** – the choice of tools that fit the situation. The business analyst focused on **product value** meeting **business needs**. The project manager focusses on **delivery** of **well-defined requirements**. The focus and effort require division of labor and teamwork.

Both the IIBA and the PMI frameworks are powerful, admirable, and expand Business Analysis capabilities.

The greatest challenge that a student of Business Analysis faces today lies in attempting to separate the perception and design presented by the two models.

For instance, IIBA and the BABOK® Guide place higher authority and responsibility upon the Business Analyst, relegating the project manager to a supporting role. PMI and ***Business Analysis for Practitioners: A Practice Guide*** place authority and accountability for needs identification (before project identification and selection) and post implementation evaluation upon the Business Analyst, separating the roles and authority of the BA and PM during projects. The BA owns product elements and business analysis planning, requirements elicitation and analysis, and traceability. The Project Manager owns the project and the work associated with the project, including the work of the Business Analyst reporting through the project for cost, time, and resource management. The tradeoffs and the handoffs continue to require careful application of soft skills.

Much of the material currently available for PMI-PBA preparation used BABOK® Guide content since the examples and models were readily available. With the publication of ***The PMI Guide to Business Analysis***, PMI has incorporated modified models and relationships derived from the ***PMBOK® Guide 6th Edition***. This results in a confusing or conflicted focus. Many of the published PMI-PBA **sample** questions available during the first edition of this course book represent CBAP content or use direct quotes from the ***Business Analysis for***

Practitioners: A Practice Guide or ***PMBOK® Guide 5th edition*** without appropriate context. Had I not made this connection and understood the distinction, then my efforts to prepare for the PMI-PBA exam would have taken far longer. As my study progressed, I often found myself exploring exciting new concepts that were irrelevant to successful exam completion or attempting to resolve clear conflicts relative to meanings and business analysis approaches.

A great business analyst should own both guides, and continue to discover additional mentors to refine their skills. Without direction, or relying solely on memorization, hours spent earning mastery will rapidly accumulate.

My desire within this course is to clarify the difference and allow you to focus your lessons and your learning.

Update for the Second Edition

This second edition of ***PMI-PBA: Business Analysts and Project Managers*** was motivated by feedback, corrections, and insights offered by students through multiple instructional and mentoring cycles. The effort was also guided by a desire to better incorporate ***The PMI Guide to Business Analysis*** within the course materials. ***The PMI Guide to Business Analysis*** is an excellent resource for the PM/BA hybrid. It can serve as a reference for either business analysts or project managers, although almost every section of the Guide is either overly project management focused, or attempts to over emphasize the elements of Product Roadmaps as an often separate and independent approach for business analysts. The tools are the tools, and efforts to overly align each option results in significant confusion and complication.

The authors of ***The PMI Guide to Business Analysis*** clearly labored to align the Business Analysis Process Groups with the five Process Groups established and maintained as a standard in the ***PMBOK® Guide 6th Edition***. I suggest struggled rather than labored, because the separation of processes across the Knowledge Areas is forced, often repetitive, and not even in clear alignment with the ANSI

Standard for Business Analysis published within the same Guide. ***The PMI Guide to Business Analysis*** is an excellent first effort, albeit too formal, repetitive, and demanding of detail comprehension for daily application.

As regularly stated throughout this course, any effort that increases a business analyst's effort and time, decreases the value that they can contribute toward an effective solution.

As a simple example within ***The Standard for Business Analysis***, the figure (Figure 1-5) that attempts to clarify the Process Group Interactions for Adaptive Projects is unduly complex and difficult to interpret.

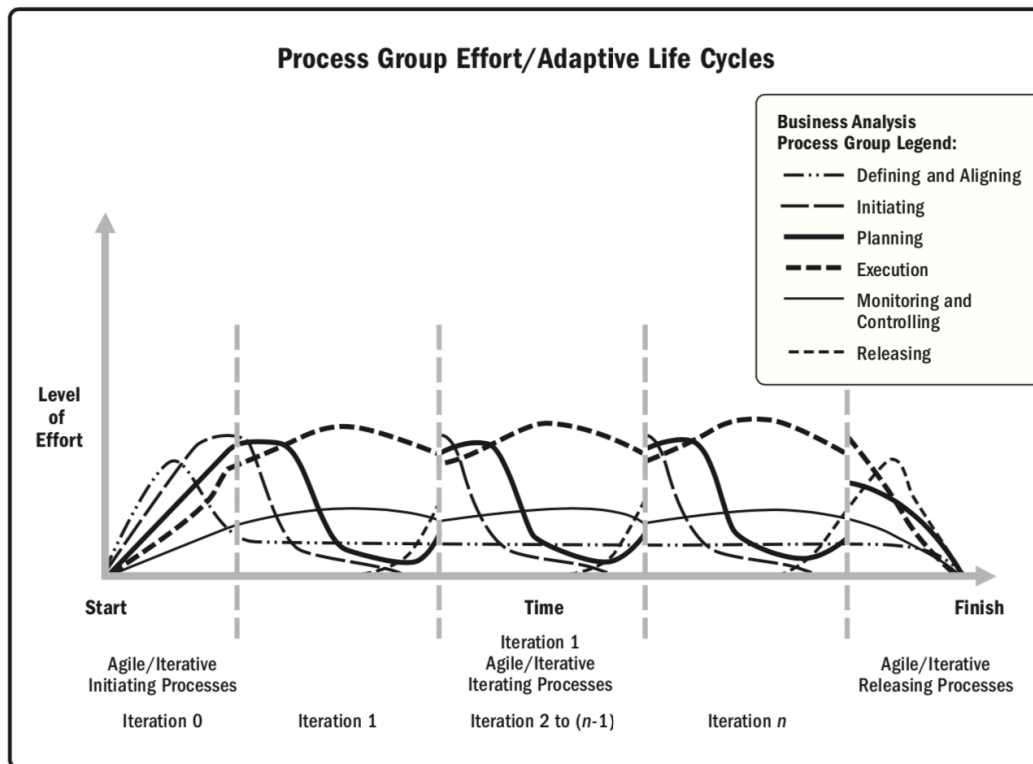


Figure 1-5. Business Analysis Process Group Interactions for Adaptive Life Cycles

While this is a valid representation for the related work, the goal of Business Analysis should be to clearly and concisely demonstrate a concept. The diagram neither simplifies nor clarifies either cause or effect.

Business Analysis tools are more typically used in a cyclic fashion, retrieved and applied whenever appropriate to business analysis activities. Tool use ‘most of the time for most of the people’ crosses both Process Group and Knowledge Area boundaries. Inputs and desired outputs regularly drive tool selection. All of the preceding statements are not new concepts, but they have acquired a new label – **Tailoring**. ***The PMI Guide to Business Analysis*** introduces tools and techniques either in synchronization with long standing project practices or where they ***might*** first be applied to business analysis efforts rather than grouping them in sets where they might be better organized or understood.

As this edition was written, I was regularly reminded of the effort to simplify models and representations that aided my learning toward certification. This second edition attempts to maintain the same approach. Content from ***The PMI Guide to Business Analysis*** is added where it logically fits rather than revising the entire course to mirror the complicated presentation within the Guide. Some terms in this course are changed to correspond with the labels and glossary in the Guide. Tools more newly added to ***The PMI Guide to Business Analysis*** versus ***Business Analysis for Practitioners*** (upon which the exam is based) are incorporated for completeness.

Many of the new tools and models focus specifically or solely on the inclusion of Product Roadmap development and maintenance within ***The PMI Guide to Business Analysis*** that are absent in ***Business Analysis for Practitioners***. Related additions are referenced as being Product Roadmap tools.

Goal

This course reinforces the PMI-PBA framework, which appears to be more immediately applicable to the more common hybrid PM/BA, and is designed to prepare candidates who have the requisite experience and hours for the PMI-PBA exam toward study that will facilitate credential achievement.

The perspective included herein includes project management references. This happens to be my primary field of expertise. As a hybrid project manager/business analyst, I respect the role of the dedicated business analyst and prefer the results that **partnering** affords. As appropriate, efforts that are better handled by a pure business analyst (versus the hybrid approach), are separated from project alignment for emphasis and clarity.

BABOK® Guide terminology is provided for clarification, comparison and contrast, as well as affording the student an opportunity to consider tools that are evolving within the business analysis practice.

Navigator Framework

Throughout this book we apply a nautical analogy in order to assist you assimilate and associate the context of business analysis with that of business operations, goal and objective setting, projects, specific business analysis tools, and knowledge specific to PMI and the PMI-PBA credential. The related symbols (anchors, compass, telescope, steering wheel, schooner, etc.) and notation will help you to categorize and differentiate the various elements of business analysis.

The role of the business analyst within the PMI-PBA framework is much like that of a Navigator.

The nautical Navigator is critical to both operational and project planning. Their work starts before voyages are selected and planned. During the voyage, the navigator's role is critical to successful resource utilization (finding food, water, trade routes) and keeping the effort on course. During and after the project, the cartography and other artifacts recorded by the navigator are critical for repeat successes as well as identifying future opportunities.

Just like a navigator, business analysts may guide a larger mission consisting of multiple ships (efforts, portfolio components, programs); find themselves

dedicated actively to a singular voyage (project); or spend much of their time updating the maps (models), generating instructions (documentation), and journaling (lessons learned/retrospectives) to create the resources for future endeavors. Consistent with the current hybridized PM/BA approach, the navigator may work for a captain, as an officer equal in status to the captain, or as the captain/navigator. The role of the business analyst/navigator regularly depends upon the scale of the need and the efforts involved. The PMI model assists with differentiation of the roles when both a PM and a BA are present, based on the nature of the project work.

Symbols



"Compass" – the role, skills, focus of the business analyst.



"Telescope" – content on which the business analyst should focus for mastery of business analysis, which may include key examination points. Examples, deeper dives into material, and alternate sources are highlighted by the telescope.

.....
SKILLS:
.....



.....
ANCHOR
.....

“Anchor” - Specific topic or point upon which you should reflect that will be essential to practical application and credential preparation. These points provide important context before you journey onward.

All of the content is applicable to business analysis, project management, or an integrated approach. Merely learning the anchors will not guide you toward success, though failing to pause, practice, or refuel at these points could cause you to set the wrong course toward mastery.

.....
SKILLS:
.....



.....
STEERING
WHEEL
.....

“Steering wheel” - Used for page numbering, and to provide material within the course guide that might aid in perspective, understanding and additional reference.

.....
SKILLS:
.....



.....
KNOT
.....

“Knot” - User questions, challenges, or examples that may be used in class or that you might work on your own to expand your business analysis understanding.

The Appendix mentioned throughout this book is a set of digital content provided to course attendees.

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Module 1 - Overview

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

What is Business Analysis (and who is a BA)?

The Business Analyst remains responsible for helping leaders to retain a clear picture of the world in which the business operates.

Note: throughout the book we will use the terms business analyst, BA, analyst, and navigator interchangeably to reference the role you should take. Other roles and titles including: sponsor, subject matter expert (SME), project manager (PM), product owner, team member or team, tester, end user, functional manager are distinct from the business analyst and possess specific relationships with the BA that must be clearly understood for exam success. All of these roles, and the individuals who fill them are referred to as **Stakeholders** – a key focus of BA efforts. Although the BA is also a stakeholder and may play many of these roles through day to day operations, consider your role as a business analyst separate for test purposes.

The public, visible works of the business analyst represent often simplified maps that offer a **high level** view of the landscape. Much like a Navigator, the BA creates maps with reference points that may be used to identify the business domain, to chart a course for exploration, or to facilitate territory transfer to end users who require concise instructions.

SKILLS:



COMPASS

The BA manages links between the business, stakeholders, and solution requirements.

SKILLS:



ANCHOR

A business analyst's primary skill is communication.

Examples of required communication skills include but are not limited to:

- Understanding stakeholders
- Eliciting (drawing forth) problems, needs, alternatives, requirements
- Monitoring situations and aiding conflict resolution
- Simplifying information (organization, models, artifacts)

Goal vs Objective

A **goal** is a strategic, long term and often high level desire of the business or individual. A goal may be measured and provided as specific, though is typically longer term and larger in scope than an objective. Although not absolute, one simple means to identify a goal is to determine whether it extends beyond a calendar year or a business season.

An example of a goal may be “graduate at the top of my class within four years”. Although clear and time bounded, aspects of the goal may be outside the individual’s control and will need to be broken into smaller increments for completion.

Objectives are more clear and precise. An objective sets a target that can be measured during achievement and which meets as many of the **SMART** criteria as possible. Smart objectives are:



SMART – Specific, Measurable, Achievable, Relevant, Time-bounded

- Specific: The terminology used must be clear, concise, and as precise as possible.
- Measurable: Stated clear quantitative (numerical) or qualitative (ability) terms.
- Achievable: Stated in a way that helps the team to determine the work needed to complete the objective.
- Relevant: An important element of business analysis is determining and confirming the relevance, often called 'value' of the product or solution relative to the need or problem.
- Time-bounded: Setting a time based target helps to determine the approach to be taken, the life-cycle to apply, and factors affecting resource selection.



The business case is based upon goals and objectives. A business analyst must have a clear understanding of business and customer goals, and the ability to state them in objective terms in order to recommend a solution or course of action. Goals and objectives are considered High Level. Too high level to clearly identify the work needed for success. Needs analysis identifies and clarifies goals and objectives. Elicitation and Analysis are typically necessary to generate detailed requirements and to decompose the work into manageable components from the stated goals and objectives.

Value

The key ***skill*** of a BA is communication. The key ***deliverable*** from a business analyst is Value. Within the Needs Assessment domain, the BA proceeds no further unless they can prove the Value associated with any recommendation.

During Business Analysis planning, there are some key efforts and deliverables required of formal business analysis processes. You will need to know these for the certification exam. But you will not plan or provide any of them unless they provide Value to the effort. Just because you should doesn't mean you will.

During elicitation every discussion you have with the sponsor, the subject matter experts, business owners, product owners, project manager, team members, vendors ... essentially every stakeholder ... comes down to demonstrating value, using value as mediation or negotiation leverage, assessing viability, and acceptance is based on VALUE.

During analysis, the models and tools you select, and objective of every effort you conduct must consider finding and demonstrating value.

When you create a requirements Traceability Matrix and trace the requirements, the components, and the work, your key focus is maintaining and confirming value.

The evaluation domain is all about identifying, confirming, and maintaining value.

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For any question on the exam or decision you make, first review the context of the situation to see if the scenario asks "why?" Value or value related efforts are your why. The best option always affirms that you understand the importance of maintaining product or solution value for the customer.

Solution or Product

From the works of Barbara Trautlein identifying ***Change Intelligence***, change leaders have a tendency to lead by vision (head), inter-relationship (heart), or action (hands). All sustainable change requires a combination of all three leadership styles. Whether creating new ideas, adapting to an external environment, or growing an existing operation - change plays a role.

Communication with understanding is essential to facilitating change.

The visionary often sees the goal, yet finds difficulty achieving consensus that motivates team effort or describing the tasks necessary to affect valued completion.

Relationship focused leaders often attempt to please everyone, or gather many points of view, sometimes missing the optimal target or losing an opportunity due to time delays and a hesitancy to launch. This approach can reduce value.

Tactical leaders know how to get the work done, but may fall into a ready-fire-aim trap or leave team members behind (physically and metaphorically) as they march forward energetically into the unknown.

The concept of Change Intelligence fits well within the realms of both business analysis and project management since it helps to identify and enforce that understanding, analysis, and planning should precede most efforts attempting to provide value.

For more information on Change Intelligence, check out the following website or book:

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<http://www.changecatalysts.com/> or the book *Change Intelligence: use the power of CQ® to lead change that sticks*; <http://changecatalysts.com/book.html>

Business analysis attempts to find a solution. Solutions might resolve problems, or they might help someone to meet an identified need. The term **product** tends to reference physical deliverables, while **solution** references a larger concept. A solution may be solely provided by a product. If you are hungry, eat an apple. A solution may also or otherwise provide new insight, alter a process, develop or acquire a service, re-organize operations, or initiate one or more projects to affect the desired outcomes.

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BA Deliverables include: Any unique or verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project. They are usually given to someone else to review.

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It is the BA's responsibility to help generate a solution, to clarify the solution through requirements generation, and to review the solution to confirm that requirements are met.

Product life-cycle

Whether we address a solution or a product, one insight provided by project management via the PMBOK® is the Product Life Cycle. Often referred to as **Total Life Cycle Costs**, a product incurs costs representing five categories during its lifetime. The sum of all costs associated with the life-cycle of the product or system include:

- Developing
- Acquiring
- Operating
- Supporting
- Disposing

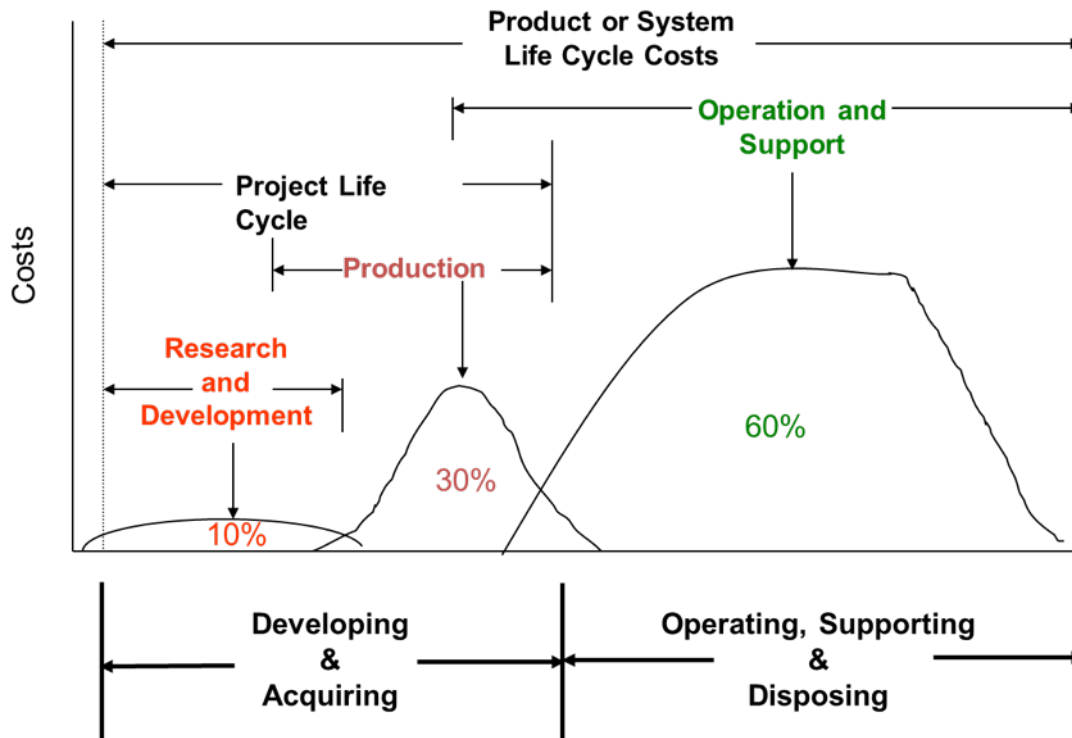
A **project** typically only addresses Development and/or Acquisition costs. Either might be attained without a project. Development might be outsourced. A product or solution might be acquired without the initiation of a project.

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Know the term COTS (Common Off the Shelf) representing goods that may be acquired. COTS may be acquired as part of a project, or a BA may recommend the purchase of COTS to meet an identified need without a formal business case or project initiation.



The diagram above identifies the relative components of a product life cycle. Note that project work represents only 40% of the total life cycle cost, while 60% of the product's cost, and therefore impact on value, occurs after the product or solution has been delivered to the customer.

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Once the need for a product or solution is identified, the business analyst needs to generate a recommendation toward resolution. This is the primary work of Needs Analysis and may lead to the creation of a business case and a formal project.

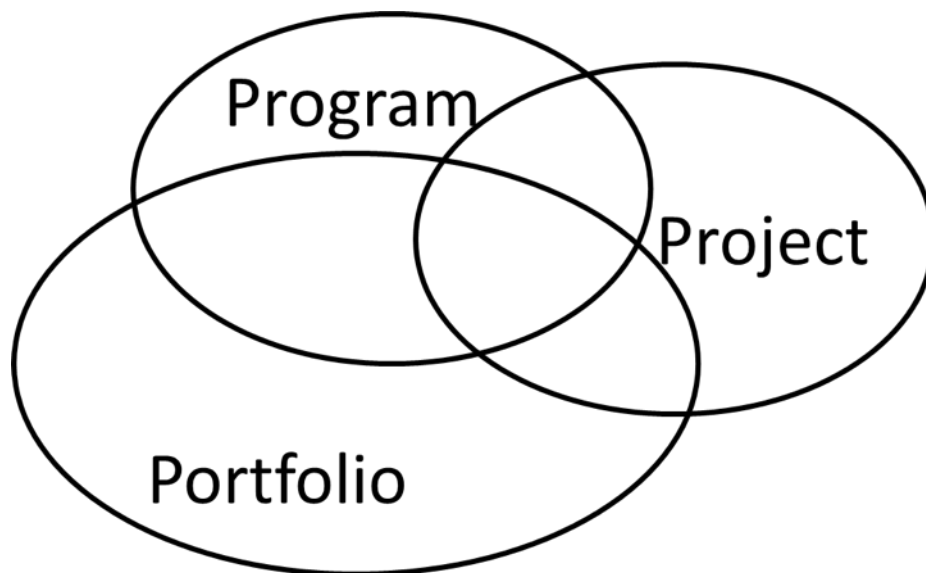
If a project provides a product or service, then the life cycle costs that extend beyond the project's delivery and closure become one of a business analyst's **Evaluation** efforts. Evaluation efforts would incorporate operational and support validation to assure that the estimated Return on Investment is achieved and maintained.

What is a Project Manager?

- Project definition
- Change – the change curve
- Manager (tasks), coach/mentor, leader
- Project life-cycle

Projects are defined as **temporary** and **unique**.

They may stand alone or serve as part of a larger plan. A project represents the work that must be done to deliver the product or solution identified by business analysts.



Portfolios represent the strategic assets of a business, including cash, stock, facilities, equipment, inventory, intellectual property, skilled staff, leadership, as well as the plans and efforts to increase business value through enhancement of portfolio elements. Programs and projects that improve or increase business value would also be considered a part of the business portfolio.

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The work of the business analyst includes identifying opportunities to improve the business portfolio, whether or not BA efforts result in the creation of a program or project. This is one of the distinctions that separates a BA from a PM.

A **Program** is a set of related projects, at the simplest level. From a PM perspective, projects may be components of larger, inter-related or integrated efforts called programs. From a BA perspective, a program may also include operations rather than temporary efforts. Consider for instance the space program or the exploration of a new product opportunity. In these latter instances, a program includes facilities, research, and ongoing support functions that initiate projects, support their execution, and transition the product into an operational setting.

A project is bounded by scope, time, and cost to affect a specific objective or deliverable. The work of helping to define and manage the boundaries, and the resources necessary to complete the work, is the accountability of the project manager.

The project manager (PM) is responsible for overseeing the work of the project. He serves as the captain of a ship given a high level mission, the funds and pre-defined resources, and a time-based deadline to achieve the objective. The scope, schedule and cost serve as the Triple Constraint for the mission.



Scope reflects the boundaries of work. The word scope should immediately bring to mind the concept of boundaries.

Project managers are often misunderstood as merely managers of tasks, since their primary function is assuring that the work is performed. Assuring work is completed in a change focused environment requires far more than management skills. Change is pain. Quite literally. The same neural regions of the human brain fire during change as during the experience of physical pain. Merely pushing to get work accomplished worsens participation and the quality of the result.

The PM must assure that the work meets regulations and standards, conforming to established guidelines. He or she needs to be a manager of tasks, a mentor and coach to the team, and a leader through both example and effort. The Quality and metrics of the project are the purview of the project manager. The PM also plans for and responds to risk during the project, for the safety of the crew (team) and the benefit of the passengers (end-users).

While the BA/navigator contributes to the project effort, the ultimate authority for integrating all of the work and management elements of a project lies solely on the shoulders of the PM.

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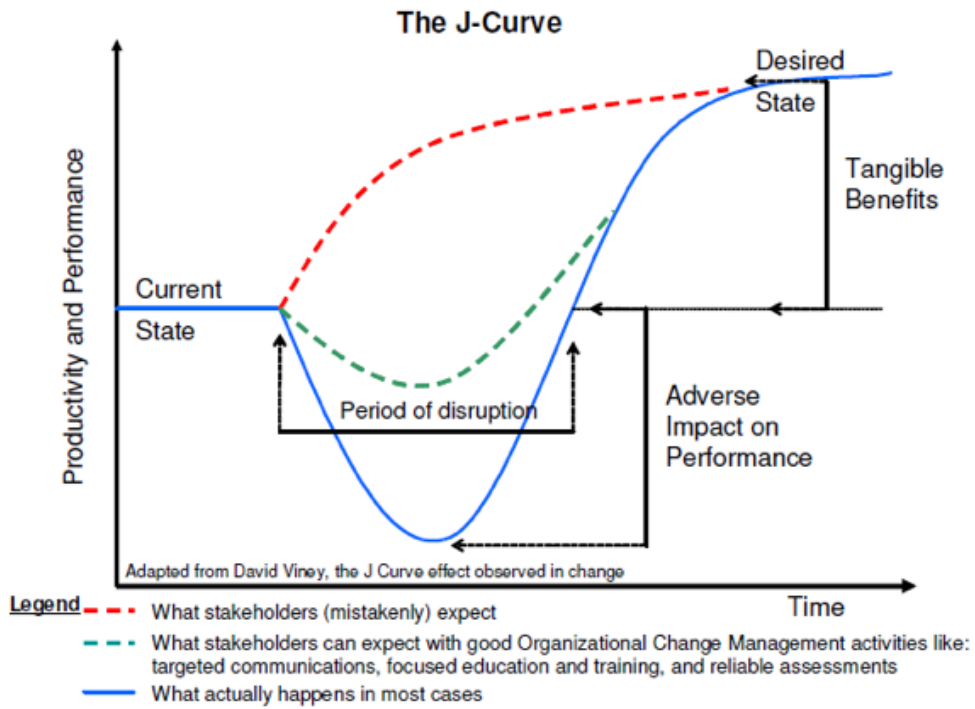
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The PBI-PBA exam requires that the candidate demonstrate familiarity with both business analysis and project management. In addition to 2000 hours of practical project exposure, the candidate must be familiar with the PMBOK® Guide and the related process groups, knowledge areas, tools and techniques applied to project management.

While this course references key terms, concepts, and techniques applicable to project management within the framework of business analysis, the greater your understanding of project management the better success you will have both on the exam and in applying best practices.

While the BA may be amongst the first to identify the NEED for change, or the course correction advised to affect a goal, it is the project manager whose talents, skills and techniques must guide the effort to fruition.

Successful project managers are skilled at Organizing the Chaos Associated with Change. They understand the psychology of change, and can apply the varied tools necessary to strategically and tactically guide the team through the change process.



The experienced and credentialed Project Manager is familiar with the ten knowledge areas of the Project Management Body of Knowledge (PMBOK®), and the five process groups (Initiating, Planning, Executing, Monitoring & Controlling, and Closing) into which they are categorized.

Process Group Knowledge Area	Initiating	Planning	Executing	Monitoring & Controlling	Closing
Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

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During an established project the BA reports to the project manager with regard to business analysis planning, the work being performed, scheduling of deliverables from the BA, and communication guidance. In all cases the BA follows the project management plan, and its many subsidiary plans, to assure that the project can meet the identified value without exceeding scope, cost, or time constraints.

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The BA will likely be an Accountable member of the Project's RACI diagram. The Project's RACI diagram identifies the project contributors (responsible), accountable (key SMEs and team members), consultant (internal and external business and SME's), and the informed (customers and end users). More about RACI diagrams will be discussed within Business Analysis Planning and Elicitation. The BA does not control the PM's RACI diagram. The BA may create a subsidiary RACI diagram to identify sub-delegation and key contributors toward the product or solution requirements, design, approval and ultimate validation.

From the project manager's perspective the BA most significantly contributes:

- Understanding of the business case and the charter that initiated the project.
- Elicitation and development of the requirements (Collect Requirements process).
- Assistance with requirements tracing and associated integrated change control.
- Communication planning, both with respect to the project, and by offering more extensive stakeholder communication requirements and approvals.

- Stakeholder relationship management insights, tools, and Coordination.
- From a product or solution perspective, the verification and validation that the product meets the expected value.

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Quality is an early consideration within project planning. Quality is a later consideration within the Business Analysis cycle, often falling well after the planning process. The criteria for quality verification are often not identified by the BA until into the Analysis aspect of Elicitation and Analysis (although early, high level indicators arise during Needs Assessment). The criteria for approval and validation (value) often arise or are confirmed during Traceability efforts.

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The concern for and application of Quality metrics and tools are different for the BA and the PM. The PM is concerned with the quality of the work, and verifying that the work is performed as planned and documented. For a PM, validation means that the customer approves the work. For a BA, quality is verification that the requirements are correct as defined by the stakeholders, are compliant with regulations and internal standards, and that the completed product (or elements, phases, etc.) deliver the intended value.

Process Group Knowledge Area	Defining and Aligning	Initiating	Planning	Executing	Monitoring and Controlling	Releasing
Needs Assessment	4.1 Identify Problem/Opportunity 4.2 Assess Current State 4.3 Determine Future State 4.4 Determine Viable Options and Provide Recommendation 4.5 Facilitate Product Roadmap Development 4.6 Assemble Business Case	4.7 Support Charter Development				
Stakeholder Engagement	5.1 Identify Stakeholders		5.2 Conduct Stakeholder Analysis 5.3 Determine Stakeholder Engagement and Communication Approach 5.4 Conduct Business Analysis Planning	5.5 Prepare for Transition to Future State	5.6 Manage Stakeholder Engagement and Communication 5.7 Assess Business Analysis Performance	
Elicitation			6.1 Determine Elicitation Approach	6.2 Prepare for Elicitation 6.3 Conduct Elicitation 6.4 Confirm Elicitation Results		
Analysis			7.1 Determine Analysis Approach	7.2 Create and Analyze Models 7.3 Define and Elaborate Requirements 7.4 Define Acceptance Criteria 7.5 Verify Requirements 7.6 Validate Requirements 7.7 Prioritize Requirements and Other Product Info 7.8 Identify and Analyze Product Risks 7.9 Assess Product Design Options		
Traceability and Monitoring			8.1 Determine Traceability and Monitoring Approach	8.2 Establish Relationships and Dependencies 8.3 Select and Approve Requirements	8.4 Manage Changes to Requirements and Other Product Information	
Solution Evaluation	9.1 Evaluate Solution Performance		9.2 Determine Solution Evaluation Approach	9.3 Evaluate Acceptance Results and Address Defects		9.4 Obtain Solution Acceptance for Release

Table 1-2 Business Analysis Process Group/Knowledge Area Mapping
From ***The PMI Guide to Business Analysis***

Without the partnership of a business analyst, the PM

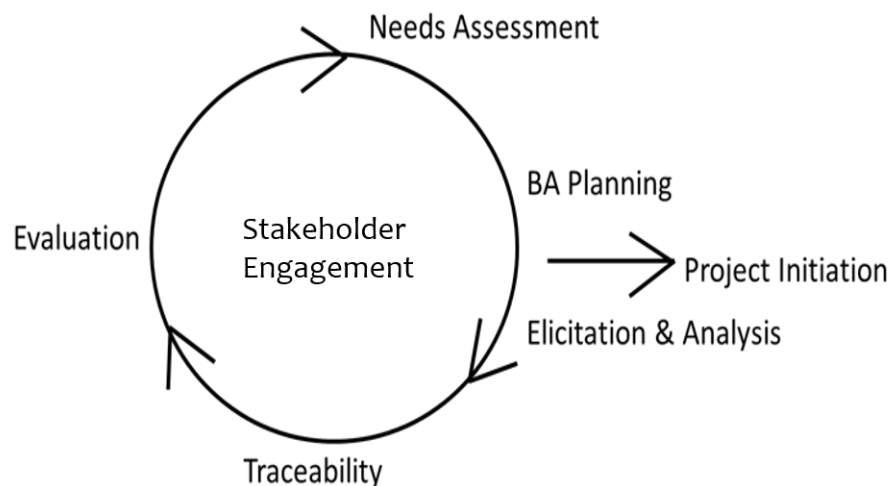
- May find themselves overwhelmed with the communication efforts associated with day to day project guidance.
- Becomes an exception handler, regularly dealing with resource constraints, risk responses for both opportunities and threats, and stakeholder issues in a reactionary rather than proactive manner.
- Captures lessons learned, equivalent to the captain's log, with fewer rich and useful details applicable to subsequent voyages.

The relationship between the BA and the PM should be a ***partnership*** that includes an understanding of their varied roles, strengths and weaknesses. While both may have the skills to identify value AND to direct the work, a clear delineation must be pre-meditated so that duplication of effort is avoided. Both the PM and the BA communicate regularly with stakeholders. Their messages, individually and jointly, must be consistent to avoid confusion.

Life Cycle(s)

One of the most important factors affecting both Business Analysis and Project Management efforts is the identification of Life Cycles. We mentioned the product life cycle above. A product life cycle is time-bound to the useful life of the product. In more general terms, a life-cycle is the sequence of activities and the associated internal and external relationships that affect those activities.

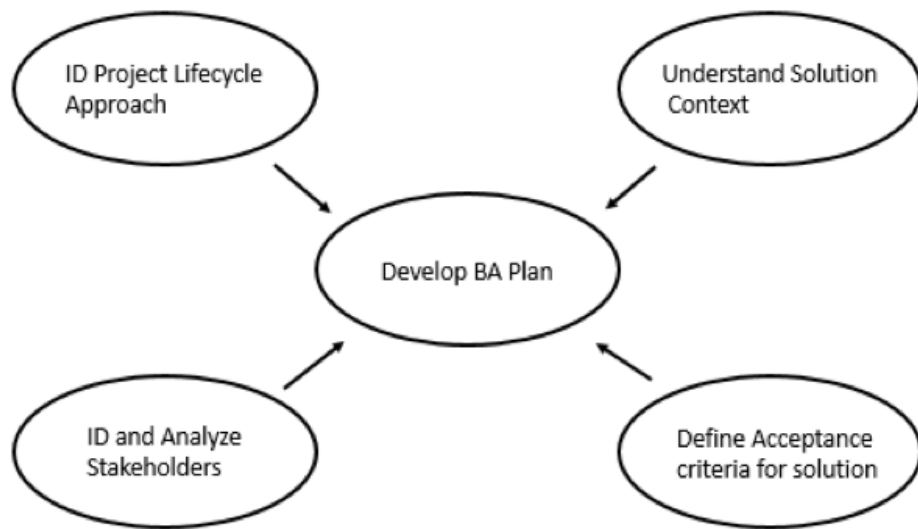
From a business analysis perspective, a life cycle is the preferred sequence of work activities necessary to complete a product or solution. The solution may be delivered all at one time, or in smaller components. Project tool and technique selection for both the PM and the BA relies heavily on project life cycle selection (Predictive, Incremental, Iterative, or Adaptive). The PMBOK® Guide 6th Edition significantly incorporates several Agile methodologies as key factors for tool selection. The work of a business analysis is itself cyclic in nature. Actually cycles within cycles.



An Overview of a simple business analysis cycle



Development of the Business Analysis plan, discussed in an entire chapter, actually requires an understanding of the project lifecycle that will be used in order to identify the business analysis plan and deliverables.



Lifecycle Approach: State Diagram and lifecycle analysis

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Businesses often identify the preferred life-cycle for project execution, and one element of a business analyst's efforts must be identifying existing processes, internal standards and required lifecycle selection. This varies from the PM stance where the Project Manager understands project work flow and should be given the authority to select the most appropriate life-cycle for project execution. The business analyst may recommend a project life-cycle, although business preference, environmental factors, standards, or PM selection of the project lifecycle are more likely.

Predictive Lifecycles

Projects with identifiable characteristics typically follow a predictive lifecycle. The larger, more complicated, or risk related (opportunity OR threat) associated with a solution, the more likely that a predictive life cycle should be applied.

Imagine that your employer (the royal court) sees an opportunity to establish trade across the ocean. You are tasked with understanding the environment, available (as-is) processes and resources, and determining if a viable course of action can be identified. You are a navigator and cartographer who can lay out the knowns and unknowns in a simple fashion so that your sponsor can decide whether to proceed.

This type of effort suggests a predictive life-cycle. The research and high level requirements need to be identified before your sponsor selects a captain or captains (PM/PMs) best suited to this project. You might even be designing a portfolio or a program. Once identified and approved by a charter, you will be assisting the captain (PM) to identify further requirements and develop a detailed plan well before any ships (efforts) are launched. You will leave the

details associated with identifying the work, recruiting the crew, and planning for risks (how to carry back all that gold while avoiding pirates) to the captain.

Should you become an integral part of the crew/project, you will be keeping the voyage on course. You will help the crew to understand and refine requirements as one of the officers (core team). You may need to help the captain to locate water, food, and fair winds (resources) because of your knowledge and experience. You will certainly be refining and updating maps (models) and creating reports (evaluations) used to make later recommendations regarding the value of the voyage and subsequent corrections or enhancements.

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For certification purposes, maximum control of risk is the most likely reason for a predictive life cycle, followed by complexity. The higher the opportunity, the greater the threat, or the more complex and inter-related the requirements dependencies, the more important it becomes to plan and review the plan prior to execution.

In the case of a predictive project, the terms ***Release, Phase, Stage*** all mean 'built at the same time'.

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For solution evaluation of a predictive project, the business analyst will rely on end state (closure and post closure elements) to determine project success, the value of the solution, and any recommendations for correction or change. Examples include User Acceptance Testing, Alignment to the initial goals and objectives, and validating metrics like Key Performance Indicators (KPI's).

Iterative or Incremental

An incremental project is one performed in phases or stages. When the project is complex, though could be separated into unique elements, you might choose to complete and evaluate the work in subsets.

In this case your sponsor has asked you to determine the viability of trade with several small islands visible just off the coast. Discovery that funds are tight might suggest a small venture whose returns bankroll the next planned effort. This would be an incremental lifecycle.

If experience is lacking, you might suggest an iterative approach. The goal doesn't change, you set out to visit all the islands at once, but generate a plan that self modifies based on lessons learned at each port of call. This is not the same as incremental since you are continuing while merely revising your course. This is not adaptive, since the goal is clear and the objectives are defined and clearly achievable and planned more fully in advance.

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The PMI-PBA content and exam place less emphasis on incremental or iterative projects, tending to focus on the two vastly different approaches: predictive versus adaptive/Agile. When in doubt, iterative or incremental are means to address a predictive approach and the decision may be left to the PM and team once requirements and constraints are better understood.

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Just-in-Time - The BA seeks the most efficient and effective product or solution to address a need or correct a problem. A simple process correction, recommendation to purchase a COTS product, or quickly achieved deliverable may not require a formal business case or initiate a project. A just-in-time life cycle suggests a short term effort or project that delivers the solution or product in one pass. This project life is called Just-in-Time. The recommendation for a just-in-time solution does not require the BA to perform business analysis planning, elicitation and analysis, or traceability, and may only require minimal evaluation following solution delivery to confirm value.

Adaptive Projects

Adaptive projects have a goal, although the objectives may be less well defined. Requirements are created by a product owner, business SMEs, and potential solution consumers as independent statements. The requirements are tracked, although seldom **formally** integrated or traced.

Key drivers behind an adaptive project life cycle are: the need to start as soon as possible, the changing or volatile nature of the requirements, the learning necessary or desired through the process, the ability or potential to use small development teams, and the ability to complete work in smaller deliverables. Not all of these requirements need to be present, although most may need to be for specific forms of adaptive projects.

As an example: Your sponsor wants you to prepare your vessel for a trip down the Mississippi river to buy and sell goods for a profit. You will be navigating from community to community exchanging trade goods. You are reliant on changing river channels and surges, must avoid the ever shifting sandbars, and other than your starting merchandise do not know what goods or services might be desired or available as you intermittently stop along the shores. The vessel has a small crew and will determine where to stop each day based on opportunity and the

goods on hand at the time. The captain runs the ship, while you maintain an inventory of the goods, historical charts, and daily navigation meetings. You are also prepared to communicate with the citizens at each of your stops, sending messages ahead to potential customers and back to your sponsor as the journey progresses. This is an adaptive lifecycle.

Agile methodologies are an example of adaptive projects.

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<i>Agile Approaches</i>	
<i>Agile - Culture based</i>	<i>values and practices</i>
<i>Scrum & Sprint</i>	<i>frameworks</i>
<i>Backlog - User Stories</i>	<i>tasks, grooming</i>
<i>Lean - Kanban</i>	<i>limits work permitted</i>
<i>Extreme programming (XP)</i>	<i>pair programming</i>
<i>Time boxes</i>	<i>strict time control per</i>
<i>activity</i>	
<i>Pig & Chicken</i>	<i>commit & contribute</i>
<i>Merciless refactoring</i>	<i>rewrite to remove</i>
<i>redundancy</i>	
<i>Pirate Metrics</i>	<i>AARRR!</i>
<i>"Acquisition, Activation, Retention, Referral, Revenue"</i>	
<i>Test driven development</i>	<i>requirements as</i>
<i>test cases</i>	
<i>Planning Game</i>	<i>sprint and release only</i>

There are several Agile methodologies, sharing some terminology and specifics in common. Despite unique environments, characteristics, and terms there are common elements to Agile. Once you understand the basic concepts, differentiation is a relatively simple task.

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The most common Agile methodologies are Scrum (and Sprint), Lean-Kanban, and Extreme Programming. Although unique in their approach, the associated concepts are applied as an aggregate on the PMI-PBA exam. Recognizing specific terms as indicators of an Adaptive/Agile approach signals the associated Business Analysis approach, BA work deliverables, and also eliminates exam answers associated with predictive project life cycles.

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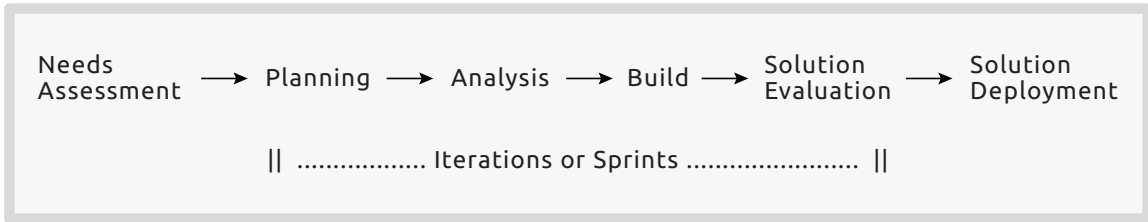
Although Lean is an Agile methodology, the focus of Lean methods is to minimize or eliminate waste. Remember this for the PMI-PBA exam.

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The business analysis cycle remains nearly the same regardless of the project life cycle. The predictive life-cycle incorporates, and usually mandates a more formal and specifically sequential BA work result. Documentation is formal and comprehensive, and the requirements Traceability Matrix is a cornerstone. The adaptive/Agile life-cycle process is informal, and limits the tools used by the business analysis. Agile methodologies also swap the deployment and evaluation process domains, performing less formal testing before solution deployment.

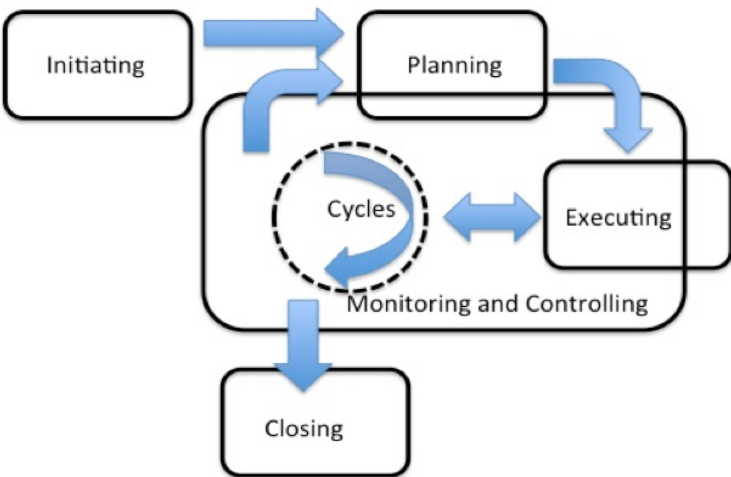


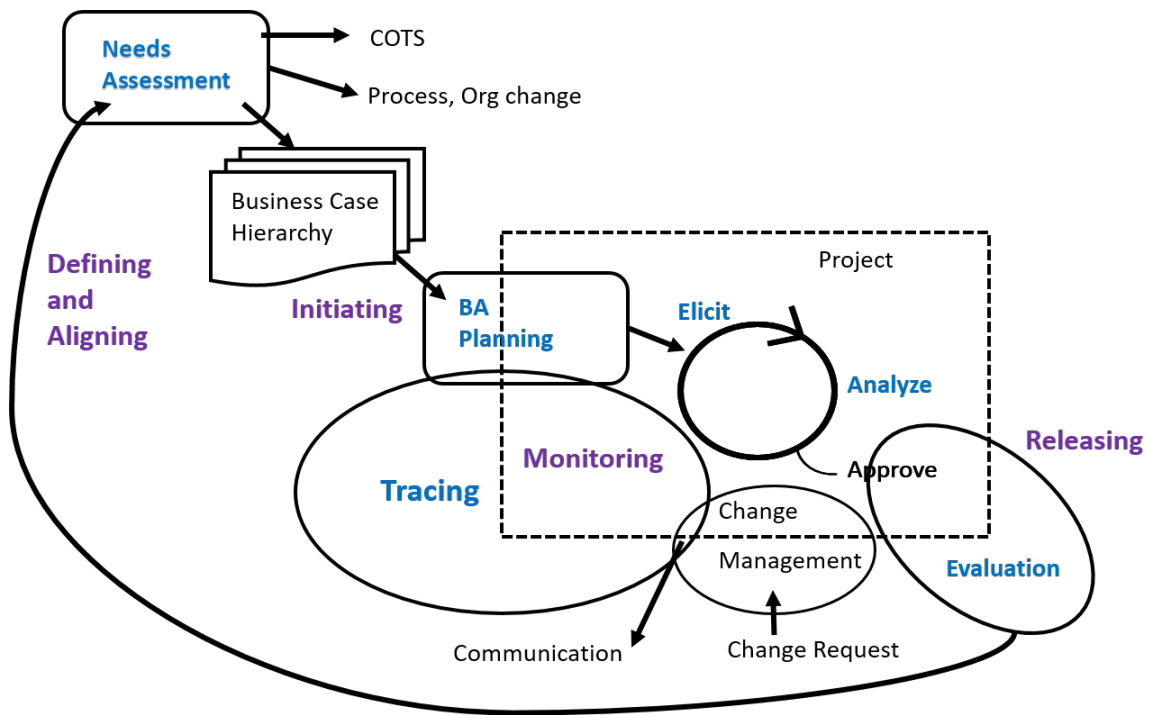
The preceding graphic identifies the business analysis sequence as it might occur in an adaptive or Agile project life cycle. Note that the iterations or sprints occur during the same project cycle sequence as a predictive project, with the exception that solution evaluation is performed iteratively and released as components of the overall solution.

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The bulk of the tools and techniques presented within the PMBOK® Guide first through fifth editions evolved from predictive life cycle methodologies within the construction and Information Technology sectors. The tools used within adaptive projects are identical, although cycle differently. Familiarity with the project life cycles and tools presented in the PMBOK® Guide enables rapid recognition of tools available to affect successful projects.

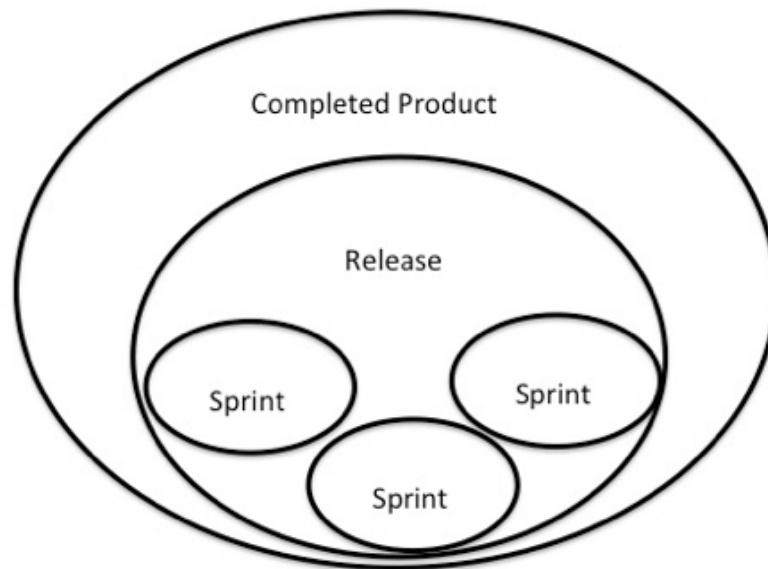




Model for Integrated Business Analysis and Project Management Flow
Created by SM Fullmer 2017, 2019

Agile technologies have evolved their own terminology. Applied terminology within the realm of business analysis will help to identify Agile projects and the business analysis approach to planning and sequencing BA work.

Basic Agile terminology and concepts



Each iteration or project cycle is referred to as a Sprint. Each sprint creates a feature or set of features requested by the product owner, business SME's, or potential customers. A ***Sprint*** means 'built together' in an Agile project. A ***Release*** refers to a set of features 'implemented together', although not necessarily delivered during a single cycle. An Agile project is considered "Iterative to Completion"; in other words sprints roll into releases which continue to be delivered until all needed features are present and the product is considered complete.

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Make sure that you understand the layered approach to Agile methodologies.

Other ways to state the relationship include:

- ***Multiple releases, each with multiple-iterations, the latter being called sprints.***
- ***Three different measurement baselines: sprint, release, project.***

Requirements for Agile projects are gathered as ***User Stories***. A good user story must meet several characteristics. Each user story is composed of three elements – a ROLE associated with a FUNCTION identified by its BENEFIT. The proper user story is stated Role > Function > Benefit. For instance:

“The END USER needs to be able to PLACE AN ONLINE ORDER to REDUCE DATA ENTRY OVERHEAD.”

One of the primary purposes to have domain SMEs create User Stories is to generate ownership or customer buy-in. ultimately there is one ***Product Owner*** identified for the project. The characteristics of a good User Story match the mnemonic INVEST:

- **I** independent
- **N** negotiable
- **V** Valuable
- **E** Estimable
- **S** Small
- **T** Testable

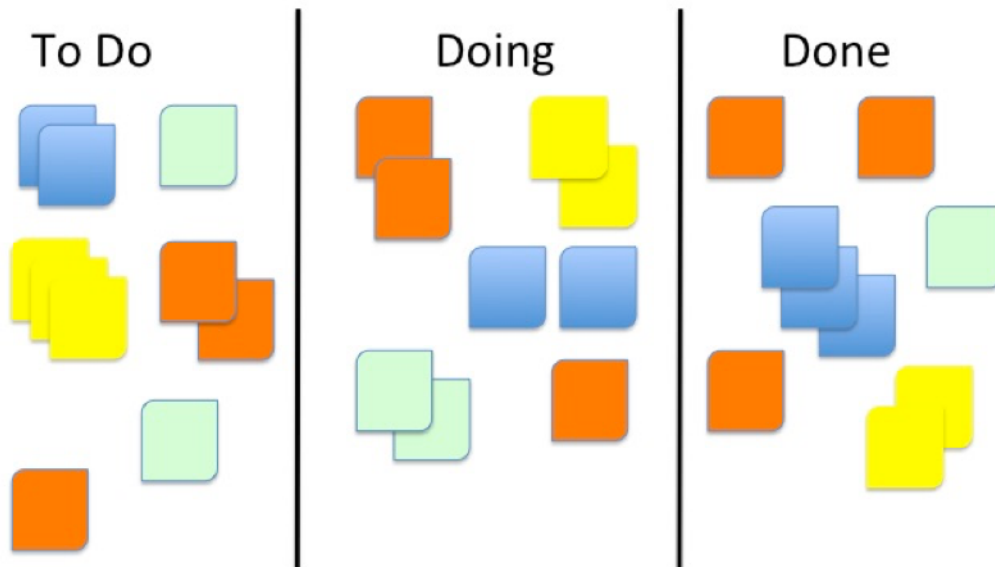
A collection of User Stories that together identify a release or the product as a whole is referred to as an ***EPIC***. The term Epic is not quite the same as a ***Product Backlog***, another Agile term. A Product Backlog might also be associated with predictive projects and use cases; the concept is associated with features. A

product backlog identifies features yet to be developed. Backlogs are used for prioritization, traceability, and test case identification.

Other terms associated with User Stories include **Story Mapping** (more commonly called **Story Boarding** except within PMI materials). Story Mapping arranges User Stories in linear fashion relative to development or delivery. **Story Slicing** refers to the approach of breaking down feature sets called **Epics** into their subcomponents of smaller features that are then identified in User Stories. Don't confuse Story Slicing with the Work Breakdown Structure. Although both apply the concept of decomposition, they are associated with different Project life-style approaches.

One specific form of Agile uses a Kanban Board. Kanban Boards are a form of work or workflow diagram, usually implemented with Post-it notes on a whiteboard to organize user stories, communicate status and progress, or generate a visual backlog. Although Kanban is a specific Lean based methodology, the PMI-PBA exam does not differentiate between alternate Agile approaches.

Kanban Board



Another unique attribute of Agile processes is the use of Daily **Standup Meetings**. A standup meeting is used solely for **Status**. Together the Standup Meeting and a Kanban Board replace the functionality associated with a Requirements Traceability Matrix discussed in significant detail later in this course. Standup meetings identify issues discovered during the sprint. They can be used to address minor technical issues and progress efforts associated with feature completion and incorporation. While Standup Meetings and Kanban are informal, the Product Owner must **Formally Sign Off** the work prior to each Release.

Testing is also associated with each of the Agile baselines rather than prior to formal closure as would be expected in a predictive project. Tests or evaluation are conducted per user story (sprint level), test cases (release level), or Day-in-the-Life (DITL) product performance.

At major milestones in an Agile project, a **Retrospective** meeting is held to discuss issues and priorities. Topics include features that could not be developed, development and technical challenges, and additional User Stories provided as the project progresses. New user stories are added to the backlog. The documentation resulting from such meetings is also called a **Retrospective**. Retrospectives replace the Lessons Learned that are typically captured during a predictive project life-cycle. Retrospectives occur far more often and informally than lessons learned, based on the nature of the life-cycle characteristics.

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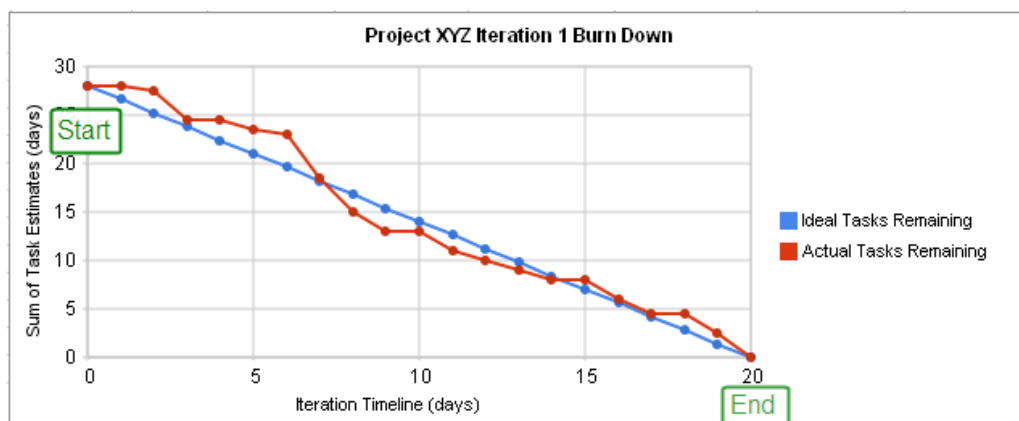


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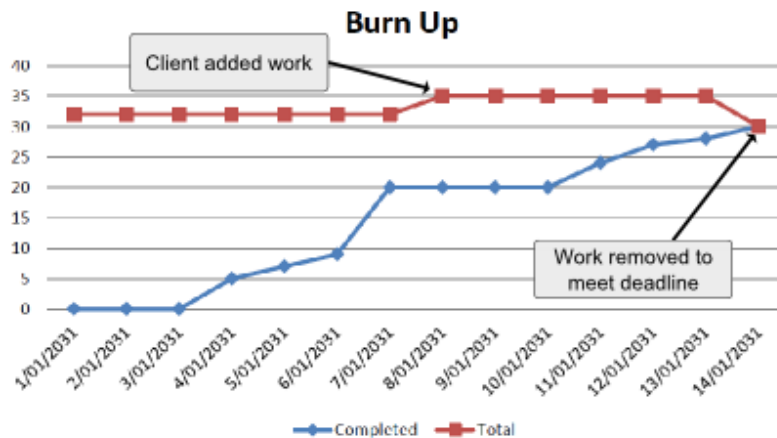
Terms like Product Owner, User Story, INVEST, Epic, Retrospective, Kanban, StandUp or descriptions of these terms are solid clues that an exam question is about Agile methodology and suggest an Agile or Adaptive answer. Make certain that you learn what each of the letters associated with INVEST signify, as well as synonyms (words with the same meaning).

Burndown and Burnup Charts

The process of reducing the backlog toward a completed release is called Burndown, and the speed at which User Stories are completed is called the **Burndown rate**.



Since very few Agile projects have a clear and complete set of User Stories before work begins, the users will add User Stories to the **Backlog**. If the effort is **Timeboxed**, then some amount of work will not be completed before release.



The Burn Up chart is based on the rate of work being completed as a predictor of the point at which any remaining User Stories will have to be omitted from a given release or Product package.

Scaled Agile

Due to the movement promoting Agile implementation, scaled and hybrid approaches continue to evolve.

Perhaps the most currently popular is the Scaled Agile Framework (SAFe. - <http://www.scaledagileframework.com/>). SAFe is a large scale, enterprise solution that requires the equivalent of a PMO to manage training, backlogs, project integration, communication, and to some degree to guide User Solution assignment rather than selection by teams. SAFe lends itself to the concept of a Product Roadmap, where solutions evolve as a series of feature cycles to affect a longer term vision and strategy.

Large Scale Scrum (LeSS - <https://less.works/>) has been evolving since 2005. The approach uses a common backlog for multiple teams, requires a dedicated integrator, and multiple dedicated non-developer teams to oversee and support different process elements. LeSS lends itself to a multi-feature product, though tends to fail when applied to a longer term Product Roadmap. LeSS tends to integrate work results without an over-arching product strategy.

Discipline Agile (DaD - <http://www.disciplinedagiledelivery.com/>) relies on a tightly disciplined Agile framework, with specialists who revolve amongst teams just to resolve issues, and tightly controlled input/output queues.

Nexus (<https://www.agilest.org/scaled-agile/nexus-framework/>) is a Scrum exoskeleton that allows 2-9 teams to work together on a common backlog.

XP cannot scale. It is powerful for local optimization but delivers inconsistent results.

Feature Injection

Feature injection changes how an Adaptive/Agile team selects the User Stories to be implemented from one associated with knowledge, skills, and team experience toward one where the team selects their work based on the value of the features to be developed. Feature injection is effectively a framework that alters the original intent of the Agile Manifesto to affect solutions that provide the most immediate return of value (think shortest Pay Back Period). This approach forces the team to become experts at identifying requirement value through analysis of user stories, and effort that is conducted by Business Analysts working with stakeholders to identify requirement value and priority in predictive and other project approaches.

Feature injection requires a three step process:

1. Determine Business Value
2. Inject Features
3. Spot examples

An Agile Team using Feature Injection works backward from the intended goal toward the features that most quickly provide value to the goal, even if the integration of features may cause more rework in the long run. Feature Injection might be incorrectly labeled as an integrated effort, though it is not, since the team determines the value of the features they choose to provide.

Work Products

Work Product is a term used by BA's for the output of their work and may not always (or as a complete set) be delivered to stakeholders. The work products may be formal or informal. All of the work products must all be represented in the time and cost estimates provided to a PM when the BA is working on a project team. The major Work Products provided by a BA are the business case, business analysis plan, BA communication management plan, BA metrics, and the requirements Traceability Matrix. There are many other documents that may be created by a BA that are also considered work products; though important they are of lesser importance than the prior list. Examples include the project charter, stakeholder register, test and transition plans, lessons learned and retrospectives each of which could be prepared by different SME's.

Business Case

Business Cases are HIGH LEVEL justification documents that lack the details necessary for implementation. As you refine the details in the business case through requirements, you move toward functionality. The purpose of the business case is to demonstrate the feasibility, viability, and value of acquiring a solution or initiating a project. The requirements are usually developed after business case approval jointly with the PM.



The BA should apply the following skills toward creation of a business case: creative thinking, decision making, learning, knowledge of business principles and purpose. Industry Knowledge and Subject Matter Expertise are not needed to create a business case. The BA can learn the vocabulary necessary to present the business case. From a prioritization perspective, feasibility, time, cost, and alignment with the business problem/need come before quality considerations.

Business Analysis Plan

The business analysis plan identifies all the formal and informal deliverables to be created by the BA. An entire module in this course is dedicated to the development of an appropriate business analysis plan.

SKILLS:



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Key elements affecting the development of a business analysis plan include: type of project (lifecycle), stakeholder locations (for elicitation and communication planning), and BA deliverables (as required of the sponsor, PM, and customer).

BA Metrics

All business analysis can be measured. Measurement suggests metrics. BA metrics are the standards against which BA work is measured and determine the value of the contribution made by the BA. Remember that the goal of business analysis is to provide value, and a positive return on investment. A BA must keep this in mind when planning and conducting work. According to the tale of Goldilocks and the Three Bears, a Business Analyst needs to get it 'just right'.

SKILLS:



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BA metrics should be quantitative and include hours worked, documents created, deliverables schedule met.

Requirements Traceability Matrix

The Requirements Traceability Matrix, often merely referred to as the ***Traceability Matrix***, is the primary tool created and used by the BA during Tracing and Monitoring. Projects and the project planning use Requirements traceability with somewhat lesser detail and application when a BA is not present on a project.

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A Traceability Matrix is considered the BA's primary contribution during a project. The details, accuracy, and integration of the Traceability Matrix guide development, testing, confirmation and acceptance of the Solution.

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The following requirements relationships must be present in a Traceability Matrix to affect the correct product or solution. The requirements must be traceable to:

- ***other requirements***
- ***product goals/value***
- ***testability (verification)***
- ***acceptance (validation)***

PM and BA – compare and contrast

- Roles overlap: Captain and Navigator
 - Monitor versus control
- Knowledge area overlap

- Techniques overlap: Stakeholder relationship management
- Communication
- Scope (product vs project)
- Requirements overlap
- Verify and validate

Should a project be initiated as the result of business analysis work, the roles of the BA and PM overlap and must be carefully defined. The effort becomes a partnership, with the PM assuming the role of Captain and the BA serving as Navigator. Both are officers and are critical to mission success. To avoid the issue of conflict, both must achieve consensus relative to perspective and design of not only the project but also their relative efforts.

SKILLS:



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Planning is the first aspect of a project conducted jointly by the BA and the PM. PMI suggests the following accountabilities, responsibilities, and approvals relative to BA Work Products:

- ***Plan ownership: Business Analysis Plan (BA), Requirements Management plan (BA & PM), Communication Management plan (BA & PM)***
- ***Plan creation: Business Analysis Plan (BA/PM/Team) – to achieve understanding***
- ***Plan Review: PM, Sponsor, Key stakeholders – to achieve verification***
- ***Plan Approval: PM, BA, Sponsor – formal acceptance/validation***

Starting prior to project Initiation, the BA has begun to identify and classify stakeholders. Stakeholder communication, and more importantly stakeholder understanding is an essential business analysis skill. The PM owns the work and therefore the relationships with the stakeholders who contribute to the project directly (team, vendors, etc.). This is the perspective that affords the PM

ownership of the RACI table/diagram. The BA helps to develop and monitor the larger stakeholder environment.

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It bears repeating that the BA may create sub-ordinate RACI tables/diagrams for the sub-team(s) responsible for the work to which they will be held accountable. Examples include other business analysts, facilitators, external experts and vendors with whom the BA consults or who provide deliverables to the project.

The project manager holds sole Accountability for the Project Management plan. The BA is a key contributor and may be delegated accountability for the Requirements Management Plan, Communication Management Plan, and Stakeholder Relationship Management Plan.

In addition to eliciting requirements, and analyzing their validity, the BA maintains Stakeholder relationships to prevent both product and project Scope Creep. Stakeholder concerns ultimately create the Assumptions & Constraints for the Project, which in turn create the Boundaries that are the scope of the project.

..... SKILLS: ANCHOR

A requirement is verified when the customer confirms the description of the need and the solution statement associated with the need.

A **requirement** is **validated** when the customer approves inclusion of the work within the scope of the project.

A **product component** is **verified** when the PM/BA/Team confirm that the planned work meets the plan and the design.

A **project** is **validated** when/after the customer formally accepts a component of the project (administrative closure) or the final product (final administrative closure).

A **product/solution** is **validated** after project closure as the BA confirms that the result produces the predicted and desired value.

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The PM is accountable for Project Scope. The BA is accountable for Solution or Product Scope. The final output of the project must meet the measurements as suggested by the Business Case and the Charter, changing only to affect the desire value for the customer.

Relative to Execution, the PM manages ALL of the work of the project. The PM also controls the project. The role of the BA is perhaps highest relative to monitoring. The Traceability Matrix, verification of phase/product completion, and ultimately acceptance passing toward closure are affected by the skills and techniques employed by the BA.

The PMI-PBA exam requirements and process

PMI offers a range of credentials within the field of Project Management and associated skillsets. All of the credentials are based upon the current version of the Project Management Body of Knowledge (PMBOK®). The PMBOK® 6th Edition was published during 4Q 2017. Only the CAPM® credential relies solely on content from within the PMBOK®. All other credentials utilize additional sources, including but not limited to the practice or standards guide published by PMI relative to the credential.



PMI Certifications

- CAPM® Certified Associate in Project Management (CAPM)®
- PMP® Project Management Professional (PMP)®
- PgMP® Program Management Professional (PgMP)®
- PfMP® Portfolio Management Professional (PfMP)®
- PMI-PBA® PMI Professional in Business Analysis (PMI-PBA)®
- PMI-ACP® PMI Agile Certified Practitioner (PMI-ACP)®
- PMI-RMP® PMI Risk Management Professional (PMI-RMP)®
- PMI-SP® PMI Scheduling Professional (PMI-SP)®

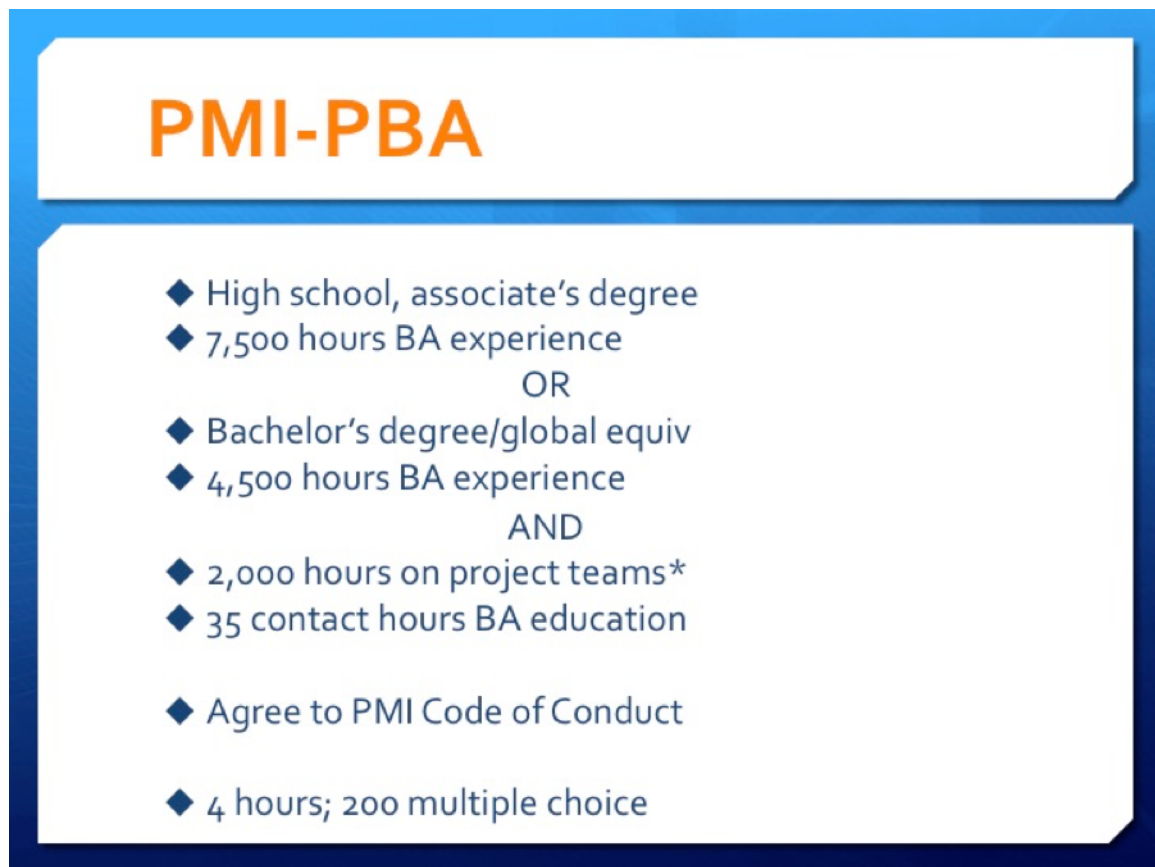
The PMI-PBA credential is also based upon ***Business Analysis for Practitioners: A Practice Guide***, and heavily influenced by ***The PMI Guide to Business Analysis***, although the latter guide was published late in 2017 after the framework for the exam was published.

Prior to application and review for the PMI-PBA exam, potential candidates should proceed to PMI's online portal: <http://www.pmi.org/>

Select Certifications and the specific overview for the PMI-PBA credential:

- <http://www.pmi.org/certifications/types/business-analysis-pba>

Be sure to download and review the ***PMI Professional in Business Analysis (PMI-PBA) Handbook*** that describes the application, examination, and related policies and procedures in detail. You will also need the ***PMI Professional in Business Analysis (PMI-PBA) Examination Content Outline*** for a detailed list of the domains and the related tasks covered on the examination. This course is based upon the latter reference guide relative to examination references and suggestions.



PMI-PBA

- ◆ High school, associate's degree
- ◆ 7,500 hours BA experience
- OR
- ◆ Bachelor's degree/global equiv
- ◆ 4,500 hours BA experience
- AND
- ◆ 2,000 hours on project teams*
- ◆ 35 contact hours BA education
- ◆ Agree to PMI Code of Conduct
- ◆ 4 hours; 200 multiple choice

To qualify for the examination, you must have either a high school diploma or associate's degree and 7,500 hour of business experience, or a bachelor's degree

(or the global equivalent) and 4,500 hour of verifiable business analysis experience. You ALSO need at least 2,000 hours of exposure/experience to project management tools and techniques through participation in documented projects. Similar to application for other PMI credentials, you may not overlap efforts in order to report hours in excess of 8 per day/40 per week/2000 per year. Hence it will likely require you to review your business analysis and project related efforts going back at least 3 ½ years. You can go back as far as 8 years for your experience. 2,000 hours of the business analysis work can be coexistent with the 2,000 of project management work IF you can show that the business analysis work was performed as a component of the project time reported. Existing PMP® credential holders are given credit for the 2,000 project hours, though you still need to show a total of 4,500 business analysis hours.

You also need to have 35 hours of formal contact training in business analysis. In other words, either within a classroom or via live/remote instruction. The training may be taken in segments or as a single class. This course will provide you the needed 35 hours if attended in an instructor led local or virtual classroom.

Once you have completed the application and it has been accepted, you will be notified that you may pay for the exam and receive a testing voucher. Costs vary for PMI versus non-PMI member, and per country. The current \$US cost for PMI members in good standing is \$405, and for non-PMI members the \$US cost is \$555. The application allows you to attempt certification three times before you would need to wait 12 months and re-apply. Examination re-test fees will apply.

It is best to refer to the current PMI-PBA handbook for actual requirements, details, and process.

The Examination Content Outline provides task descriptions and currently includes a 40 item list of knowledge and skills with which the candidate must be familiar. The content is separated by five domains, according to the ***Business Analysis for Practitioners: A Practice Guide***. Each of the five domains is

separated into tasks for examination purposes, and you will certainly be exposed to content representing each of the tasks within each domain on the exam.

The emphasis for each of the tasks reflects the content within the ***Business Analysis For Practitioners: A Practice Guide***, though places different emphasis on achieving the work of business analysis using current best practices desired by employers and project managers seeking great business analysts for their teams. As is typical across PMI standards, the team generating the standards documentation and the team overseeing examination content and process remain independent. This enables the teams to accommodate new ideas and best practices within the business analysis field, and to affect quality metrics relative to the examination process. PMI maintains an ISO 9000 (quality standards) certification relative to credential processes. You will encounter validation questions representing potential new content on the exam. These questions will not count against your passing score, although you should answer every question on the exam since the validation questions are not uniquely identified.

The tools and techniques utilized by business analysts can and most often do span multiple domains. Unlike the Project Management Professional and Certified Associate in Project Management credentials, the PMI-PBA exam is less rigorous about isolating tools to specific domains or task groupings.

The framework for business analysis tool selection is more heavily influenced by project lifecycle and the sequence of efforts conducted. Evaluation tools, although presented in the fifth (last) domain might be used to help identify or clarify a need or determine root cause for a problem that leads to the development of a business case or specific solution recommendation. Business analysis work tends to be cyclic, unlike project management work that has a clearly defined end. As such, you most often find yourself asked questions about the most appropriate tool given a specific scenario rather than an absolute time line.

The exam is strictly timed and allows 4 hours to answer 200 questions.

The approximate distribution of examination questions across the Six Business Analysis Domains as presented in the Examination Content Outline follows.

Domain	Percentage of Items on Test
Domain 1. Needs Assessment	18%
Domain 2. Planning	22%
Domain 3. Analysis	35%
Domain 4. Traceability and Monitoring	15%
Domain 5. Evaluation	10%

SKILLS:



COMPASS

Learn to prepare for the exam by considering the Business Analyst's point of view. Examples include:

- ***Once you have delivered the business case and created a Business Analysis plan, always assume you are doing your work correctly as a qualified business analyst.***
- ***Remember that Scope means boundary, and that the Solution boundary vs Scope Boundary vs All Boundaries have different meanings***
- ***BA work is on the critical path of the project because much other work depends upon it.***
- ***A Business Analyst should learn EVERYTHING and pick one of each tool category to provide a quality solution.***
- ***Creating a Glossary of Terms (for the business, the business case, or other documents) enhances communication and should precede document creation unless eliminated for cost/value considerations.***



Read every word of the question. Key words can make a significant difference when selecting the best answer.

Module 1 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) How would you differentiate between a goal and an objective?
 - a) A goal is measurable.
 - b) An objective is specific, measureable and shorter term than a goal.
 - c) Goals and objectives are different words with the same meaning.
 - d) Only goals address strategic needs.

- 2) SMART stands for:
 - a) Specific, Manageable, Attainable, Relevant and Timely.
 - b) Specific, Measureable, Achievable, Realistic, and Timely.
 - c) Specific, Measureable, Achievable, Relevant, and Time-bounded.
 - d) Significant, Measurable, Achievable, Realistic, and Time-bounded.

- 3) Which of the following is an example of a SMART Objective?
- a) Create a map that will allow us to return to ports of call.
 - b) Decrease voyage transit times by 10% in order to diminish the spoilage of perishable goods.
 - c) Identify possible trading partners during a two year voyage.
 - d) Accurately mark harbor entry and anchorage depths at each stop.
- 4) A business analyst measures success by assuring that:
- a) Customer expectations are exceeded.
 - b) All of the requirements are met.
 - c) The solution provides value.
 - d) All customer suggestions are considered.
- 5) Why is the term COTS important?
- a) Business analysts often work long hours.
 - b) Business analysts may recommend a solution that can be purchased without the need for a formal project.
 - c) COTS is component of the ROI analysis process.
 - d) The product life cycle extends beyond the project life cycle.
- 6) Which is not an output of Needs Analysis?
- a) A business case
 - b) A COTS recommendation.
 - c) Models or diagrams that identify the need.
 - d) A project.

- 7) Who is accountable for overseeing the work of the project?
- a) The project manager and the business analyst partner to oversee the work.
 - b) The PM is accountable for the work of the project.
 - c) The BA is accountable for the work of the project.
 - d) The PM, the BA, and the team oversee the work of the project.
- 8) Which concept most accurately reflects a completed Scope?
- a) All of the work is defined.
 - b) The boundaries of the work are defined.
 - c) The work is linked to time and cost.
 - d) Work has been identified for all of the objectives.
- 9) Which of the following statements is most correct?
- a) The Business Analysis Plan is subsidiary to the Project Management Plan.
 - b) The Business Analyst follows the Business Analysis Plan, unless the Project Management Plan provides higher guidance.
 - c) The Business Analyst owns the Communication Management Plan.
 - d) The Business Analyst always creates the Communication Management Plan for the PM.
- 10) Which statement is most relevant to a business analyst?
- a) The work of the project must be completed as planned.
 - b) The quality of the work requires proper metrics.
 - c) The value of the product overshadows the work effort.
 - d) The project life cycle affects the nature of the Business Analysis deliverables.

- 11) Another term for a business problem or opportunity is:
- a) Threat
 - b) Need
 - c) Value
 - d) Objective
- 12) The solution scope defines:
- a) The work of the project.
 - b) The requirement boundaries.
 - c) The ROI.
 - d) The decomposed goals and objectives.
- 13) Business Analysts conduct their work
- a) On projects.
 - b) Before, during, and after projects.
 - c) To identify projects and oversee the goals.
 - d) At the discretion of the Project Manager.
- 14) Who is more likely to select the Project Life cycle?
- a) The project manager
 - b) The business analyst
 - c) The PMO establishes the guidelines
 - d) Business preference, standards, or environmental factors.
- 15) Predictive Project Life Cycles are most likely due to:
- a) Complexity
 - b) Risk
 - c) Total duration
 - d) Policy

- 16) For a simple process change or solution to solve a singular problem the most likely project life cycle is:
- a) Adaptive
 - b) Incremental
 - c) Just-in-Time
 - d) Predictive
- 17) Which of the following is not a characteristic of Adaptive projects?
- a) Objectives are less well defined.
 - b) Work is time or resource bounded.
 - c) The requirements are formally traced.
 - d) There is a need to start as soon as possible.
- 18) What is the guidance for Lean processes?
- a) Any Agile methodology
 - b) Minimize waste
 - c) Continuous improvement
 - d) Limit resources
- 19) Although business analysis tools may be applied in any order suggested by the need, which most closely represents the business analysis cycle:
- a) Planning – Assessment – Analysis – Build – Evaluation
 - b) Assessment – Planning – Elicitation – Analysis – Tracking
 - c) Assessment – Elicitation – Analysis – Evaluate – Build
 - d) Elicitation – Analysis – Tracking – Deployment – Evaluation

- 20) Which of the following is not a clear indicator of Agile project life cycles?
- a) Product Owner
 - b) Sprint
 - c) Iteration
 - d) Backlog
- 21) What does the Acronym INVEST stand for?
- a) Iterative, Needed, Valued, Evaluated, Simple, True
 - b) Independent, Negotiable, Valuable, Estimable, Small, Testable
 - c) Independent, Negotiable, Valid, Estimable, Specific, Testable
 - d) Iterative, Negotiable, Valuable, Estimable, Small, True
- 22) A collection of Agile User Stories is called:
- a) A backlog
 - b) An epic
 - c) A standup
 - d) A retrospective
- 23) Which is the least important characteristic used to prioritize a solution in a Business Case?
- a) Feasibility
 - b) Time/cost/scope
 - c) Quality
 - d) Need

- 24) Which of the following is the least important Business Analysis work product?
- a) The Business Case
 - b) The Traceability Matrix
 - c) The Project Charter
 - d) The Business Analysis Plan
- 25) Which statement is correct regarding verification and validation?
- a) Verification is only about the product.
 - b) Verification means true, and Validation means provides value.
 - c) Verification always precedes validation.
 - d) The BA verifies and the PM validates.

Module 2 – The Six Business Analysis Domains

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

Business Analysis for Practitioners: A Practice Guide presents business analysis processes in five domains, as does the ***Examination Content Outline***.

- Needs Assessment
- Business Analysis Planning
- Requirements Elicitation and Analysis
- Traceability and Monitoring
- Solution Evaluation

The PMI Guide to Business Analysis identifies six business analysis Process Groups:

- Defining and Aligning
- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Releasing

The BA Process Groups afford alignment of business analysis activities with the five process groups used by project managers. Specifically, Initiating, Planning, Executing, and Monitoring and Controlling. The processes groups for business analysis tend to reflect the **outputs** that they commonly produce. In other words, the deliverables that they provide to varied stakeholder sets. Where business analysis outputs are project aligned, PMI elected to label the BA process groups with labels identical to the PM process groups. A professional business analyst must remember, however, that the tools of business analysis are applicable to any situation wherein they may best be applied.

The other two BA Process Groups, Defining & Aligning and Releasing suggest that aspects of business analysis work regularly precede, surround, and follow project management efforts – which indeed they do! One strong indicator of business value is **customer satisfaction**. Customer satisfaction may not be measurable at the end of a project cycle, or even until a subsequent business cycle. Reputation takes time to build, and is a key performance indicator for many service organizations where production, productivity and other quantitative measures are less effective.

The Process Group labeled Defining and Aligning includes subsets of Business Value outside the realm of projects, for instance the role of some business analysts who focus on organizational portfolio management, which is a focused form of Needs Assessment. Another example is support for Risk Analysis across product lifecycles as well as within project efforts. The role of the business analyst is to determine the risk **Impact** of business decisions that span multiple project cycles.

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SKILLS: **ANCHOR**
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Multiple projects may occur within a single product's lifecycle. The product concept typically arises during Needs Assessment as a means to address an opportunity or solve a problem. The initial product is created via a project effort. As need for the product changes due to market pressures, competition, technological advance, or other drivers; additional projects will be initiated to enhance the product and/or extend its useful life. At the end of the product's life, business analysis will help to determine or recommend the product's retirement.

Process Group Knowledge Area	Defining and Aligning	Initiating	Planning	Executing	Monitoring and Controlling	Releasing
Needs Assessment	4.1 Identify Problem/Opportunity 4.2 Assess Current State 4.3 Determine Future State 4.4 Determine Viable Options and Provide Recommendation 4.5 Facilitate Product Roadmap Development 4.6 Assemble Business Case	4.7 Support Charter Development				
Stakeholder Engagement	5.1 Identify Stakeholders		5.2 Conduct Stakeholder Analysis 5.3 Determine Stakeholder Engagement and Communication Approach 5.4 Conduct Business Analysis Planning	5.5 Prepare for Transition to Future State	5.6 Manage Stakeholder Engagement and Communication 5.7 Assess Business Analysis Performance	
Elicitation			6.1 Determine Elicitation Approach	6.2 Prepare for Elicitation 6.3 Conduct Elicitation 6.4 Confirm Elicitation Results		
Analysis			7.1 Determine Analysis Approach	7.2 Create and Analyze Models 7.3 Define and Elaborate Requirements 7.4 Define Acceptance Criteria 7.5 Verify Requirements 7.6 Validate Requirements 7.7 Prioritize Requirements and Other Product Info 7.8 Identify and Analyze Product Risks 7.9 Assess Product Design Options		
Traceability and Monitoring			8.1 Determine Traceability and Monitoring Approach	8.2 Establish Relationships and Dependencies 8.3 Select and Approve Requirements	8.4 Manage Changes to Requirements and Other Product Information	
Solution Evaluation	9.1 Evaluate Solution Performance		9.2 Determine Solution Evaluation Approach	9.3 Evaluate Acceptance Results and Address Defects		9.4 Obtain Solution Acceptance for Release

The PMI Guide to Business Analysis also sorts the tools and techniques of business analysis into 35 processes that are aggregated across six knowledge areas:

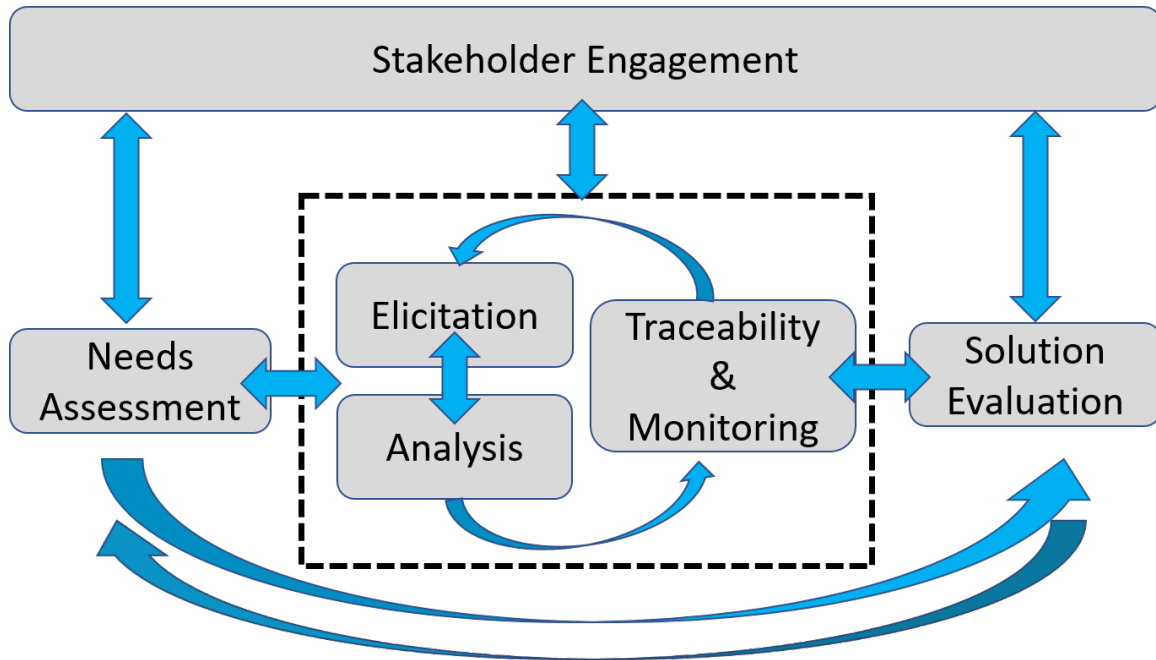
- Needs Assessment
- Stakeholder Engagement
- Elicitation
- Analysis
- Traceability and Monitoring
- Solution Evaluation

Note that the Knowledge Areas are numbered starting at 4.1. The first three sections (or knowledge areas) of ***The PMI Guide to Business Analysis*** focus on:

1. The overview and purpose of the guide and of Business Analysis in general.
2. The Business Environment, with emphasis on Enterprise Environmental Factors (EEF) and Organizational Process Assets (OPA).

3. The role of the business analyst within and external to portfolios, programs, and projects.

This course is aligned with the Business Analysis Knowledge areas, since situational deployment may be better understood within this framework.



The most significant change within ***The PMI Guide to Business Analysis*** relative to the naming of the knowledge areas is a shift in emphasis from Business Analysis Planning to Stakeholder Engagement, with the former title and tool sets now falling as a subset within the Stakeholder Engagement knowledge area.

In practice, Elicitation and Analysis are inseparable - requirements generation and clarification being the common bond. These two knowledge areas are most often separated due to the scale of the tool and technique content, although the tools significantly overlap. From a learning perspective, use of every tool applies the concept of **Tailoring**, and it is more important to understand the situational application of a tool or technique than to learn every Process Group and Knowledge Area at which its application might intersect.

Traceability lends itself to project monitoring, although tracing tools and the **Traceability Matrix** in particular are the most important tool used by Business Analysts across all six process groups.

Much like the project life cycle presented by the PMBOK® Guide, there is a logical sequence to the selection and application of the processes and tools used by BA's. Also, much like the authority of the PM to select which knowledge areas require detailed planning and effort based on the characteristics of the project, the BA has the ability to select which processes and tools are best applied to BA efforts. This is **Tailoring**.

The **Examination Content Outline** directs the BA toward the tasks to be achieved within each of five domains, while **A Practice Guide** and **The PMI Guide to Business Analysis** identify specific tools and decision points toward their selection. Both elements are melded within this course framework so that students work toward mastery of the subject both relative to exam preparation and real world application.

Tool selection and application is **Situational**. Given an appropriate framework, you can readily identify which techniques fit common situations and scenarios. As you carefully evaluate the content in **A Practice Guide**, you will start to see logical sequences arise.

..... SKILLS: ANCHOR

For instance, elicitation is the process of drawing forth information from stakeholders. Regardless of the elicitation technique applied, the common aspects of elicitation include note taking, listening, attribute capture, and tracing (tying pieces of information to one another). Documentation occurs AFTER elicitation and formats the capture of the information. The Analysis elements of Elicitation and Analysis identify the templates, models, and techniques used to capture the results as Documents. The capture can be textual or diagrammatic, formal or informal, shared or retained within the team, etc. The choice of elicitation was itself driven by the choice of project lifecycle as well as the number, location, and characteristics of the stakeholders. Each tool or process lends itself best to particular sequences. All of these elements are planned during Business Analysis Planning given information and business processes available to the BA.

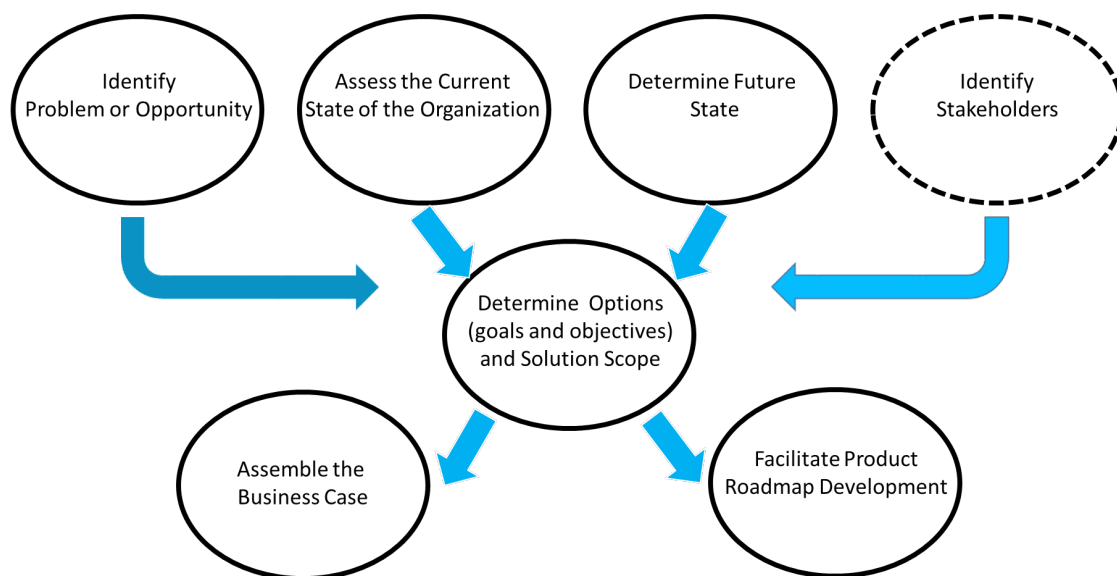
Each of the domains is further decomposed into possible processes, techniques and tools, interspersed with recommended criteria for defining or determining the business analysis approach.

..... SKILLS: COMPASS

In Project Management, decomposition is used first to create the Work Breakdown Structure that creates a graphical, hierarchical diagram of all the work necessary to complete the project. Decomposition is then used within schedule planning to decompose each work package into required activities for sequencing. For a Business Analyst, decomposition means to break a high level need, problem, opportunity, requirement (or any other element) into smaller pieces in order to aid understanding, confirm completeness, and identify potential dependencies. In this more general sense, decomposition may be used within any of the domains to refine work efforts.

Needs Assessment

- Identify the Problem or Opportunity
- Assess Current State of the Organization
- Determine the Future State
- Determine Options
- Facilitate the Product Roadmap or Assemble the Business Case



Stakeholder Analysis

Although still a requirement to affect Needs Assessment, identifying and analyzing stakeholders has become its own knowledge area. The tools are still used within Needs Assessment to affect option identification and constraints. As such the content must be introduced within the Needs Assessment module.

Needs Assessment, addressed in detail within Module Three, includes the business analysis efforts to understand the business. Factors influencing the business include the industry in which the business operates, the external regulations affecting operations, the internal standards guiding operations, the organization structure, the characteristics of the various internal and external stakeholders, economics, marketing, and management processes. Within this domain, the BA may apply business administration knowledge, project management understanding, and specific analysis tools that strategically and/or tactically assist business vision and planning. The BA is truly a navigator, helping to chart the future course of the business from short term corrections to long term goals. Skillsets include research, creativity, organization, logic, and prioritization.



The nature of which skills the BA is able to apply, and the recommendations that might be made are totally dependent upon an understanding of the business environment.

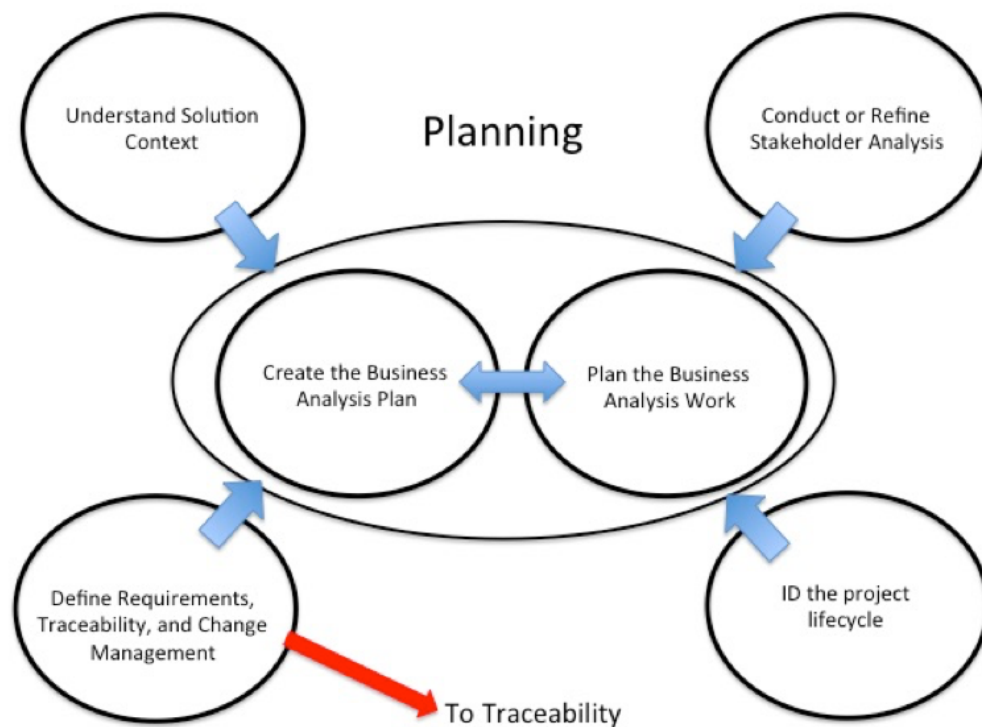
SKILLS: ANCHOR

Key points arising from Needs Analysis include:

- *Business analysis is about people, requirements, and organizing the complex*
 - *People are the most complex part of a project. You must start by understanding the people.*
- *Start with Learning, documenting the current state whenever possible.*
- *Root Cause Analysis is an ALWAYS tool for BA's. Finding the root or cause of the problem or need being addressed aids in solution development.*
- *Business Rules exist within the business and must be understood:*
 - *Rules define or constrain some form of the business and always resolves to true or false*
 - *May be written, unwritten or even informal. Documentation makes sure they do not conflict.*
 - *Business rule formats: Decision trees, Decision Tables, Rules catalogs.*
- *Regulators do not participate in needs assessment for a solution, but they do influence alternatives, and evaluation once the Solution is created.*
- *Systems thinking is about how all the processes work together. How to predict a solution's fit.*
- *SOLUTION SCOPE is created AFTER understanding organizational capability.*
- *When people ask for features out of scope, it is most likely because scope was poorly defined, or stakeholders were excluded from the identification process.*
- *The high level Project Scope should be defined in the Business Case*

BA Planning

- BA (and PM) planning
- Understand Solution Context
- Conduct/Refine Stakeholder Analysis
- Identify the Project Lifecycle
- Define requirements, traceability, and change management
- Business Analysis Planning, Defining the BA work
- Work Products



Business Analysis Planning, explored in depth within Module 4, takes the effort from an approved suggestion and determines the best approach to apply business analysis skills to affecting the Solution. The suggestion may have been an informal recommendation, a formal suggestion that does not require the resources associated with a formal project, or a formal business case that leads

to more detailed solution analysis. Within this domain, the BA refines the suggestion, better understands the stakeholders who can influence the outcome, identifies the nature of the work as being predictive or adaptive, and attempts to determine how detailed the effort may be relative to requirements definition, tracing and change management.



If a formal project is being initiated, the BA may be tasked with creating a charter. Once a charter is signed by the sponsor (or other signator), the PM and BA work together to identify BA deliverables and establish the foundation for their partnership efforts.

At this point the BA generates a Business Analysis Plan based upon their understanding of the solution and its context. The plan includes the information about the approach to be taken for requirements development, communication, distribution of accountability, and partnership (or separation of authority). Communication includes both verbal and written reports and documentation. The plan must be approved by the BA, PM, and Sponsor before funded work can begin. The BA begins the process of organizing and designing the elements of business analysis deliverables (BA Work) that will be necessary to conduct Elicitation, Analysis, Traceability and Evaluation of the Solution. This latter work includes working with the PM to identify BA Metrics as well as deliverables to the project and efforts the BA will conduct independently to confirm Solution value.

SKILLS:



ANCHOR

Key points from Business Analysis Planning that are built into the plan include:

- ***After completing your Business Analysis work, trust your application of mastered skills and report to the PM (status, completed work, issues, etc.).***
- ***The BA manages business analysis performance by tracking and comparing work efforts, process modeling, root cause analysis, and lessons learned; formal or informal documentation associated with BA Work.***
 - ***Comparing what-is with what-should be.***
 - ***All business analysis includes Business Analysis metrics, for instance hours worked.***
- ***Reporting suggests Information which suggests creating a Data Dictionary; Data Dictionaries may also be used for detailed analysis.***
- ***Always select proactive over reactive actions, and build them into the plan.***

Requirements Elicitation & Analysis

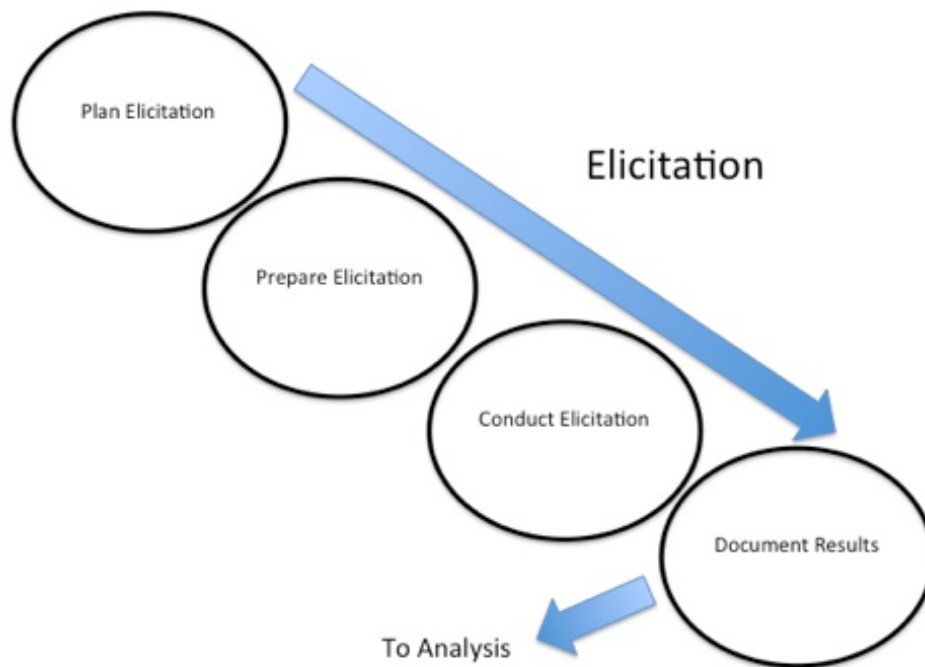
- Planning for Elicitation
- Prepare for Elicitation
- Conduct Elicitation
- Document Outputs
- Requirements Analysis
- Models
- Solution requirements
- Validating requirements
- Verify Requirements
- Obtaining Approval
- Product Risk
- Product Design

Requirements Elicitation and Analysis contains the largest selection of BA tools, offers a wide range of alternatives for each potential deliverable, and sets the tone for project efforts.

Clear requirements and scope arise out of well conducted elicitation and analysis. Without both Elicitation (the drawing forth of information) and Analysis (the organization of the results), the voyage will begin pointing in the wrong direction. These efforts set the stage for both beginning the work AND verifying work elements as they are conducted.



Although the business analyst carefully planned their work, refinement is ongoing. Just as in formal project management, Progressive Elaboration is the continual adding and refinement of details to the requirements, understanding, documentation and Value of the solution.



Through Elicitation, the BA determines how best to draw forth or gather requirements based upon the project lifecycle, the location and characteristics of the stakeholders (as well as their availability). Requirements are sorted and organized as preparation for Analysis and Traceability work.

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SKILLS:



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COMPASS

The Business Analyst will continue to return to Elicitation Tools throughout the project, and even during post deployment Evaluation. As the member of the project leadership team who most often interacts with stakeholders, you will be regularly approached with requests, questions, inputs, and new requirements. You are the Navigator who regularly wanders amongst the crew for input, and relies on unsolicited input from the crew to gain information about the environment, and unseen opportunities to add Value (like that island in the distance that has a visible waterfall). Each time you interact whether one-on-one or with small numbers of the team, you are conducting an Interview. Don't forget to share what you learn with the PM, they steer the ship!

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SKILLS:



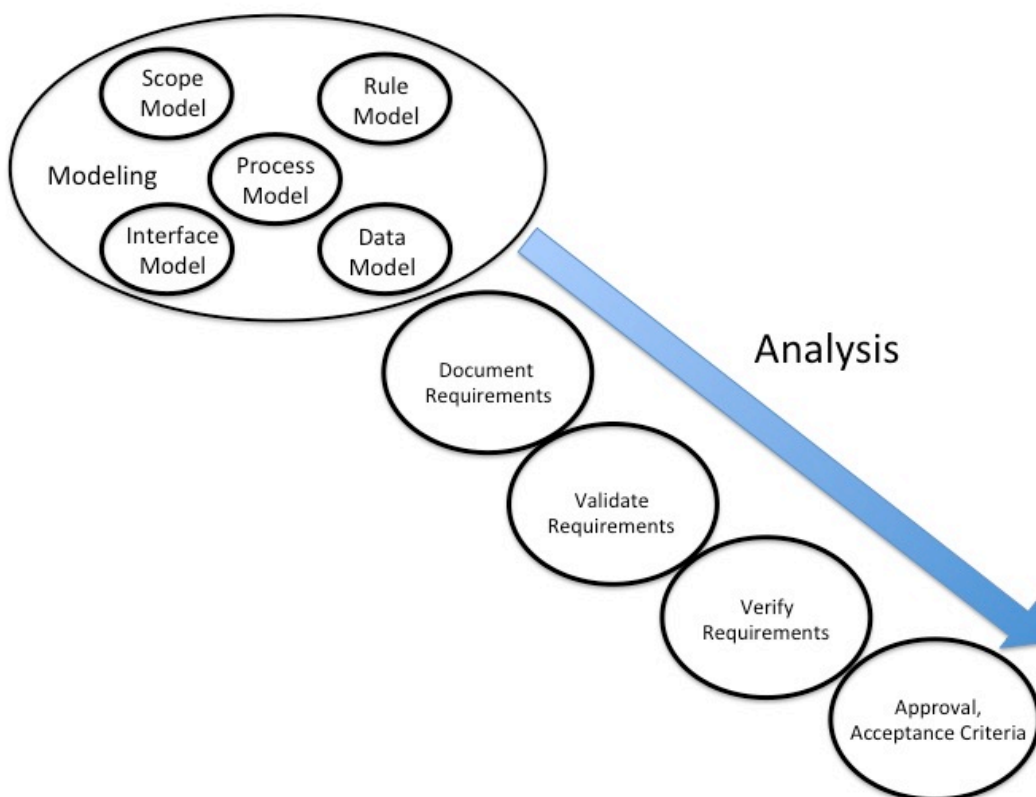
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ANCHOR

Understanding the true Needs may not occur until the first facilitation session. Although there is a logical sequence to BA efforts, the Situation prompts the use of the appropriate tool more than the activity sequence or the time frame.

SKILLS: ANCHOR

Lessons learned through Elicitation Include:

- ***Elicitation, a key function of a Business Analyst happens both Outside and Inside of a Project. You are constantly learning about and from stakeholders.***
- ***Conduct more detailed OBSERVATION and INTERVIEWS after initial elicitation and BEFORE analysis. You are always Eliciting.***
- ***From Project Management, ALWAYS co-locate the team, even if only initially. This facilitates the elicitation process and consensus, the latter being a goal of elicitation.***



All that information! The BA is an expert at organizing and presenting information in the most clear and concise manner possible. You don't want to

lose any details, though sharing them ALL will confuse and reduce the quality and Value of the Solution. The broadest, most robust, and potentially most confusing toolset used by business analysis is Modelling. The model must fit the data AND the project life cycle AND the project plan AND the audience with whom you are communicating. Models may be either textual or graphical. There is no requirement for either, just best case scenarios.

Models may become the requirements, or merely identify and clarify requirements. The goal is to Analyze and select the requirements that together create the Solution and enable the proposed Value to be recognized upon project completion. Models also help Stakeholders to recognize their needs, extending Elicitation into the Analysis effort, which is why Elicitation and Analysis are complementary.

Documentation generated following each elicitation session will be used to **Confirm** that you recorded the information accurately.

You will formally gather and document requirements, having the team, PM, key-stakeholders, and the sponsor **Approve** the requirements to initiate the work. As the BA, you will **Validate** that the requirements will resolve the problem or meet the need before conducting the work.



Requirements Elicitation and Analysis by the BA uses your understanding of the Goals and Objectives to assist with Decomposition leading to the Project Work Breakdown Structure. Consider yourself the Navigator of whom the Captain requests "what course today?" You are not individually defining or changing the plan, you are assisting to refine the plan.

As the work of the project progresses, your Analysis of the route relative to the Solution will assist the PM to Verify that **Project** Requirements are being met.

Ultimately, validation and verification of the requirements will help to identify clear metrics to identify Acceptance Criteria and Approval for the Product delivered to the customer.

Analysis tools also include a focus on development of the vision and strategy associated with Product Roadmaps. Related efforts include a better understanding of both project and product risk, as well as assessing the design (technical) requirement that will affect product delivery. It must be carefully noted that both the Risk Analysis and Technical Requirement development efforts are the within the accountability and control of the project manager, and that tools evolved for PMI-PBA presentation are evolving from this space and perspective.

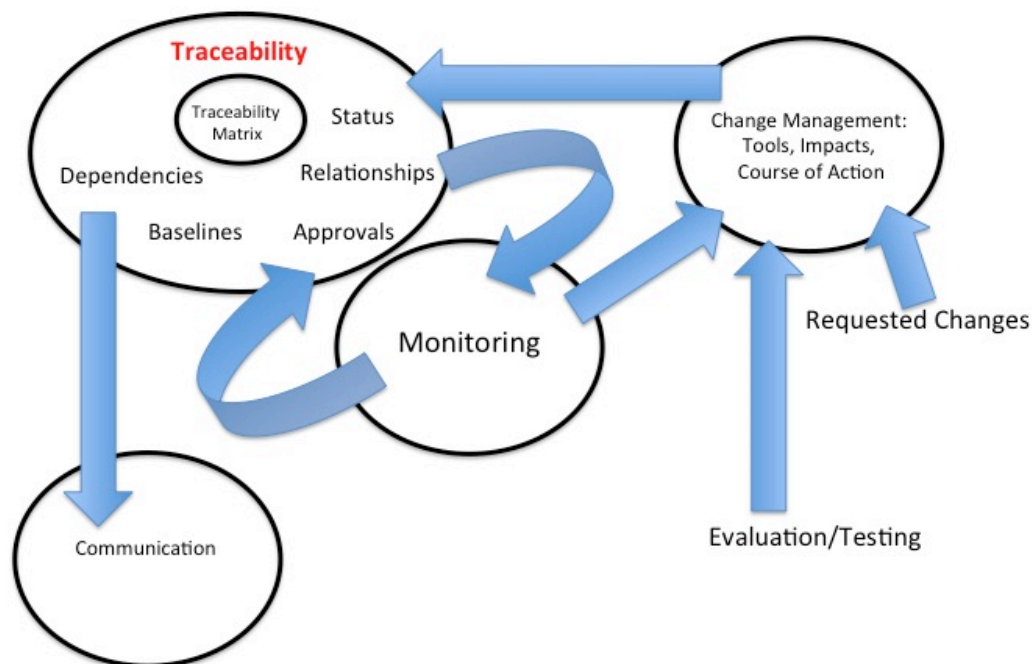


Key lessons learned from Analysis include:

- ***Models match the scenario and may be used within any domain ...***
 - ***For example: Interface Analysis is often the first tool used when the work is BETWEEN organizations (partners, regulators, vendors, etc.) and might actually be conducted during Needs Assessment or Evaluation.***
- ***Requirements may be broken into subsets for REVIEW***
 - ***Requirements provided by: sponsor, business SME, customer, suppliers***
 - ***Requirements (actually the solution generated from the requirements) are supported by: solution team, testers, operational support***
- ***Requirements in order are: confirmed > approved > validated > implemented.***
- ***Remember Validated always suggests 'Adds Value'.***
- ***The best possible stakeholder involvement is review of the requirements.***
- ***Acceptance criteria are created after a project has been authorized.***

Traceability and Monitoring

- Traceability Matrix
- Dependencies, Relationships
- Status
- Approval
- Baseline
- Monitoring
- Change Management
- Communication



Traceability and Monitoring is the day-to-day work of the business analyst. Related deliverables are addressed in Module 6. After all the analysis, planning, defining, and preparing are done and the project has been launched, you will trace the progress of the project, assist the PM to monitor the results of the work accomplished, and deal with additions, deletions, and changes as they affect the Goals/Objectives/Solution. You are also responsible for communication relative to the overall mission.

..... SKILLS: COMPASS

As the navigator, you have created a set of charts with key deliverables marking the course from initiation through arrival at your final destination. You understand the human and material resources. You are regularly checking your position relative to the sun and stars, partly by dead-reckoning, and partly with the use of a sextant, compass, landmarks, and other tools you selected for the voyage. Remember that river voyage? You need lead-lines and sounding poles to avoid the sandbars. More importantly, you are marking your position several times a day so that you are prepared to answer any question the Captain or Crew might ask about progress and success.

..... SKILLS: ANCHOR

The Requirements Traceability Matrix is the business analyst's chart. No less than a Navigator's charts and maps, you need this tool to perform your duties as a business analyst. The level of detail tracked, the timing of updates, and the frequency of reporting may vary, but this tool is essential. Although the effort associated with maintaining an accurate and up-to-date Traceability Matrix potentially generates the most work and cost associated with BA deliverables, you will create and manage one, even if unofficially. There is no better tool to help Validate (Value) the Solution as you proceed. Help the Sponsor and the BA to understand this value early during Business Analysis Planning.

Many questions on the exam will inquire as to which tool will best assure the Value of the Solution. The answer is the ***Traceability Matrix***.

(Note: for those amongst you who have attended my Project Management certification course, the Traceability Matrix is to a Business Analyst as the Triple Constraint is to the Project Manager.)

As you monitor the work, you will record status against approved baselines. The **Traceability Matrix** records relationships amongst requirements, between requirements and objectives, and identifies stakeholder roles (RACI) relative to the work. Communication flows as a result of changes to the **Traceability Matrix**, even if merely to declare “Five o’clock and all is well”.

New requirements may be revealed, new objectives and deliverables will be requested by stakeholders (the Captain, the Crew, the Sponsor, Vendors, natives, pirates, etc.), risks (both threats and opportunities) will be uncovered, and testing will reveal acceptance or the need for rework. All variance from the plan will require an **Impact** analysis before reaction, and compliance with the Project Change Management plan if preventative or correction actions are indicated.

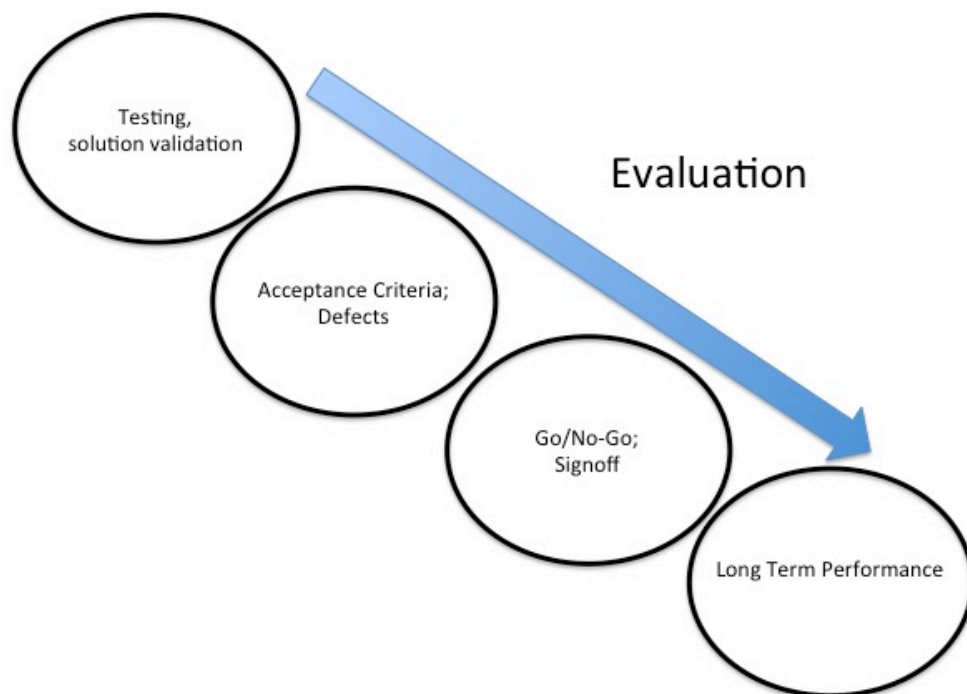


Key lessons from Monitoring, Traceability, and Change Management include:

- ***Some Tracing (traceability) is critical; at least some must be performed.***
- ***Solution performance may be evaluated 'as-is' or 'will-be'. Both of these are measurements. Requirements have multiple attributes, many of which may need to be tracked across all their states to measure success.***
- ***Confirming Quality for the Solution occurs through traceability. Although "Lean" is a quality term, it focuses on removing waste or being efficient. Traceability affirms that which is necessary versus that which does not provide Value.***
- ***Within Business Analysis, Risk Events are also called Risk Triggers, although they are distinctly different within Project Management. The key to risk for a BA is the Impact on the solution.***
- ***Seeking the source of a change (Root-cause) and determining the Impact is more important than submitting the information to a Change Control Board. The impact on the Value of the Solution must be considered before changes are suggested, let alone made.***

Solution Evaluation

- Evaluation mindset
- Planning
- Evaluation techniques
- Acceptance and Defects
- Go/No-Go
- Sign Off
- Long Term Performance



Evaluation, presented in more detail in Module 7, covers the evaluation and testing of the work, the units or components of the product, the integrated system or solution, the success of the project, and the Goal/Objective/Solution originally recommended by the analyst (with or without a Business Case).



The PM is responsible for Verification, confirmation that the work meets standards, regulations, internal/external best practices, and follows the plan. The Business Analyst is responsible for Validation, confirmation that the Solution provides the intended Value. In this regard, the BA will likely play a major role in creating the documentation or packaging for delivery of the completed result to the customer, even if the PM is accountable for making the final delivery.

Since the BA confirms Value, your input is critical to a Go/No-Go decision. You would not allow the Captain to run aground on a reef, beach on a sandbar, or moor in a harbor with poor shelter and a shallow bottom. Your knowledge of the Goal and the status/condition of the crew, work, and deliverables is critical counsel to the success of the mission.

Following mission/project completion, your knowledge and experience is also critical to documenting lessons learned, guiding retrospectives (for those Agile efforts), and analyzing the results toward potential future opportunities.

The Business Analyst may also be tasked with measuring longer term value of the deliverable. Recall that the Product Lifecycle extends beyond design and acquisition of the product. The same metrics and methods used to determine the Value of the initial Solution and effort may be used to confirm the extended value, support costs, or end-of-life for the product.

SKILLS:



ANCHOR

Key lessons learned from Evaluation include:

- ***When stakeholders complain well after deployment, you probably measured the wrong criteria.***
- ***Evaluation stems from proper Needs Assessment, Business Analysis Deliverables, Elicitation and Analysis, and Traceability. If you enter a project scenario late, consider resetting at least the Business Analysis effort to a prior domain or toolset in order to identify the best course of action to achieve a Valued Solution.***

And the cycle continues ...

Another Problem identification and resolution, another Need uncovered or requested, a new destination to consider, or a new course to plot. Now where is that treasure map?



Which Tools Should be Selected?

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SKILLS:
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COMPASS
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Although not every domain or process area across the domains will be used in each project or even each scenario, a large scale, predictive project might require one or more tools from each process listed above in a top to bottom sequential order. Within an Adaptive project, representative processes or tools will be applied, albeit in a more informal fashion. Agile methodologies have often already identified an informal (or at least less formal) means to affect business analysis deliverables. Regardless of the project life cycle or approach selected and planned, acquiring Stakeholder understanding and consensus, and acquiring formal sign-off before execution and prior to implementation are critical to achieving Solution Value. The goal is always to achieve and exceed customer expectations.

Remember the role of the business analyst is to assure Value to the organization. You may choose to use some tools only informally to gain an understanding of a situation or requirement, while others provide the structure for a Work Product formally delivered by the BA. While a 'one-of-each' approach would provide a powerful result, the time and cost expended might detract from the value delivered.

Module 2 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) Which of the following is NOT a Needs Assessment Tool?
 - a) SWOT
 - b) PEST
 - c) Force Field
 - d) COTS
- 2) What are the six business analysis knowledge areas
 - a) Initiating, Planning, Executing, Monitoring, Controlling, Closing
 - b) Assessment, Stakeholder engagement, Elicitation, Analysis, Tracing, Solution Evaluation
 - c) Initiating, Planning, Analysis, Monitoring, Transition
 - d) Predictive, Incremental, Iterative, Just-in-Time, Adaptive
- 3) Elicitation means 'to _____':
 - a) Teach
 - b) Draw forth
 - c) Facilitate
 - d) Question

- 4) Elicitation does not include:
- a) Note taking
 - b) Active Listening
 - c) Documentation
 - d) Tracing
- 5) Which of the following statements is most correct?
- a) Decomposition is applied identically by the business analyst and the project manager.
 - b) Decomposition means breaking objectives into work packages.
 - c) Decomposition may be used to generate more detail for goals, problems, opportunities, requirements, or work.
 - d) The project manager decides when decomposition is complete.
- 6) Which statement best identifies Needs Assessment?
- a) Needs Assessment precedes project management.
 - b) The work of Needs Assessment is cyclic and ongoing.
 - c) Needs Assessment ends when the Business Case is created.
 - d) Needs Assessment is only about problem, opportunity, and need identification.
- 7) The most challenging and complex component of a project is:
- a) The cost and budget
 - b) Controlling the schedule since projects are often late.
 - c) Managing the scope, changes, and scope creep.
 - d) Communicating with people.

- 8) When a problem is identified, what is the most important business analyst output?
- a) A situation statement and solution.
 - b) Clear and concise documentation.
 - c) The root cause.
 - d) The impact of the problem.
- 9) Which of the following is not a description of business rules?
- a) They always resolve to true or false.
 - b) They may be written, unwritten, or informally assumed.
 - c) They are like regulations and must be followed.
 - d) Documentation always clarifies business rules.
- 10) Which of the following is not included in a Business Case?
- a) The solution scope.
 - b) The project scope.
 - c) A justification for the need and approach.
 - d) Recommendation of a project manager.
- 11) Which of the following is most important to planning Business Analysis work?
- a) The project life cycle.
 - b) The goal, objectives and requirements management.
 - c) Stakeholder analysis
 - d) The solution context.

- 12) Business Analysis work is always:
- a) Formal
 - b) Informal
 - c) Proactive
 - d) Reactive
- 13) Progressive Elaboration is:
- a) Only conducted on projects.
 - b) Handled differently by business analysts.
 - c) Infrequent within business analysis due to detailed analysis.
 - d) An essential refinement of the requirements details.
- 14) You are at a local restaurant having lunch when a co-worker approaches and starts a casual conversation about a problem with product specifications. What should you do?
- a) Stop the conversation, business problems should not be discussed outside the workplace.
 - b) Actively listen and ask for clarification.
 - c) Ask the co-worker to write down their problem for clarity and submit it to you, promising you will review the issue.
 - d) Make a quick note about the issue and let the co-worker know you will call them later in the day.
- 15) Which of the following statements most accurately reflects interviews?
- a) Interviews always precede other forms of elicitation.
 - b) Interviews are always better than observation.
 - c) Interviews provide a better context when identifying a need.
 - d) A business analyst needs to prepare carefully for interviews to be effective.

- 16) As you gather requirements, how should you share them with approved stakeholders?
- a) In detail to demonstrate that you have captured all of the information.
 - b) In diagrams, text, or tabular form for simple review.
 - c) According to the communication management plan.
 - d) Only verified and validated requirements should be shared.
- 17) Which of the following statements best represents modeling?
- a) They are always graphical in order to provide rapid, clear understanding.
 - b) The project life cycle dictates the model to be used.
 - c) The audience determines the model to be used.
 - d) The business analyst should use a model from each category for completeness.
- 18) Requirements should be:
- a) Confirmed or verified before they are approved.
 - b) Provide value before they are approved.
 - c) Implemented once they are approved.
 - d) Validated before they are verified.
- 19) Which tool most influences a business analyst's day-to-day work?
- a) The business case.
 - b) The business analysis plan.
 - c) The Traceability Matrix.
 - d) The project management plan.

- 20) The relationship between a risk event and a risk trigger is:
- a) The risk trigger prompts the response to a risk event.
 - b) Since the business analyst focuses on impact and response, a risk event and a risk trigger mean the same.
 - c) A risk event can always be identified, but risk triggers cannot always be identified.
 - d) Risk triggers result in the analysis of a risk event.
- 21) If a problem is identified through risk monitoring, the proper course of action is:
- a) Document the problem and submit it to the Change Control Board.
 - b) Seek the source and document the impact, you may not have to submit a change request.
 - c) Respond only according to the Risk Management plan.
 - d) Notify the project manager since they own the Risk Management plan.
- 22) The best description of Product evaluation is:
- a) Validate the product before delivery to the customer.
 - b) Ask the customer if they are satisfied.
 - c) Determine that the Value of the product matches the requirements.
 - d) Long term monitoring of the ROI.
- 23) What does Go/No-Go mean?
- a) The project should not be initiated if a No-Go decision is made.
 - b) Determine if the value of the product matches the need before customer signoff.
 - c) The 'Go' decision authorizes project work.
 - d) Go/No-Go is a reset for each project life cycle.

- 24) When a customer reveals dissatisfaction after delivery, what is the most likely cause?
- a) The requirements were captured incorrectly.
 - b) The customer is complaining about a new problem.
 - c) The training and communication were insufficient.
 - d) The project manager did not complete the validation process.
- 25) What is true of formal signoff?
- a) Formal signoff is only required on predictive projects.
 - b) Formal signoff occurs after the customer receives the product.
 - c) Agile projects only occasionally require formal signoff.
 - d) Formal signoff is always required to assure and achieve solution value.

Module 3 – Needs Assessment

PMI-PBA: Business Analysts and Project Managers

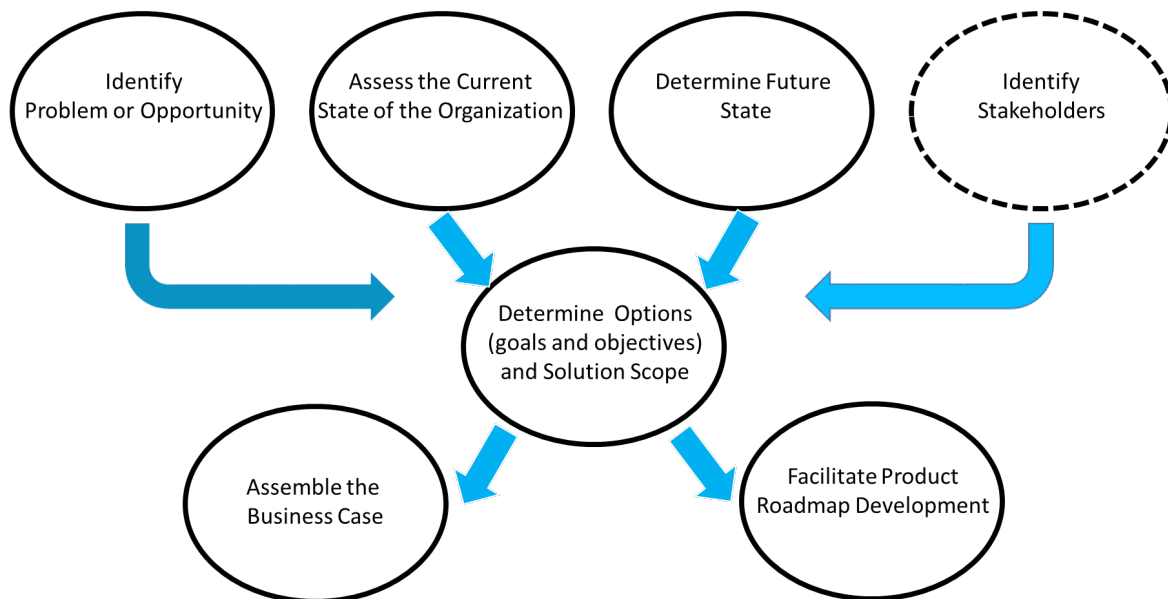
Steven M. Fullmer, MBA, PMP, PMI-PBA

- 1) Identify the Problem or Opportunity
 - Stakeholders
 - Problem or Opportunity
 - Relevant Data
 - Situation Statement and Approval
- 2) Assess Current State of the Organization
 - Goals and Objectives
 - Business Case Hierarchy
 - As-is and to-be
 - SMART
 - SWOT
 - Root Cause
 - Five Whys
 - Interrelationship
 - Process Flow
 - Capabilities and Gap analysis
 - Affinity Diagram
 - Enterprise Business Architecture
- 3) Recommend Action
 - Alternatives, Assumptions, Constraints and Risks
 - Feasibility
 - Weighted Ranking

- Cost-Benefit
 - Payback Period (PBP)
 - Return on Investment (ROI)
 - Internal Rate of Return (IRR)
 - Net Present Value (NPV)

4) Assemble the Business Case

- Problem/Opportunity
- Analysis of Situation
- Recommendation
- Evaluation



The Needs Assessment moves through a logical set of steps, though not always followed in the same sequence or the same level of formality, you must visit them all before any action can be taken. The goal is to move from **Situation** to **Solution**. The need is making sure the solution properly matches a correctly defined situation.

- Identify situation
 - Gather relevant information
 - Identify interest and impacted stakeholders
 - Clarify and validate the need (high level)
- Create a situation statement
- Gain stakeholder approval that the situation should be assessed.
- Identify capabilities
 - Identify the current environment
 - Conduct a Gap Analysis
- Identify Approach
 - Identify Alternatives
 - Suggest high level approach
 - Constraints
 - Assumptions
 - Risks
- Assess Feasibility
- Recommend Solution
- Create the Business Case

Needs arise to sustain the business. From the MBA perspective, needs assessment starts with a straightforward SWOT Analysis: strengths, weaknesses, opportunities, and threats. Strengths and weaknesses are found or originate within a business while opportunities and threats are external to the business.

Remember that we mentioned the assets or portfolio that bring sustenance to the organization? The portfolio is essentially an aggregation of strengths that the business can use to its advantage. Opportunities are assets that do not yet belong to the company, yet whose acquisition and development would add to the business value and therefore sustainability. Don't forget that Business Analysis is all about Value!

Weaknesses and threats are internal and external problems that the business should consider addressing. You don't want to put all of your resources into a defensive posture. Growth oriented risk suggests exploiting opportunities more than avoiding the threats. The highest priority threats and weaknesses are the ones that create barriers between now and the future goals set by the business.

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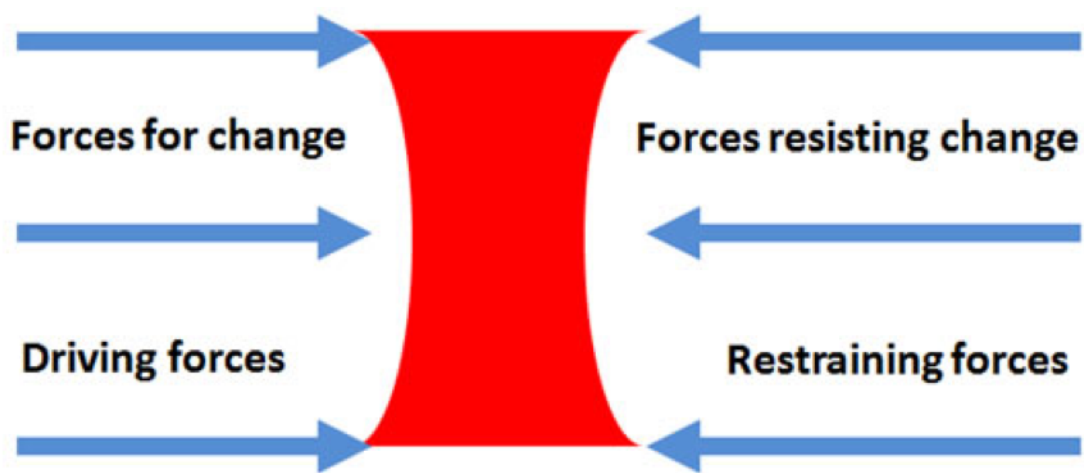
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A simple SWOT Analysis creates a columnar document that lists the strengths, weaknesses, opportunities and threats. A SWOT diagram is a form of Force Field Analysis. Force Field Analysis allows you to identify the factors that support or move change forward versus those that oppose or block change.

SWOT Analysis

Internal		External	
Strengths	Weakness	Opportunities	Threats

Force Field Analysis





Needs Assessment is an ongoing activity for a business analyst from an operations perspective. As you gain understanding of the business, the goals, and the Key Performance Indicators used by the business to measure success, you will grow in your ability to identify and recommend beneficial efforts on your own. The starting point, however, is learning about the business. As you learn and gain experience you will more often start by processing requests from the business leaders, representing internal stakeholders, reviewing the impacts of new regulations, or identifying and documenting business rules and processes. As you perform your work, you will be learning about the PEOPLE across the business environment. Getting to know and understand people; using your communications skills is the greatest asset you can bring to the business. People often have a difficult time articulating their needs. This becomes truer as people are confronted with change. The tools of Needs Assessment are designed to help you learn about the business, the people, and the interactions that will move the business forward.

Both overpowering stakeholders and stakeholder withdrawal are the responsibility of the business analyst to solve. In other words, the business analyst must learn to lead and influence without authority. This requires a constantly changing and improving set of soft skills.

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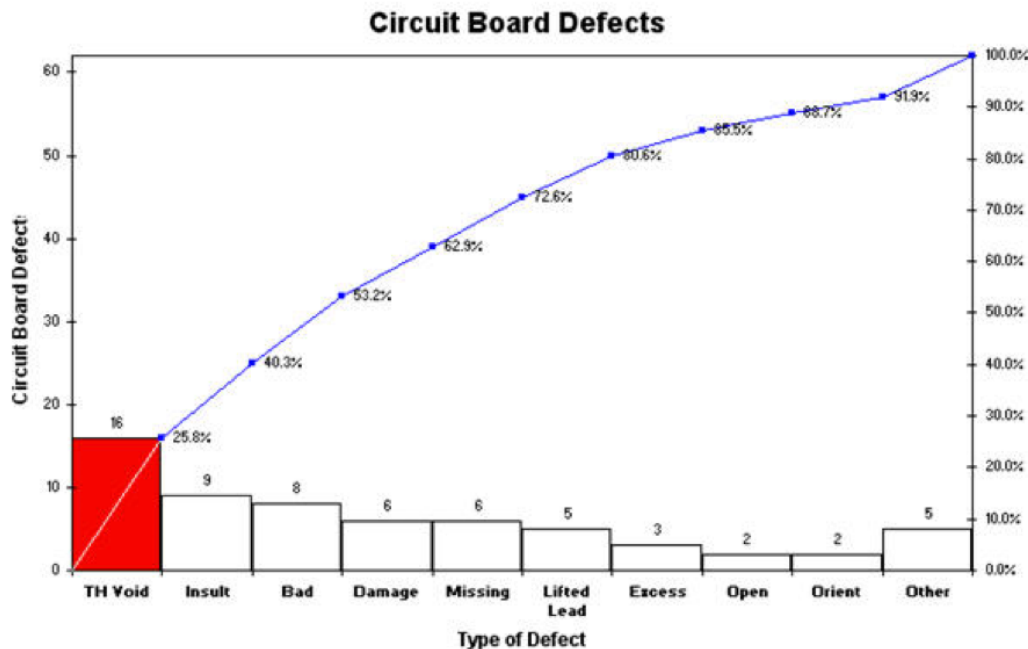


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In the case where the Need is the solution to a problem, one of the more powerful tools used by a Business Analyst is a Pareto Diagram. The approach is ALWAYS to find and address the root cause rather than merely treating a symptom of the problem. A Pareto Principle is based on the "80-20 rule" named after Italian economist Vilfredo Pareto, though proposed and developed by management consultant Joseph M. Juran. The Pareto Principle states that roughly 80% of the effects arise from only 20% of the causes. Find and isolate the correct 20% and you eliminate 80% of the undesired symptoms. The Pareto Principle may be represented by a table, a bar chart/histogram, a pie chart or many other forms. The bar chart or histogram is most common.

For the PMI-PBA exam, the Business Analysis is ALWAYS supposed to use a Pareto Diagram to identify and isolate the need.

Pareto Diagram Example



Your work begins when:

- Someone makes a formal or informal request that suggests change, new functions, a product or service, or an idea to enhance value.
 - This alternative most often leads to a project.
 - You may be handed a business case, charter, or other formal document that suggests project initiation within your organization.
- The BA notices an opportunity in the external environment matched by an internal strength, or a weakness that could be attacked by an external threat. These typically occur while you are learning about the business.
- An external regulator mandates a change.
- An external customer requests a product or service, or identifies a complaint that must be addressed.
- Business vision, strategy, market or economic changes offer a new direction (or at least its investigation).

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As you prepare for the PMI-PBA exam, focus heavily on stakeholder analysis tools. Although you need to understand the tools associated with understanding the organization, people will provide you the greatest challenge, the information necessary to affect a solution, and are integral to converting requests into objective requirements.

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The term 'as-is' references the current environment, or the starting point for a project. Corporate Documents contain connections between solution components, providing 'as-is' information. Corporate Documents are considered components of Organizational Process Assets.

Organizational Process Assets are always internal information or knowledge sources that are considered inputs for project efforts. They may be created or maintained by business analysts. There are three commonly named subsets:

- *Business analysis maintained process, policy, and procedures.*
- *Corporate Knowledge Bases.*
- *Team and Subject Matter Expert Knowledge.*

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Just as the navigator studies existing maps and charts, the BA reviews existing documentation to gain insight into current knowledge and understanding. Don't trust simply what is written, however. Talk to stakeholders – anyone with knowledge or interest in the subject – to obtain their insight and perspective. Listen carefully, take notes, and ask insightful questions.

You are seeking to get a sense of scale and reference points for any request you receive. When you lack obvious internal information, you may need to seek additional sources.

- Market information – size, competition, share, pricing, and potential.
- **Business Principles and Practices** tend to be common across similar organizations. These may be documented regulations, standards, or simply assumed knowledge within an industry (everyone has an MBA, right?). **Lessons Learned** and business analysis models are less likely to or may be unnecessary to identify principles and practices. They may result in Business Rules, identified later in this course. You often identify them by visiting with business Subject Matter Experts.
- **Benchmarking** – looking outside the organization for best practices and comparative analysis.
- Standards organizations and related documents.
- Problem or error statistics like customer complaints, help desk tickets, sales closing rates and money spent or lost per transaction, archived historical information (like **Lessons Learned**) might be sources of information seldom considered by the stakeholders stating a situation.

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Avoid trying to find a solution too soon. You need to gain points of reference by understanding the stakeholders. You need to understand Root Cause and the most significant factors using Pareto Analysis or a similar tool. For the exam, it is far more important to understand the root cause than to take action. The business analysis is more often trying to discover the answer to the questions 'Why?' than the question 'How?'

Stakeholder Analysis

Stakeholder Analysis begins with Needs Assessment and runs through every business analysis activity. Stakeholder roles may change from situation to situation, but many of their attributes change rarely or slowly. There are many ways to identify and classify stakeholders. The nature and scale of the situation should help you select the tool or model that is most appropriate.

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You will select your method for recording and tracking stakeholders during Needs Analysis and refine it during Business Analysis Planning. Beyond these domains you are expanding and refining the information using the layout and plan you developed. Remember – follow the plan.

A **Stakeholder Register** is a tool used by both Business Analysts and Project Managers to record information about stakeholders associated with a situation. The content in the Stakeholder Register will grow as the situation moves through approvals. First the situation approval, then the alternatives approval, toward the recommended option, the business case, and ultimately the charter and into a formal project. Different stakeholders contribute, review and approve the various elements of the business analysis process. As requests turn into documented requirements, the stakeholder list will grow. The team, testers, and end users will ultimately become a part of the stakeholder register. Don't forget regulators, vendors, and the general public in some cases.

Stakeholders are identified throughout any business analysis or project effort. The stakeholder registered may be transitory for a project manager, but is a mainstay for a professional business analyst. Create it, maintain it, and review it regularly through every process group or domain.

An example/template for a Stakeholder Register is provided in the course appendix.

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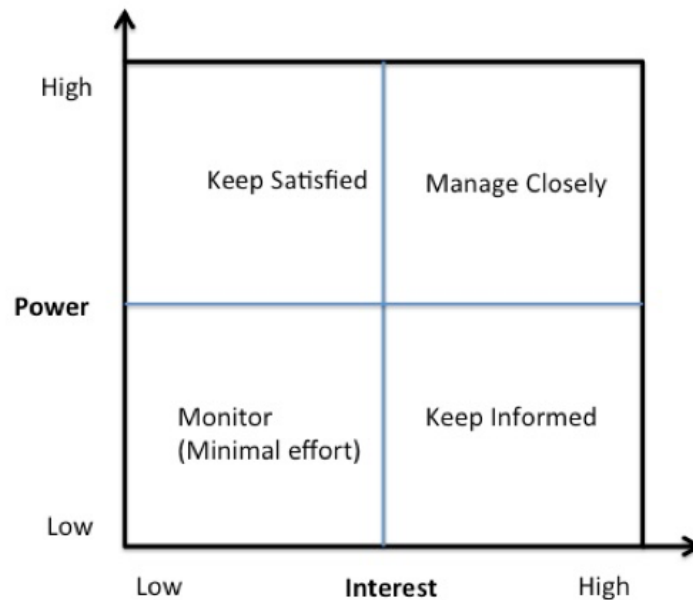
The Business Analyst contributes his or her knowledge of stakeholders to the project team. Both the BA and the PM will use the Stakeholder Register. During Business Analysis planning, the BA and PM will refine the desired content in the Stakeholder register relative to Project Relationship, Communication and overall Management plans. The BA may maintain separate records to assist and contribute clarification during Elicitation, Analysis, and Evaluation.

Two of the more familiar stakeholder categorizations are the Power/Interest Grid and the RACI model from the PMBOK® Guide.

Power Interest Grid

The power/interest grid is used to identify communication approaches, initial relationship management, and to assist with placing priority on initial components of the opportunity, problem or situation statement. More details will be necessary to affect appropriate elicitation, analysis and requirements relationships.

Stakeholder Power/Interest Grid



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Know the placement of the communication/relationship recommendations within the four quadrants of the Power/Interest grid for the PMI-PBA Exam.

RACI Model

The RACI model is often used for identifying roles on formal projects. The business analyst uses a similar model to help identify stakeholders who might be affected by the solution even before a formal project is established.



R – Responsible- the person performing the needs assessment

Or for projects: delivering the solution

A – Accountable – the person who approves (the assessment, solution, business case, etc.)

Or for projects: the person with approval authority; on a project there is only one accountable party; as situation statements are being identified there may be one person accountable for each situation that contributes to a solution.

C – Consult – person or persons to consult for input to the problem or opportunity.

The stakeholders who can provide subject expertise

I – Inform – person or persons who will receive results

Or in the case of projects, status or updates.

For the PMI-PBA exam, make sure you know what each letter stands for and what the category suggests.

Activity	Sponsor	Product Manager	Business Analyst	Project Manager	Product Team	SME
Situation statement	A	C	R		C	C
State of Organization	A	I	R		C	C
Recommend Solution	I	A	R	C	C	C
Prepare Business Case	I	A	R	I	C	I

Sample RACI Chart for Needs Assessment

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While distribution of a RACI Chart aids to clarify roles and responsibilities, the larger Stakeholder Register and more comprehensive stakeholder information assembled by the business analyst (and potentially the PM) may contain confidential, propriety, or personal information that should not be broadly distributed. Use extreme caution when distributing stakeholder registers to a large group and make certain the document is marked and recipients are informed regarding acceptable and unacceptable use. As a security analyst would remind you, sharing of Personally Identifiable Information (PII) in our modern world can compromise individuals and businesses in untold ways.

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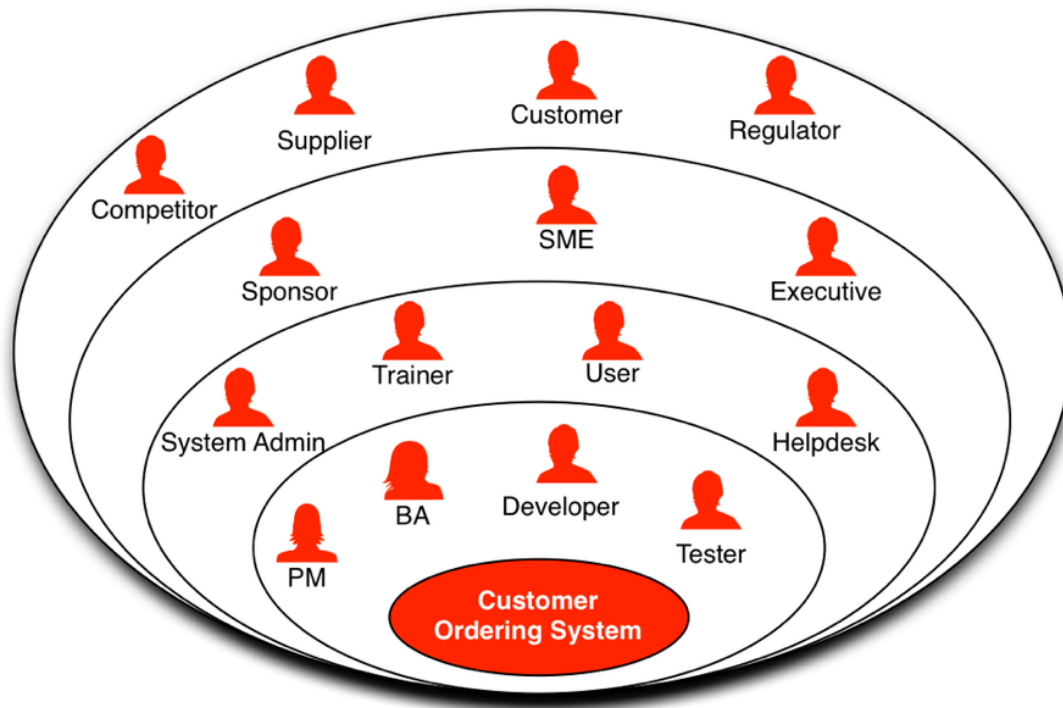


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There are several additional models for categorizing stakeholders. Two that might be mentioned on the PMI-PBA exam are included here for your edification, although you are unlikely to have a need to address specific details about either. The Onion Diagram and the Salience Model. Both are referenced in the BABOK® which is a broader, container-like collection of business analysis tools.

An **Onion Diagram** is a form of Stakeholder analysis. The name is based upon the shape of the diagram, which mimics the layers of an onion. In the example below, the layers are based upon the level of contact the stakeholder will have with the solution during the project. The placement of stakeholders within the onion may change when the product transitions from development to operations. This model is more about interaction than power or influence.

Typical layers are: product creation; people whose work changes due to solution; those who interact with the system; external stakeholders.

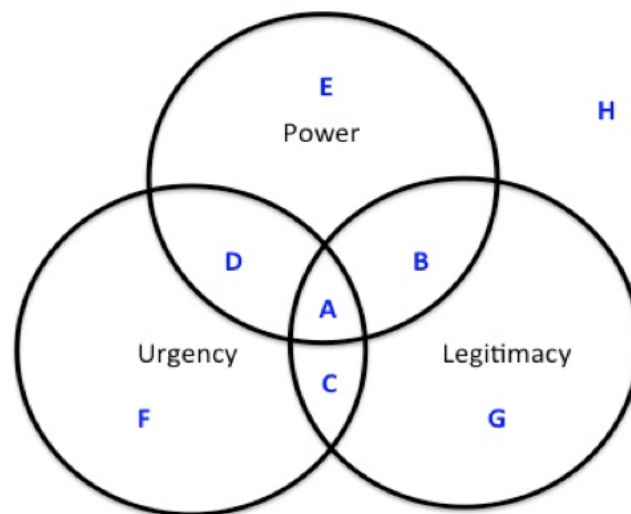


The Salience Model

In October 1997 Ronald Mitchell, Bradley Agle, and Donna Wood published an article entitled “***Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts***” in the ***Academy of Management Review***. Their model has come to be known as the Salience Model. The model is a Venn diagram consisting of three overlapping regions: Power, Legitimacy, and Urgency. The model was designed to address project influence. The diagram and model also reference three overlaps between each of the regions, a central three-region overlap, and parties external to the three regions. The model identifies eight distinct stakeholder classifications.

- **Power:** The ability project stakeholders have to influence the outcome of an organization, deliverables, or a project.
- **Legitimacy:** The authority or level of involvement project stakeholders have on a project.
- **Urgency:** The time expectations set by stakeholders relative to response or delivery.

Salience Model



- A) **Core:** These are the critical project stakeholders. As a Project Manager, you need to provide focused attention to these stakeholders.
- B) **Dominant:** Such project stakeholders have power and legitimacy, but do not have urgency. Focus on their expectations, but without a sense of urgency.
- C) **Dependent:** These project stakeholders hold limited power over the project. They need to be managed because of alignment with other project stakeholders who can influence the project.
- D) **Dangerous:** These stakeholders have power and urgency, but no legitimacy. As an example, a very senior leader forcing views on project outcomes. A Project Manager needs to keep such stakeholders appropriately engaged or satisfied.

- E) **Latent**: Stakeholders who typically only engage due to significant non-conformance to plan/need. Over-communication or micro-management would be inappropriate.
- F) **Demanding**: Stakeholders who believe their needs require immediate attention. Spending excess time with this category rapidly creates diminishing returns.
- G) **Discretionary**: Stakeholders who require only regular status updates.
- H) **Non-stakeholders**: Outside the framework of the project. Reactionary interaction at best.

Stakeholder Attributes

Although stakeholder attributes are more likely to be discussed and filtered during Business Analysis Planning, the BA should understand the attributes that are most often identified and collected due to their impact on both business analysis and project planning. You want to understand, with sincerity and openness, as much about stakeholders as you can capture.

Stakeholder identification is about creating trust. You, the project, and the business will benefit far more from open and trusting communication. The challenges associated with clarifying needs, and overcoming the resistance to change, are difficult to overcome. A strong, trusting foundation goes far toward team building and full needs disclosure.



The following attributes affect requirements prioritization, the form and methods associated with elicitation, acquiring approvals; perspective and conflict; the communication and relationship management plans; all levels of testing; team dynamics; and ultimately solution acceptance and value. This list represents the attributes that have the greatest influence over or impact on a Business Analyst's planning, deliverables, and overall work.

Stakeholder Attributes

- Authority
- Complexity of group
- Culture
- Experience
- Location
- Availability

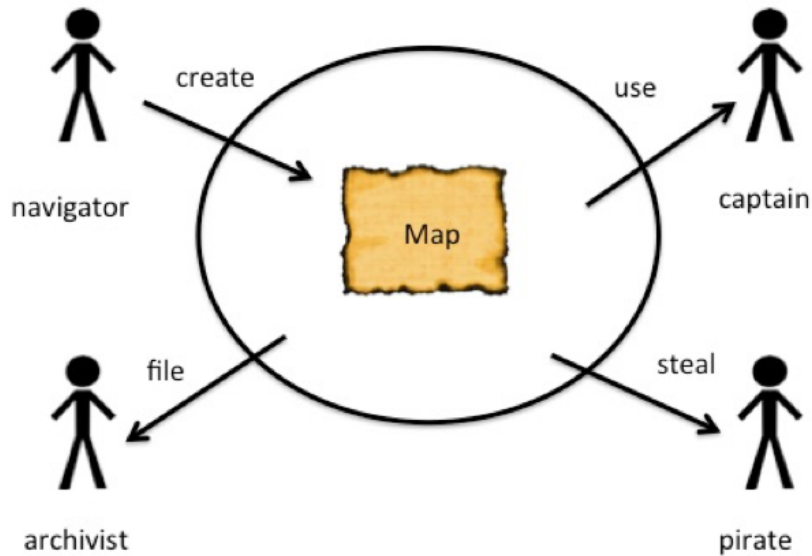
Stakeholder attributes used within Models, as discussed in Elicitation and Analysis, tend to fit one of three characterizations: Job, Persona, Actor.

Job Analysis: Identifies the knowledge, skills, and experience necessary to perform a job or complete a specific task. Projects tend to assign tasks to jobs. Defining a job rather than a person allows you to identify the components to meet a need, and identify the people who can complete the work as it progresses.

Persona Analysis: Identifies the factors that motivate or influence people toward certain behaviors or choices. Often associated with sales or marketing, Persona Analysis might help to identify the functional or non-functional attributes of a product or service. They might also be used with the Power-Influence grid to identify how power and interest are applied.

Actor identification: An Actor is a ***role*** played by a stakeholder relative to ***Interactions*** with the situation, processes, the solution, or the project. **Actors** are often represented as stick figures tied to objects by directional arrows that demonstrate input, retrieval, or dialog. Actors are often incorporated within **Unified Modeling Language (UML)**, **Use Cases**, or **Use Case Diagrams**.

Use Case Diagram



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Attitude: *Stakeholder opinions are often only expressed non-verbally. Attitude is considered a personal rather than a shared attribute. As such, it would not be part of a Persona. The attitude of a significant stakeholder can dramatically support or detract from the success of the Solution or Project. As such, the Business Analyst should spend time interviewing major stakeholders face-to-face in order to assess attitude while gaining additional insight and attributes.*

Stakeholder Analysis Process

The stakeholder analysis process offers a logical sequence, like so many other Business Analysis efforts. The purpose for a sequential process or a checklist is to assure that all essential elements are captured and no important information is omitted due to oversight.

- 1) **Stakeholder Identification:** determine whose interests to take into account.
- 2) **Stakeholder Analysis:** Assess & classify information regarding identified stakeholders.
 - **Cultural Assessments:** Stakeholder characteristic clarification tool.

Common examples may include language and communication styles for communication planning; Myers-Briggs or DISC analysis for behavior or personality; Change Intelligence (CQ®) for change leadership or Anti-fragility for the ability to improve beyond stressors; Intelligence Quotient (IQ) for logical processing ability, or Emotional Intelligence (EQ) for the ability to assess human scenarios.

- **Profile Analysis:** Any tool used to identify an understanding of MAJOR stakeholders. Rather than a general or categorical assessment, you are seeking unique characteristics of significant stakeholders as related to the current situation. A profile may be categorical (like the characteristics of the end user for a new product solution) or individual (a specific stakeholder like the sponsor).
- 3) **Stakeholder management:** Increase support for the needs and expectations of the stakeholders according to the classifications, and minimize negative impacts to the Solution in order to provide the best Value.

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The practices of Organizational Management, Change Management, Operational Design, and Human Resources Management provide a broad variety of models and tools used to understand and guide both businesses and people through change toward growth. Related organizations and the tools they provide can be of extreme value to Business Analysts. The more common terms like IQ, EQ, Myers-Briggs, and DISC might appear on the PMI-PBA exam (although more commonly in practice content) as portions of a question scenario though you are not expected to be able to describe or implement specific examples. You should be able to identify related material as means to identify stakeholder characteristics and in practice to identify reliable sources for clarification and understanding when called upon to implement them.

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Although a Business Analyst is expected to be familiar with a broad range of assessment, elicitation, analysis, monitoring and tracing tools, you are NOT expected to be an expert in all of them. If you are tasked with or identify the need to apply any tool or method with which you are less familiar, acquire expert assistance to perform the task. Expert assistance may include the Delphi technique, hiring an external firm, or (time allowing) having team members (including the BA and/or PM) trained to perform the task. The quality of the BA work provided directly impacts the Value of the Solution delivered.

Situation Statement

Once you have identified the problem or opportunity, and identified relevant (initial) stakeholders, you need to create a **Situation Statement** before you move forward to determine the 'As-is' state of the organization and organizational capability to address the need. The situation statement is a concise way to frame the issue. You must obtain approval from the sponsor or contributing stakeholder that the Situation Statement represents the scenario correctly before proceeding. The Situation statement becomes the foundation for researching the needs, capability, costs, benefits, assumptions, constraints, and risks that form the Business Case (and any related Project Charter.)



Situation statements have a particular format:

- ***Opportunity or problem "A"***
- ***Has the Effect of "B"***
- ***With the Impact of "C".***

"Discovery of a new continent provides our country with the opportunity to increase resources through trade or acquisition with the effect of enhancing our economy in order to sustain the desired royal lifestyle."

Note that situation statements tend to be fairly high level, as are the Goals from which they derive and the objectives that they will generate. The more detail you have available when stating Goals, Objectives or the Situation Statement, the better. Don't forget to use **SMART** whenever you can. In any case, the Business Case, if needed, derives from the Situation Statement.

Assess the Organization

Once you have the Situation Statement approved, you assess the Value of resolving the situation for the business, as well as the business' capability to resolve the situation internally. If you discover that the business cannot resolve the situation internally, then you might move straight to recommending an externally sourced solution. Given any situation, you have a variety of tools that will assist with your review and recommendation. The following section helps you to understand the various tools and their potential applicability.

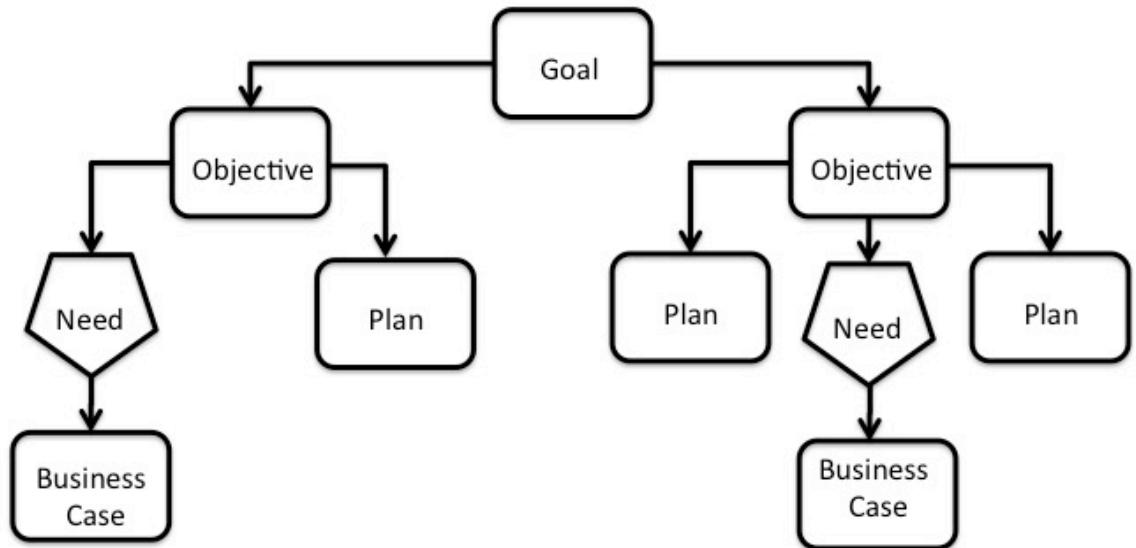
Goals are high level and revealed within strategic business documents.

Objectives are used to support or enable goals and require additional details.

Plans to affect business strategy and tactics are driven by goals and explained by objectives. Both goals and objectives should be SMART (discussed in Module One), but Objectives must be SMART to affect further analysis.

A goal-objective-plan hierarchy, often called a **Business Case Hierarchy** identifies the derivation of business plans and the business cases from which they originate. Since not every objective or business case may be immediately funded, the hierarchy may represent a portfolio or backlog of potential opportunities.

Business Case Hierarchy



SWOT Analysis

SWOT analysis was introduced at the beginning of this module as a means to identify potential strengths, weaknesses, opportunities and threats. If you have not completed a SWOT analysis associated with a situation statement, then creating one may offer a means of comparing strengths to opportunities and determining whether a threat is the result of an internal weakness that must be addressed.

PEST/PESTLE

A PEST/PESTLE analysis is similar to a SWOT analysis, with slightly different focus and you evaluate internal and external factors that might either be creating the situation or be used to help meet the needed value.

PEST stands for **Political, Economic, Social, and Technical**. Create four quadrants as for SWOT, placing factors affecting or supporting the situation into each of the quadrants. **PEST** is sometimes expanded to **PESTLE** by including **Legal** and **Environmental** factors in your analysis.

Relevant Criteria

Recalling that all Objectives must be SMART, consider which metrics or criteria might ultimately affect the success of the solution. If the situation is financially motivated then monetary measures need to be understood. If the situation is time based, then you need to know fixed milestones and delivery dates. If the issue is regulatory, then you must clearly understand the criteria used by regulators to assess compliance.

Root Cause Analysis

If the situation is a problem, then you need to seek the cause or source of the problem before taking action. You don't want merely to respond to symptoms, you want to isolate and eliminate the root cause so the issue is not repeated. If you are attempting to exploit an opportunity, then you want to make sure that you understand what the effort entails and how various alternatives inter-relate. The approach is the same; the names for the two types of goals differ only as reminders to the target categories of the scenario.



The tools for Root Cause Analysis and Opportunity Analysis are effectively identical. The terms are used somewhat interchangeably on the exam.

Root Cause Tools

Five Whys

Five Whys is more technique than a tool, and is seldom used independently. Five Whys (5-whys) may be used as a component of Root Cause, during Elicitation, or any time you seek additional clarification. The Five Whys is also sometimes called the **Five W's** since any of the common interrogatives in the English language might be used during the questioning (Who, What, When, Where, Why).

The technique calls for asking a question containing the word “why?” in five successive responses to your questioning as a means to dive more deeply into the situation. Stakeholders regularly know the root cause of a problem though may have difficulty identifying or stating the need clearly. Most people start with wants. A great business analyst must dig more deeply to identify the need and the cause behind it.



Using 5 whys is a specialized skill. A skill that must be learned and practiced. You cannot merely ask 'why' five times in a row. (Are we there yet?) Each successive 'why' must incorporate understanding from the stakeholder's prior answer, successfully demonstrating Active Listening throughout the dialog. Because this is an essential BA skill, you will be expected to understand its application for the exam.

Asking two or three 'why' questions in a row is challenging, getting to five without annoying the stakeholder or steering off the track is exceptional.

Example:

- Captain: We need to go on a trip.
- Navigator: Can you help me understand why (1) we need to go on a trip?
- Captain: Our voyages need to discover strange new lands, and to do so, we need to go on a trip.
- Navigator: Why (2) do we benefit from discovering strange new lands?
- Captain: Strange new lands typically means new products and new customers.
- Navigator: Oh, I understand. Toward What (3) specific purpose would we plan to apply the new products and new customers?

- Captain: Our sponsor/customer has promised a larger share of the profits if we can find new customers for the wares we carry, which would mean additional return trips and larger cargos.
- Navigator: Why (4) would we want larger cargos, wasn't the ship's hold full on our last mission?
- Captain: Yes, the hold was full, but all those coconuts did not provide very profitable margin for the space they used.
- Navigator: So profit margin is a concern and we want goods with higher value, and more than just a trip to strange new lands, we need to discover a strange new land with a better profit margin. What (5) objective would do you believe we need to set?
- Captain: A profit margin 10 doubloons per cubic foot would be ideal, so we should look for a land rich in minerals or industry rather than tropical plants.

I am mindful of the dialogs between Captain Hook and Mr. Smee. You want to make sure that the dialogue is clarifying the goal and refining the solution. Don't just ask questions and clarify statements for their own sake. That would be simple active listening, or perhaps even avoidance.

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Optional Class Exercise – Five Whys

Consider a current “issue” and try Five Whys with a partner. This is practice so do not try this with the intended stakeholder first!

Role	Situation / Question / Reply
Sponsor/Customer Situation Statement	
BA (Why #1)	
Sponsor Answer	
BA Why #2	
Sponsor Answer	
BA Why #3	
Sponsor Answer	
BA Why # 4	
Sponsor Answer	
BA Why #5	
Sponsor Answer	

Reflection: Did the process help you to better identify a root cause, source or better objective toward a Solution for the Situation?

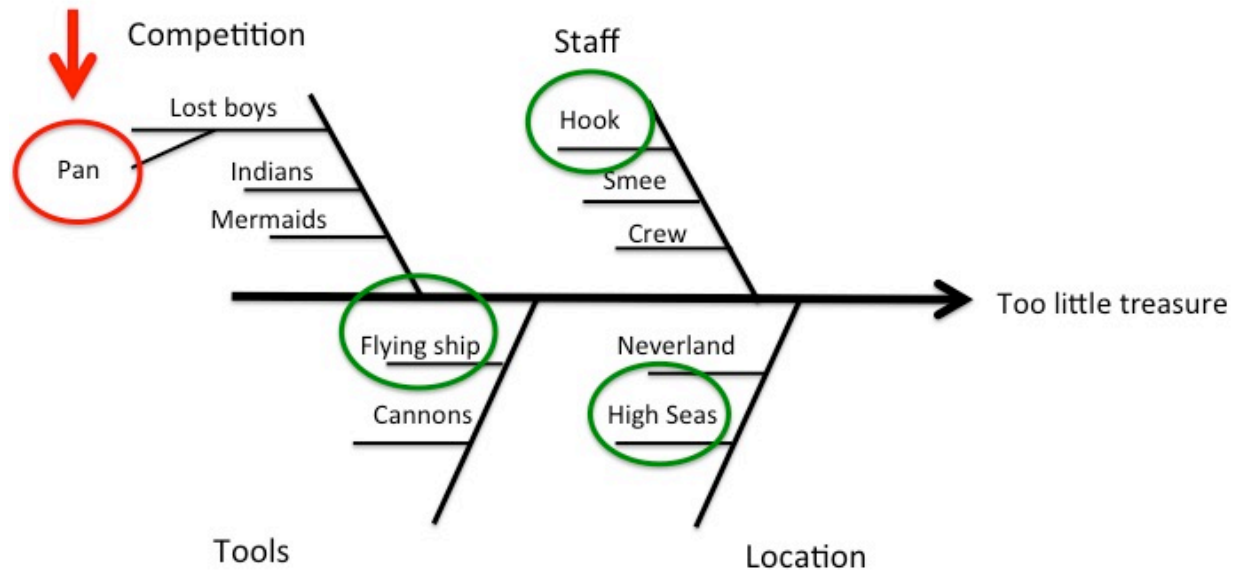
Cause and Effect Diagrams

Cause and Effect Diagrams, also called fishbone diagrams or Ishikawa diagrams (after their creator Dr. Kaoru Ishikawa), are the most common tool used to graphically represent the cause of a problem. Formal cause and effect diagrams have four recommended elements:

- The problem to be solved is placed at the head of the fish (to the right or the left).
- List between 3 and 8 categories to contain the potential causes of the problem. Fewer than three and you can make a simple decision. More than 8 and you probably need to use Decomposition or another method to demonstrate more complex interactions.
- For each cause category attempt to identify why the cause is occurring, identifying subcategories as needed. More than two or three levels again suggest shifting to another model due to complexity.
- Look for patterns or categories with complimentary effects or to study more closely. You might also combine a **Pareto Analysis** to determine which of the categories is responsible for the largest number of symptoms.

Remember that Cause-and-Effect for Problems and Opportunities can utilize the same tools!

Fishbone Diagram

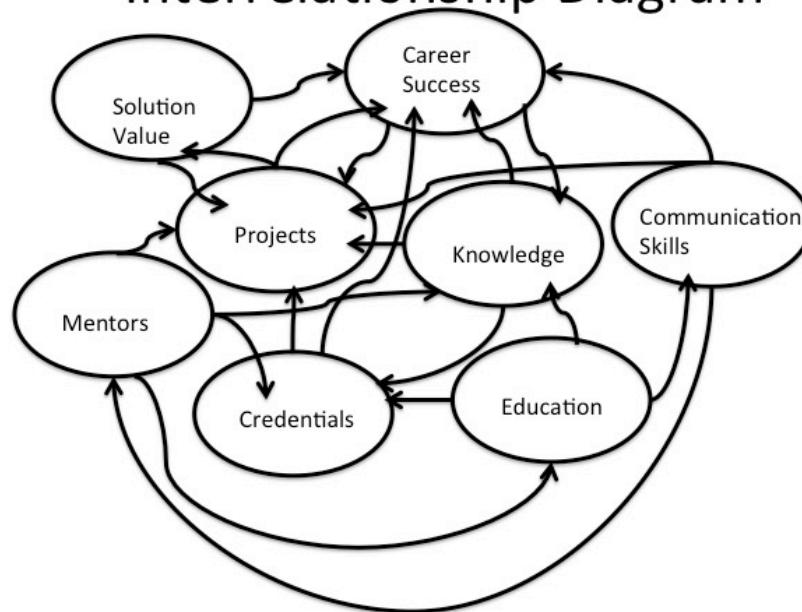


Interrelationship Diagrams

Interrelationship diagrams (sometimes called Diagraphs) are used for more complex problems or scenarios. They are drawn to demonstrate the relationships between factors when the factors may influence and be influenced. Remember that Needs Assessment is high-level approach and that you need not decompose or clarify the relationships. You are seeking source or cause. Look for major factors or components that influence one another. Draw each as a circle or a box. Then draw arrows demonstrating the direction of influence. Sometimes factors influence one another. Try to note which factor is the stronger influence by bolding the line, or noting 'scores'.

- Try to keep the number of factors less than ten as a starting point.
- Factors with the larger number of incoming arrows are outcomes.
- Factors with larger numbers of outgoing arrows are source.
- Analyze the diagram to see if you can identify the most significant source factors.

Interrelationship Diagram



The above Interrelationship Diagram displays possible factors affecting Business Analysis Career Success, the goal.

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Review the preceding Interrelationship diagram:

- ***Which factor(s) display the most incoming lines?***
- ***Which factors display the most or a disproportionate number of outgoing lines?***
- ***On which factors would you focus to affect Career Success?***
- ***What changes would you make to the diagram after your first analysis?***

Process Flows

Process Flows are a form of model, typically used in far more detail during Requirements Analysis (see the Analysis Section of the Elicitation and Analysis module.) Common examples include software design, manufacturing sequences, and swim lane diagrams.

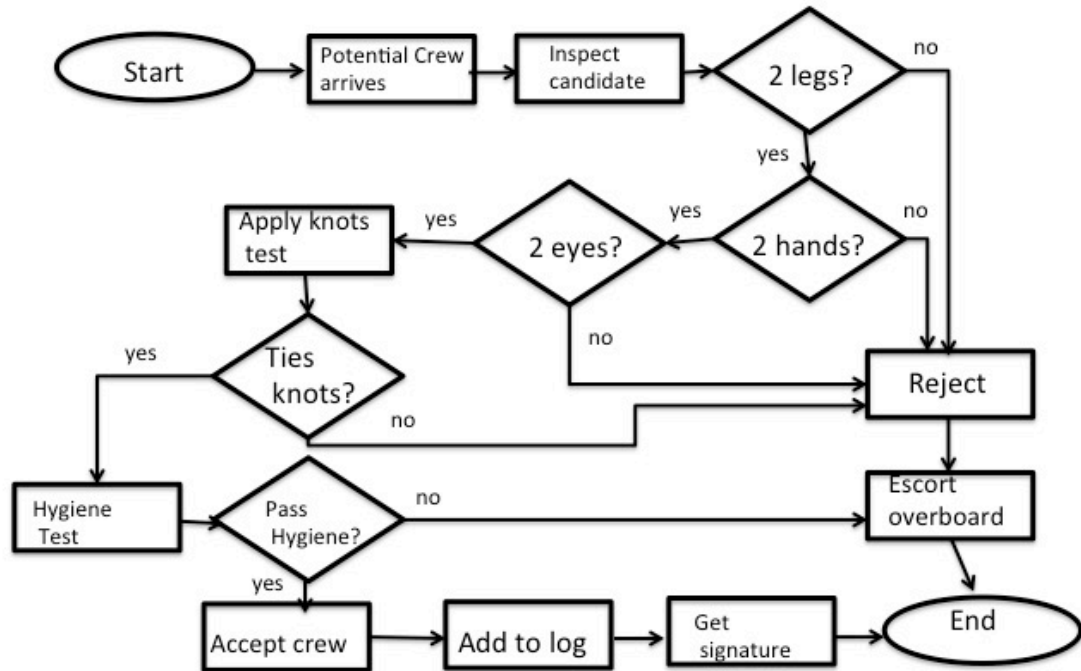
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The BA must be familiar with several process flow documentation and modeling techniques. The Business Analysis for Practitioners: a Practice Guide makes it clear that designing a process flow is NOT useful for developing opportunities. If a PROBLEM situation statement suggests a root cause associated with an existing process, attempt to find existing process flow diagrams. Position the situation relative to the existing process while attempting to discover where the process may breakdown; notably where inputs are missing or delayed, where outputs are flawed beyond control limits, or where alternate steps are often implemented by end-users.

Process Diagram



You have completed identifying, assessing, and clarifying the cause or source for the need.

Identify Capabilities

Next you determine the Capabilities needed to address the situation.

Capabilities assessment is addressed in three steps:

- 1) Identify the new feature to address the situation.
- 2) Identify the capabilities of the organization to deliver the feature.
- 3) Identify the gaps between the feature and the ability of the organization to deliver the feature.

The feature needs to provide Value to address the approved Situation Statement.

Step One – Identifying features.

Capability Framework

A **Capability Framework** provides a mechanism to sort descriptions about skills, knowledge, behaviors, abilities, systems, and competencies that provide **value**.

A capability framework is tabular or matrix in nature and lists desired attributes in an order relative to increasing value or evolution. The focus of a capability framework may be people, product, or solution based.

Business Analyst	Entry level	Intermediate	Senior I	Senior 2	Senior 3
Capability 1					
Capability 2					
Capability 3					

Categories	Level 0	Level 1	Level 2	Level 3	Level 4
People					
Process					
Technology					

Capability Table

A **Capability Table** is a simple columnar table that lists each Situation statement, or its decomposed elements, the root cause, and the capability or solution feature that might be used to solve the problem or deliver the need. The capability table is the first step in identifying the components, resources, staff, and process changes needed to address the Situation. A capability table is most useful to identify what the Product 'will do'.

Problem / Opportunity	Root Cause / Value	Capability / Feature
Talented crew	Screening onboard	Pre-screen applicants
Poor knot tests	Frayed ropes	New ropes

Affinity Diagram

An affinity diagram is an alternative to a Capability Table. We learned to create affinity tables in grade school (or before). This is a simple method to group like elements or features and their subsets. Merely create boxes, containers or quadrants, and group like or related features and their subcomponents into categories. This allows you to see patterns, identify potentially common features, and potentially identify an overarching theme that aids in problem solution.

Able Bodied Seaman	
Physical characteristics: Both arms, legs, eyes. No visible, identifiable physical deformity or limitation.	General seamanship: Ability to tie knots, lift up to 50 pounds, climb a rope ladder.
Experience: Desired though not mandatory.	Health habits: Not claustrophobic. Ability to live in tight quarters for extended periods. Basic general hygiene.

Benchmarking

Benchmarking looks at external organizations to identify best practices and solutions to similar problems. A common approach to benchmarking for the business analyst is **Competitive Analysis** – explicitly looking at how known competitors are dealing with similar situations. While you may not recommend parity with the competition, this will provide additional insight and information regarding potential features or capabilities that need to be addressed.

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For a BA, benchmarking indicates looking outside the business to learn about possible solutions. Two of the most important drivers guiding a BA to use benchmarking are missing DATA and FINANCIAL information. For a PM, benchmarking means looking outside the project for alternatives and best practices, which in this case may be inside the organization. Recognize the difference relative to the search target(s).

Step Two - Identifying Capabilities

Hopefully you are only comparing the need against known resources, at least known somewhere within the organization even if not to the stakeholder identifying the problem or the need. Recall that a Business Analyst is constantly improving their knowledge about the business. In many cases, you will merely match a need with a current capability. This may include relocating resources, suggesting a process change, or recommending staff reorganization. In such situations, neither a formal business case nor a project may be necessary. You may, however, need to facilitate meetings to help internal stakeholders recognize their ability to solve the problem themselves.

When the problem or its solution are less apparent, there are many ways to solicit or elicit possible alternatives. There are three tools more commonly used by Business Analysts:

Process Flows: An example of a process flow diagram was provided earlier in this module. It might be used to identify what you already know how to do. This is called the “as-is” state. You are looking for existing process flows and related documentation used to identify existing capabilities.

Enterprise Business Architectures: a documented framework displaying the locations, people, processes, infrastructure, systems (hardware and software), data, and other technology currently in place. The documentation may be textual or graphical in nature.

Capability Framework: an organized collection of the organization’s ability to deliver solutions or capabilities. Similar to the business architecture, although documented with a focus on deliverables or products rather than resources.

SKILLS:



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Remember that you are NOT trying to create a process flow, enterprise business architecture, or capability framework during capability analysis. You are looking for possible existing documentation and capabilities. Even if documentation and infrastructures exist or are documented, they may not match the current state or capability of the organization. This approach is supposed to be a relatively quick check before recommending the creation of a solution that may already exist.

Step Three – Identifying Gaps

Identifying the Gaps is a high level activity that leads toward a business case and potential project. Having identified and confirmed the need(s), and the organizational capabilities, you have started down the road toward specific objectives and deliverables.

The simplest and most common approach is to start with the Capability Table from step one, and add a column to the right listing one or more alternative approaches to providing deliverables which fill the identified Gap.

Problem / Opportunity	Root Cause / Value	Capability / Feature	Project Deliverables/Fill Gaps
Talented crew	Screening onboard	Pre-screen applicants	Application Background check
Poor knot tests	Frayed ropes	New ropes	Materials research Selection/Procurement process

Now that you have a sense that there is a viable alternative, you are going to develop the elements necessary to make a recommendation that is clear, concise, and most specifically addresses the needed Value identified through your analysis.

Determine the Future State

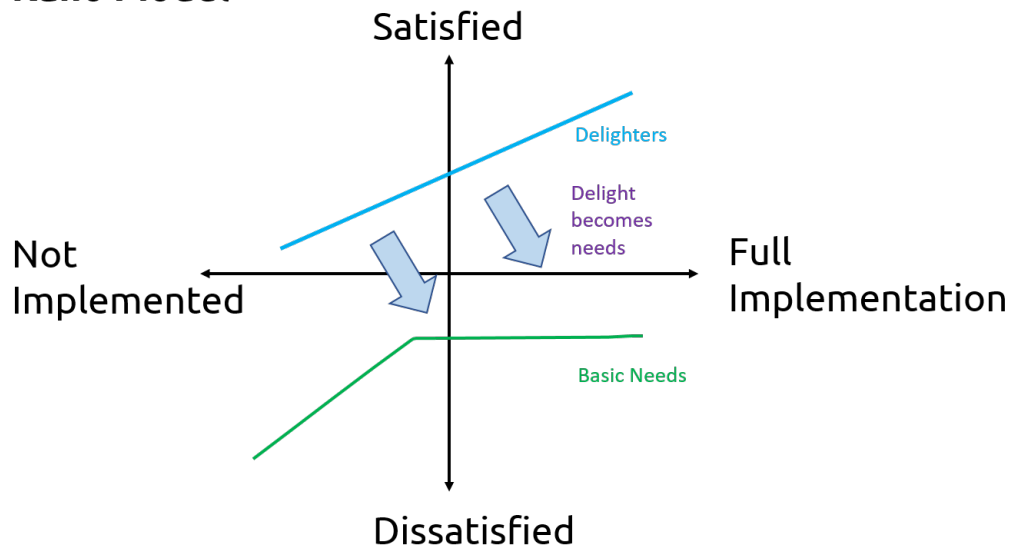
Now that the features, capabilities, and gaps have been identified, the business analyst may attempt to identify the organizational or product changes that might be required to provide the features, add new capabilities, or close the gaps. It should be noted that the focus of the future state is the ***changes required***, and NOT how the changes themselves might be implemented. Effectively, the same tools as those used within Assessment of the Current State are applied, with a focus on achieving the desired Solution State rather than merely identifying the current 'As-is' state.

Kano Models

The Kano Model was developed by Professor Noriaki Kano in the 1980's and focuses on five primary characteristics related to customer preference or satisfaction. The model is best applied to the analysis of product roadmaps and evolution, since a customer's perception or preference tend to change over time (and are therefore a moving target rather than a solution fixed or constrained in time as would be a project goal). The model, written in Japanese, has been translated into many languages, resulting in many versions of the vocabulary. The closest English translation would be: Must-be Quality, One-Dimensional Quality, Attractive Quality, Indifferent Quality, and Reverse Quality. The model is quite often associated with Herzberg's theories, associating basic (hygiene) factors and motivators with customer preference and desire. As 'delightful

needs' are met and exist, they become basic needs over time, and additional needs must be met or features introduced.

Kano Model



Purpose Alignment Model

The purpose alignment model is a framework for supporting strategic or product based decisions within an organization. It may also be used to identify if proposed new product features or requirements align with the current or proposed state of a product and its evolution.

Purpose Alignment Model

Market Difference	High	Partner	Differentiating
	Low	Who cares?	Parity
		Low	High
		Mission Critical	

Solution Capability Matrix

A solution capability matrix is a simple table that matches proposed features or solutions components with the capabilities that each provides.

Solution Components	Component A	Component B	Component C	Component Z
Capability 1				
Capability 2				
Capability 3				
Capability N				

Include a High-Level Approach

Provide a high-level proposal identifying how the proposed solution should be acquired or developed.

Remember to revisit the situation statement that you are attempting to resolve. The example provided at the beginning of the module follows:

"Discovery of a new continent provides our country with the opportunity to increase resources through trade or acquisition with the effect of enhancing our economy in order to sustain the desired royal lifestyle."

A related high-level proposal does not yet have the details associated with a business case or charter. It is used to provide direction for the gathering of the details necessary to write the business case.

"Gathering and developing nautical charts identifying swift passage to and from the new continent will facilitate advantageous trade. Toward this goal a fleet of ships shall be commissioned to explore and document routes between national ports and desired ports of call."

Provide Alternatives

It is likely that multiple options were proposed or considered. Make sure to list the most viable of the options, even if a singular option is being proposed.



Stakeholders typically fail to participate due to lack of ownership. Including multiple alternatives demonstrates that all contributions are being considered, and helps the Business Analysis to achieve consensus toward the eventual solution. Priority and Design are always the top two sources of Conflict. Complexity is created by people. Other issues tend to hold relatively less impact. All of these elements are due to perspective. By listing viable alternatives, the recommendation suggests that the proposed solution has considered the complexity of the situation, alternative designs, and taken multiple factors into account while prioritizing the recommendation.

Identify Constraints, Assumptions and Risks

Constraints: Limitations on the options provided based on knowledge, technical or business considerations.

Constraints for our trans-oceanic exploration might be routes used by hostile competitors, seasonal weather conditions, available funding, or the size of the existing fleet.

Constraints and Assumptions are often identified by listening to stakeholder concerns while learning about the situation, organizational capabilities, and gaps.

Assumptions: Factors considered to be true or real without actual evidence or proof.

Assumptions for our voyage include available, able-bodied crew; civilizations interested in trade located on the new continent; claims of the new continent's presence and location are accurate.

We may be unable to quickly verify some assumptions, although choose not to expend the effort until the project is funded. For example, identifying that qualified crew might be available. While other assumptions may only be verifiable (proved to be true) by pursuing the project. For instance, actually reaching the new continent.

Risks: Risks are an evaluation of the value of an opportunity or threat by calculating a positive or negative impact respectively, as well as the probability of a positive or negative outcome.



Project Managers are potential experts at evaluating the probability and impacts associated with risk. Risk Management is a documented PMBOK® knowledge area. Risk evaluation including the identification of risk events, their impacts, and their probability is an early collaboration opportunity for the PM and BA.

Feasibility Assessment

Elements of the Feasibility Assessment take the business analyst one step closer to the business case. They confirm the ability to identify and clearly state the need, capabilities, and effectiveness of the recommended solution. Apply the elements of SMART (specific, measurable, attainable, relevant, and time-bound) to the solution to determine if an objective approach has been identified.

Operational Feasibility

Identify how well the proposed solution meets the business need. This includes how well the solution fits the business, how well the solution will accept and sustain the solution, and the value of the proposed solution.

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This is the first exposure to non-functional requirements. Non-functional requirements are often qualitative in nature, though are an important aspect of solution adoption. Non-functional requirements are often identified by words that end in ‘-ability’. Sustainability, maintainability, supportability, reliability, compatibility, etc.

Technology Feasibility

Does technology to solve the situation exist, and if so can it be found within the business? Might it be acquired from outside with reasonable effort or cost? Does the business have the expertise to create the technology?

Cost Effectiveness

Identify the potential costs and potential financial returns at a high level. At this point you are not looking for details, nor are you comparing alternative solutions to existing investments. (You will shortly.) The BA attempts to affirm that associated funding is generally available.

Time Feasibility

Relative to the time-bound nature of objectives, can the proposed solution meet the delivery date or time-boxed characteristics stated in the needs of the business?

Assess (Alternatives)

Given that more than one alternative solution was identified and documented, gather the relevant feasibility factors for each alternative to further clarify how each may address the situation or better solve the problem. A list of each alternative with a table listing the Operational, Technology, Cost, and Time Feasibilities might further serve to reinforce the proposal being recommended.

Viable Option Recommendation

Weighted Ranking may be used to prioritize entire solutions, features within a solution, or the approaches taken to complete a solution.

Remember that obtaining stakeholder buy-in and approval are important goals for a business analyst. Performing a weighted ranking (also known as **Multi-Criteria Decision Analysis**) enables stakeholders to review and vote on alternatives in order to affirm the viability of a solution. In order to assure that the ranking is not preference based, you need to establish instructions and criteria for analysis. For instance identifying the criteria against which participants are to base their assessments.

A set of sample Weighted Ranking Instructions may be found in the course appendix.

Cost-Benefit Analysis

Before assembling the business case, the Business Analyst must perform a cost benefit analysis. Identifying the potential cost and return for a proposed effort assures that the investment matches the desired value of the solution.

Most businesses use a common Key Performance Indicator or set of standard economic and accounting formulas to compare project returns.

SKILLS: COMPASS

One of the roles of a business analyst is to assure that the solution provides value AND to provide information that may be used to compare the solution's value to other opportunities and problems being addressed by the business. Even a solution that provides a positive return for the investment may be shelved or postponed in favor of an effort with greater significance or more immediate return. The business analyst, much like a navigator who works on multiple maps at once, will regularly review more than one opportunity or problem at the same time. While some of the maps may provide long-term value, others might achieve greater attention due to competitive pressure, immediate returns, or matching existing plans and efforts.

Businesses typically use one of four common portfolio evaluation tools. When one of these tools is used, a specified minimum target may be set in order for any solution to be accepted. The most commonly cited target example is related to Internal Rate of Return. If a business holds an asset portfolio such that the average return achieved by all investments is 20%, then any additional effort or project with less than a 20% return would decrease the average value of the portfolio and therein diminish the average return for the company.

The four tools are:

- **Payback Period (PBP)** : The amount of time an investment or project will require to recover or return the expended funds. Longer payback periods suggest more risk. Example: A project costs \$100,000 and requires six months to complete. Upon completion, the solution delivers \$10,000 per month in revenue. Assuming the investment is made up-front, and insignificant operating costs as revenue is recovered, the \$100,000 will be recovered 16 months (6 months project plus 10 months @\$10,000) after the project is initiated. Payback Period is a high-level comparison. Although

one project has a short payback period, a slightly longer project (suggesting greater risk) may yield many times the long-term value.

- **Return on Investment (ROI):** ROI is calculated by determining the sum of all benefits achieved by the project or effort (often within a fixed time period or using a fixed number of years), and dividing the sum by the total cost of the project. As with Payback Period, the costs used to determine the value do not include ongoing operation or support costs. Extending the example from Payback Period, if an investment of \$100,000 returns only \$100,000 then ROI is 0%. If the project returned \$150,000 in benefits, then ROI would be 50%. The stated limit for an ROI is called a hurdle rate.
- **Internal Rate of Return (IRR):** IRR is the projected annualized yield of an effort or project. In this case, the investment includes both initial and ongoing product costs. Again a Hurdle Rate may be established such that any solution or project that does not meet the Hurdle Rate would be rejected. IRR is more commonly used than ROI, although it requires an organization to monitor and maintain the annualized return for all efforts, not only new projects or efforts.
- **Net Present Value (NPV):** NPV is determined by identifying the future value of a project or effort, effectively at the total point of its expected optimal current and future benefits/returns. The second element of NPV is determination of an annualized rate of return for cash or other financial investments given the current economy. A backward calculation of the project returns is then made using the determined annualized investment rate. This determination identifies the amount of money in current/present dollars that would have to be invested in order to generate a cash return equal to the project return. This method equalizes projects and investments with varying time periods, varying investment amounts, and therefore varied inflation impacts. The investment with the largest value in current dollars should always be selected.

SKILLS:



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Simplified best practice for the four cost-benefit evaluations suggests that you select:

- *The shortest payback period.*
- *The largest ROI.*
- *The largest/greatest IRR.*
- *The highest NPV.*

SKILLS:



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The PMI-PBA exam merely requires that you understand how to select or recommend a solution or project based upon PBP, ROI, IRR, or NPV. The simplest equations associated with calculating each of the four values are:

- *PBP = Cost of project or investment / annual cash inflows.*
 - *Note that PBP assumes a consistent annualized cash inflow, although returns may not be the same from year to year.*
- *ROI = (Investment Revenue – Investment Cost) / Investment Cost*
 - *Note that the challenge with ROI is that cost and revenue are only broadly defined, while both revenue and cost may be composed of multiple, variable elements.*
- *IRR is also referred to as the interest rate (discount rate) required to bring the NPV to zero.*
 - *IRR is represented by R in the following equation: $NPV = \text{Sum} \{ \text{period Cash Flow} / (1+R)^t \} - \text{Initial Investment}$, where t is the number of time periods.*
 - *Business Accounting departments identify the factors and calculate the rate “R” that must be met or exceeded to maintain the value of the current portfolio.*
- *$NPV(i,N) = \text{Sum from } t=0 \text{ to } N \text{ of } Rt / (1+i)^t$ where i is the discount (interest) rate, t is the time of the cash flow, and Rt is the net cash flow. Net cash flow is cash inflow – cash outflow.*
 - *This more complicated formula requires a specialized calculator or spreadsheet to determine NPV across multiple periods.*

The Business Case

As the Needs Assessment comes to a close, and a viable solution has been found that will meet the needs identified in the situation statement, and the solution has been reviewed, affirmed, approved, and validated, the Business Analyst may create a Business Case as input to the initiation of a project. The Business Case may alternately be used to suggest operational process changes, business reorganization, or acquisition of an external solution. In the latter examples, Business Analysis efforts continue outside the framework of a project.

Procurement

One example of a Business Case that does not turn into a formal project, with sponsor, charter and Project Manager might be a procurement effort.

In the case of a Procurement recommendation, the BA plays a role in:

- Vendor Analysis - the selection process, NOT the contract process.
- Developing business and non-functional requirements. You cannot tell the vendor how to create the product, which would be defined in functional requirements.

Business Case

Build the business case from the efforts and materials gathered during the Needs Assessment process. Minimal Elements include:

- Problem or Opportunity. State and clarify the situation statement.
- Analysis of the Situation. All of the documentation, models, tables and analysis conducted during needs assessment, organized and explained in as simple a means as feasible.
- Recommendation. The solution statement, alternatives and selection process, as well as the final solution recommendation.
- Evaluation. Evaluation is the last domain of the Business Analysis. During evaluation the BA confirms the value of the ***Delivered Product***. During needs assessment the BA will have identified or started to identify the criteria that will be used to validate the product. Any known validation criteria, processes or metrics will be included in the Business Case.

Module 3 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) Situation statements always apply the following format:
 - a) Cause – effect – solution
 - b) Problem or opportunity – effect – impact
 - c) The format is situational.
 - d) Need – benefit – cost
- 2) The purpose of a Gap analysis is:
 - a) Identify the current need and alternative approaches.
 - b) Identify the current environment and ability to address the need.
 - c) Determine the differences regarding stakeholder perception.
 - d) Resolve the stakeholder interest versus power grid.
- 3) When determining which problem or opportunity to address first the best approach is:
 - a) Address current problems before looking to the future.
 - b) Focus more on opportunities that improve the sustainability of the company; solely addressing problems is not growth oriented.
 - c) Remove the problems that are barriers to exploiting opportunities.
 - d) Perform an analysis to determine which strength, opportunity, weakness or threat provides the greatest value.

- 4) A successful business analyst most requires:
- a) Certification or a degree
 - b) Strong communication skills.
 - c) The ability to organize and analyze
 - d) An understanding of the business.
- 5) A business analyst is supposed to use a Pareto Diagram to identify the root cause or greatest need. How do you define a Pareto Diagram?
- a) A bar chart or histogram
 - b) A force field analysis of the problem.
 - c) Application of the 80-20 rule.
 - d) A tool developed by Joseph Juran.
- 6) Which of the following would not initiate needs assessment?
- a) An external regulator mandates a change.
 - b) A sponsor or customer requests a product.
 - c) An executive reorganizes the leadership of their division.
 - d) The business analyst recognizes an external opportunity matched by an internal strength.
- 7) What is the best source for obtaining 'as-is' information?
- a) Organizational Process Assets.
 - b) Models generated by the business analyst.
 - c) Benchmarking
 - d) Other business analysts
- 8) What is the best definition of Business Principles and Practices?
- a) Lessons Learned from other projects
 - b) Internal policy documents
 - c) Regulations, standards, or assumed knowledge within an industry.
 - d) The knowledge provided by subject matter experts.

- 9) How should a business analyst interact with a stakeholder with low power or influence and high interest?
- a) Keep them satisfied.
 - b) Keep them informed.
 - c) Manage them closely.
 - d) Monitor them.
- 10) Which of the following statements is true of RACI charts?
- a) Only one RACI chart, owned by the PM, can exist on the project.
 - b) The business analyst may maintain a RACI diagram identifying the accountability for business analysis work.
 - c) If needed, both responsibility and accountability may identify more than one individual.
 - d) Inform means stakeholders who inform you of their needs.
- 11) Which of the following is not a means to display the results of stakeholder analysis?
- a) RACI chart
 - b) Onion diagram
 - c) Salience model
 - d) Goat matrix
- 12) In order to understand stakeholder attributes that may later be applied to modeling, the business analyst may perform any of the following except:
- a) Personal interviews
 - b) Job Analysis
 - c) Actor Identification
 - d) Persona Analysis

- 13) Which of the following stakeholder attributes is individual rather than shared by a group?
- a) Culture
 - b) Attitude
 - c) Experience
 - d) Availability
- 14) What are the results of a cultural assessment?
- a) Determining the region or location that a stakeholder represents.
 - b) Group characteristics are categorized.
 - c) Identification of language and communication styles for communication planning.
 - d) Developing policies relative to cultural sensitivity and diversity.
- 15) What is another term for a portfolio?
- a) A strategic program.
 - b) A business case hierarchy.
 - c) A stock and cash inventory.
 - d) A retrospective.
- 16) What do the L and E stand for in pestLE?
- a) Liability and Equity
 - b) Liability and Environmental
 - c) Legal and Economic
 - d) Legal and Environmental

- 17) You are asked to conduct an Opportunity Analysis. What are you being asked to perform?
- a) SWOT or PEST.
 - b) Root Cause Analysis
 - c) Cost/Benefit Analysis
 - d) Gap Analysis
- 18) As you refine your approved Situation Statement, you are preparing to perform a root cause analysis. Which tool are you least likely to select?
- a) Five Whys
 - b) Ishikawa Diagram
 - c) Competitive Analysis
 - d) Interrelationship Diagram
- 19) Why isn't designing a Process Flow diagram useful for identifying opportunities?
- a) Process flow diagrams are only useful for identifying problems.
 - b) Process flow diagrams are only 'As-is', never 'to-be'.
 - c) Process flow diagrams require time and effort that may not be justified until the Business case is approved.
 - d) Process flow diagrams are never used for root cause analysis.
- 20) What are the primary drivers for performing benchmarking?
- a) To achieve competitive advantage.
 - b) To determine business principles and practices.
 - c) To identify missing data and financial information.
 - d) To discover best practices in other parts of the company.

- 21) What is the major difference between an enterprise business architecture and a capability framework?
- a) An enterprise business architecture is about systems and a capability framework is not.
 - b) An enterprise business architecture is more detailed than a capability framework.
 - c) A capability framework focuses more heavily on products and deliverables.
 - d) The two tools are identical.
- 22) A business analyst conducted thorough situation, capability, and gap analysis. A high level approach has been presented, but the analyst failed to share discarded alternatives during the presentation. What is the most likely outcome?
- a) The priority cannot be assessed from the information gathered.
 - b) Stakeholders will not participate or commit efforts due to lack of ownership.
 - c) The complexity of the project has been oversimplified, generating incorrect assumptions.
 - d) The business analyst will be asked to revisit the problem.
- 23) Which of the following is not a project management and business analysis collaboration?
- a) Identifying constraints
 - b) Documenting assumptions
 - c) Evaluating risk
 - d) Create a feasibility assessment.
- 24) Four projects are being compared based upon PBP. Which project should you recommend?
- a) Project A has a PBP of 6 months.
 - b) Project B has a PBP of 16 weeks.
 - c) Project C has a PBP of 1 year.
 - d) Project D has a PBP of 30 weeks.

- 25) When comparing the selection of projects using IRR, a hurdle rate of 12% is provided. What does this mean?
- a) The project can borrow funds at 12% APR.
 - b) The project must exceed a return of 12% even to be considered.
 - c) The 12% is a target. Select the best project regardless of the calculated IRR.
 - d) The organization set an arbitrary 12% number to filter project selection.
- 26) Four projects are being compared using NPV. Which would you select?
- a) Project A has an NPV of \$200,000 but takes 4 years to complete.
 - b) Project B has an NPV of \$50,000 but takes 1 year to complete.
 - c) Project C has an NPV of \$125,000 but takes 18 months to complete.
 - d) Project D has an NPV of \$95,000 and only takes 6 months to complete.
- 27) For what purpose are PBP, ROI, IRR, and NPV used?
- a) Determining the value of current assets.
 - b) Performing Cost/Benefit analysis.
 - c) When no other measures are available for project selection.
 - d) To satisfy organizational standards.
- 28) A business case is composed of several elements. Which element is not a fundamental part of a business case?
- a) The situation statement.
 - b) The recommendation.
 - c) The value of the solution.
 - d) A procurement recommendation.

Module 4 – BA Planning

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

- Refine Stakeholder Analysis
 - Characteristics
 - Job and Persona Analysis
- Project Lifecycles
 - Predictive
 - Adaptive/Agile
 - Lessons Learned
 - Retrospectives
- Levels of detail
- Project context and solution value
- Create the BA Plan
 - Requirements and Requirements Management
 - BA Plan elements
 - Elicitation Planning
 - Relationship to lifecycle and sequencing
 - Analysis Planning
 - Requirements Prioritization
 - Traceability Approach
 - Communication Approach
 - Decisions Approach
 - Verification and Validation
 - Change Process
 - Solution Evaluation

- Business Analysis Work
 - Work plan
 - Deliverables
 - Tasks and Activities
 - Timing and Sequences
 - Roles and Responsibilities
 - Resources
 - Estimate work
- Assemble the Plan
 - Approach
 - Review
- Obtain Approval

For the project managers amongst you who are reading this course, you will understand the next suggestion quite well.

Plan before you execute, and execute to the plan.

Business analysts, who are regularly assigned to discover all things, all the time, find themselves alternately digging into tomes buried within ancient libraries, scurrying among the cubicles of co-workers for bits of useful trivia, or perusing vendor stalls looking for the next great idea or invention. In order to affect the desired outcome, a plan is most necessary.

Planning is essentially setting aside time to consider a specific goal, gathering relevant facts, understanding your starting point and current limitations, and organizing a course of action to move toward the goal.

If you were moving forward alone you would merely gather the most important resources that you can carry (or transport) and move in the generally correct direction. But you are not alone. Business analysis is about helping a group, team or tribe to achieve more together than any of you might achieve alone or via

mere addition of skills. You are looking for factorial improvements. This generates true value rather than mere exchange of resources.

Note that this module assumes you already have a clear understanding of business analysis tools and techniques. If you are attending this course or reviewing this material for the first time, you still have much to learn prior to your first formal plan.

Recall navigating your back yard for the first time. Or traveling to a friend's house by bicycle or afoot. You spent a little time planning what you might take, getting ready, and planning your route. As you considered larger efforts, you either relied on accumulated knowledge or broke the work into component efforts.

The same is true in business analysis. If the scale or scope of work appears larger than your direct experience dictates, you will **decompose** the work into smaller elements in order to organize your approach. Checklists can help, as well as referring to prior efforts by other business analysts. Once you have an understanding of your skills and needs, you will often need to remind yourself to plan and to help others understand the plan, before you race forward anticipating the outcome.

Business Analysis planning is about how you spend your day, or days, depending on the scale of the work placed before you. You start with assignments and evolve to more self-defined work as you grow your experience and accountability. You have many options. Understanding processes and their inter-relationships defines the best approach to follow.

Project environments create unique opportunities and introduce unique constraints. These must be taken into account on a case by case basis. Mere repetition of familiar tools may not create the best possible value.

Complex, high-risk solutions suggest predictive projects, more detailed analysis, formal documentation, fully planned deliverables, and careful controls. Short term, time boxed, immediate needs based solutions suggest adaptive/agile projects, team based analysis, informal documentation, iteratively planned deliverables, and modest controls. Both approaches require verification toward their respective planning approaches, value determination (validation), and formal approval.

As a business analyst, you will be responsible for recognizing the approach mandated or suggested by the industry or organization you serve. You may sometimes be asked to recommend the best approach given a particular need or solution requirement. You neither want to spend too much time planning your efforts nor working on efforts for projects with lesser value. You do not want to become the resource whose cost causes the project to be a financial (and value based) failure. Your goal should not be to provide everything or to demonstrate your skills. Your goal should be to provide just enough of the proper ingredients that the result offers high value for the investment.

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On the PMI-PBA exam, if asked for the process you might follow – ALWAYS follow an existing plan, whether it is the plan you created during Business Analysis Planning or the Project Management Plan created by the project manager. Whether you work as a dedicated business analyst, or in the hybrid BA/PM role found in most organizations, you need to understand the tools and processes used by Project Managers. BAs tend to identify the what? and the why?. PMs tend to identify the how?, the when?, and the how much? while refining the what?

Remember that the Project Management Plan is an overarching document composed of sub-plans for each of the relevant knowledge areas from the PMBOK® Guide. The primary knowledge areas are: management of Project integration, Scope, Time, Cost, Quality, Resources, Communication, Risk, Procurement, and Stakeholder relationships. For those less familiar, the first step within any planning process includes considering the full suite of tools available to you, and documenting the proposed set before actually stepping into the planning process. You may always change your mind as you discover new details (that's called **Progressive Elaboration**). Specific subordinate plans may be created for requirements management, scope management, communications management, or stakeholder relationship management – each affecting deliverables provided by the business analyst. As such the project management plan, which is the primary planning document for a project, is composed of multiple sub-plans with one or more potentially representing each of the ten knowledge areas.

Within Business Analysis Planning, the BA creates a plan for the work that will be delivered relative to a specific Needs Analysis, its situation and solution statements, and the Business Case that may have resulted. This work will definitely both precede and follow any project initiated due to the Needs Assessment, as well as provide deliverables toward the approved and funded project.

The goal of Business Analysis Planning is a clear understanding of Business Analysis deliverables. Some will be formally documented and delivered, while others are merely the application of business analysis talent, knowledge and skills. Remember that you are the Navigator. Much of your work is done behind the scenes, yet is critical to providing direction and measurement for success. You will report to a Project Manager during the voyage we are labeling “the project”, even if you are the subject matter expert who identified the potential for success based upon a specific route that you have charted. After all, the PM knows and manages the crew. This allows you to perform other relevant and often critical services as the BA.

SKILLS:



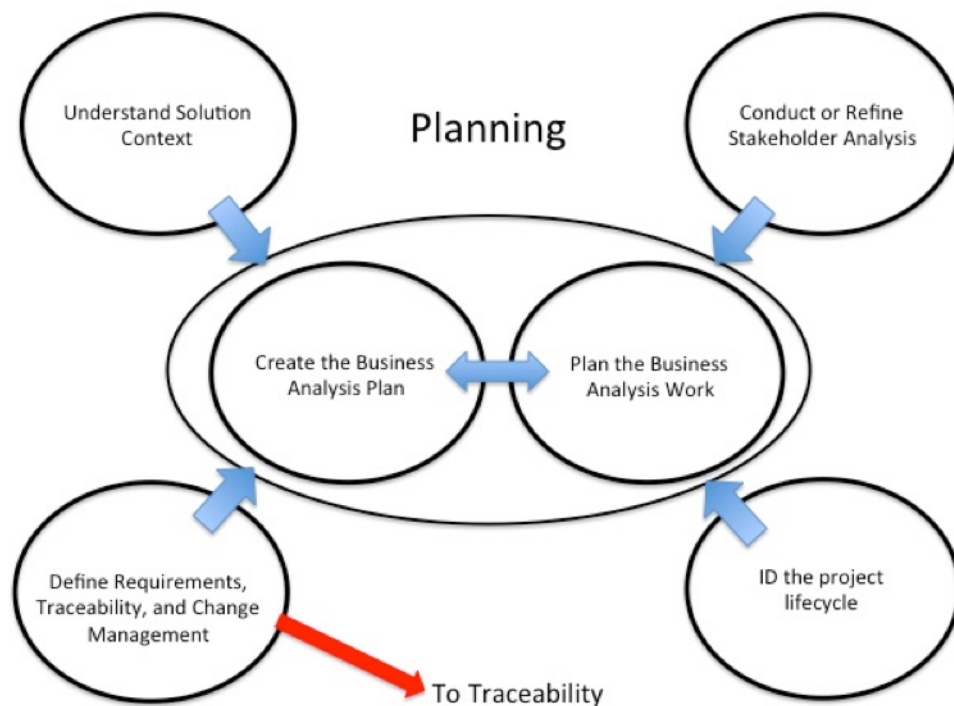
ANCHOR

To create a Business Analysis Plan, you will need to work with several stakeholder groups. An understanding of interaction, roles, and authority will be critical to certification.

The Business Analysis Plan is:

- Developed by BA, PM and team. You will work with the PM to clarify roles, authority, and responsibility. You include the project (development) team within this effort in order to affect team building, establish trust, and to build a sense of understanding for the goal and commitment to the project.
- Reviewed by PM, Sponsor and key stakeholders. In order to assure that all relevant details and deliverables are understood and documented, you always want to achieve approval from the stakeholders who will be most accountable for confirming success and approving value during final delivery. The PM is your partner in this endeavor, the Sponsor is 'funding' the effort – politically if not financially, and key stakeholders include the business and product owners whose interests you are representing through your efforts.
- Approved by BA, PM, Sponsor. As a professional business analyst, you always desire formal approval as you pass from one stage of an effort to the next. The perfect perspective obtains signoff from the primary partners to an endeavor, assuring their commitment to one another and to the common goal. As such you need to obtain signoff for the plan from the PM, the Sponsor, and from yourself. This suggests that you have been negotiating for this outcome throughout the development and review process so that the approval is not truly an independent step.

In order to plan your deliverables you need to organize and document details within four specific arenas: 1) a more thorough understanding of the **stakeholders**, 2) the **project life-cycle** to be applied and its impact upon your deliverables, 3) the level of detail desired for **requirements generation and traceability**, 4) the criteria necessary to provide **solution value and acceptance –the solution context**. These four determine the informal or formal nature of elicitation and analysis; needs prioritization; communication; change control; verification and validation; and eventual solution adoption and evaluation. Each of the determinations result in the development of your plan.



Lifecycle Approach: State Diagram and lifecycle analysis

SKILLS:



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There is a natural progression as you work through the four arenas. The Business Analysis approach is a workflow itself, and may be designed via a workflow. Existing workflows are an analysis tool used to identify 'as-is' processes during Needs Analysis, and to identify potential 'to-be' processes during Elicitation and Analysis. Since the business analyst understands workflow tools, you might use an existing template or create one for yourself as you sequence through your planning and deliverable work. The specific creation of a Business Analysis workflow is not a BA deliverable. Remember to use appropriate tools to organize your work, without creating excess overhead.

You do not need to start with Stakeholder analysis, although this is a logical first step since stakeholders typically influence or dictate other business analysis work. Understanding the project life-cycle might dictate the nature of stakeholder involvement. For instance, Agile projects typically include a **Product Owner** who is responsible for contributing and/or approving requirements (called **User Stories**). Further, you may already have a clear understanding of the situation statement, product or solution, and value desired through your Needs Assessment efforts such that refining the approval process might be a continuation of those efforts and a simple next step.

The ***Business Analysis for Practitioners: A Practice Guide*** does not dictate a specific sequence or workflow. Use of a workflow is mentioned as one approach. You need to understand how the tools work and interact. Start with the information available to you. Merely assure that you consider all the elements and incorporate those essential to successful solution delivery.

This course strongly encourages learning through the use of workflows, models, and process relationships to affect a clear understanding of the essential skills and tools used by Business Analysts. The recommended sequence is the most common, as it reflects the timeline often used for a single product identification, and the project that provides the desired solution. Humans are best at time sequential processing.

You wouldn't want to board a ship crossing the ocean without appropriate plans and resources, even if you find yourself altering the plan mid-ocean. Recognizing a sequence or a checklist assures that you remember all the relevant materials, even if you choose not to bring them along.

When you are ready, let's start some business analysis planning.

Refine Stakeholder Analysis

The work of identifying and building relationships with stakeholders continues above and beyond projects or defined work. We have already stated that Communication and People are a majority focus for business analysts. During Needs Assessment you began to organize and document organizational stakeholders in a general context. Once you have a specific situation to solve or solution statement to deliver, you need to filter and refine your understanding of stakeholders in order to properly elicit and define the requirements. You also need to understand who will be accountable for approval of the requirements, approval of the work plan and the work itself, and ultimately approve the product and its transition into operational use.

SKILLS:



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Additional Stakeholders are identified during the BA Planning process domain, a continuation from the Needs Analysis domain. This effort will continue formally through the Elicitation and Analysis domain. For example, one of formal questions you should ask during Elicitation is “who else might have input or requirements regarding this solution/product?” You can also ask the question during informal stakeholder sessions, interviews or personal analysis.

SKILLS:



STEERING
WHEEL

If you took a break between modules, take a quick look back into Module Three. Review the underlining elements of Stakeholder Analysis before proceeding. Pay attention to the concept of Stakeholder Attributes. You will be further refining the detailed characteristics of stakeholders and stakeholder sets as you progress through Business Analysis Planning.

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During Needs Assessment, you generally identified stakeholders, their characteristics, the role within the organization, and their ability to support or influence solutions that provide value. If you inherit a solution from another business analyst, or find yourself assigned to a project that does not have a Business Case, statement of work or other agreement, there may not be a detailed stakeholder analysis from which you start. You should have a Stakeholder Register, RACI diagram or other stakeholder identification effort in order to conduct more thorough analysis. If such does not exist, then you need to take a step or two backwards before you start the effort towards Refining Stakeholder Analysis.

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Remember that you partner with the PM/Captain in order to develop stakeholder documentation. The effort is collaborative, and you share information as members of a project Core Team. Nevertheless, the Navigator will often delegate responsibility, and maintain reference information about stakeholders that is irrelevant to the Captain. In such cases, you maintain your own documentation. This may include a separate stakeholder register, RACI chart or other documentation. For instance, if you delegate requirements elicitation to another BA or hire an outside consultant, they may be included as Accountable or Responsible within your RACI chart for the deliverable. You remain Accountable for the deliverable in the PM/Captain's RACI diagram and have no authority to alter that part of the project plan except through an approved change process. It must be noted that this is NOT duplication. Duplication hurts the partnership trust and the project effort. A work package owner understands the details associated with each activity, and may create checklists to assure the resources and tasks are complete, although the specific details may not be documented within the project plan. Always organize your information and be prepared to share it with stakeholders in authority when asked. This demonstrates the organization and professionalism of a business analyst.

Brainstorming

Brainstorming may be considered the most important means of identifying peripheral stakeholders. The primary goal of brainstorming is to identify ideas, requirements, and information relevant to a problem or solution. As ideas are provided, the BA may discover the need for other stakeholders who may be able to provide clarification or additional input of their own.

Much like the role of Elicitation and Analysis, Brainstorming itself consists of two elements: information gathering and analysis. Use Open Questions to achieve clarity and consensus that the information gathered is comprehensive and complete.

Brainstorming will generate more than just stakeholder lists. The foundation for many requirements and further business analysis tasks also arise during brainstorming sessions.

Organizational Charts

If the organization you support has an organizational chart, obtain one and start your stakeholder list from this framework. A good organizational chart will minimally identify stakeholders with influence and authority, as well as representative management for affected internal end-users.

If an organizational chart does not exist, the business analyst should start to create one.

Don't forget that organization charts may be localized, regional, or global in nature. Titles and roles may change, and interrelationships will vary based on industrial standards, culture, and corporate vision/strategy.

SKILLS:



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*Although not referenced in **Business Analysis for Practitioners: a Practice Guide**, the **Work Breakdown Structures** and related templates from prior projects might be an excellent resource for identifying both internal and external stakeholders. The **WBS** from prior projects would be found within the **Organizational Process Assets** available to PMs and BAs for use during both internal needs assessment and project planning.*

Stakeholder Characteristics

The stakeholder list will continue to grow. You need to identify individual stakeholders who will be responsible for reviewing and approving the work and the solution, who have the ability to influence or control outcomes, and who provide the needed work. At the same time you will identify individuals who represent larger audiences or sets of stakeholders. The stakeholder register may contain both personal and group attributes.

Attributes

PMI identifies several characteristics that are relevant to business analysis work.

- Attitude – those who champion, support, remain neutral, are disinterested, or who oppose the solution or the effort.
- Complexity – large audiences with varied needs, input, interactions, diverse work efforts, and/or who provide multiple contributions. Multiple stakeholders and ambiguity are the two factors most influencing complexity.

- Culture – multiple aspects affect culture including age, nationality, ethnic group, tribe (defined by sociology as a group of 20-250 with a common goal), education, department, division, and organization.
- Experience – the training, knowledge and prior exposure to elements that may be related to affecting the desired solution. Identifying individuals who either possess or lack the requisite experience may be useful while determining the value of their input as well as determining the elicitation and analysis approach required by the BA. Experience is not merely about an individual's ability to perform a task. It includes tenure and exposure to cultural, industrial, and referent influence. Experience analysis should also consider a stakeholder's exposure to the tools of business analysis. For example, a stakeholder with strong technical experience may not have been exposed to the elicitation techniques desired by the organization or preferred by the BA. Breadth of knowledge and the progression of skills are preferred within most organizations. One of the roles of a BA is to identify and close related gaps – and one ideal way to affect both official and informal deliverables is to pay attention to stakeholder experience.
- Level of Influence – The authority of a stakeholder to require or approve solution requirements, funding, or related work remains important to project success. Real and perceived influence also affect the manner in which others react to their input and attitude. Rank, reporting structure and job title are external indicators, while reputation, relationships, knowledge, experience and prior success are also factors. Focusing on influential stakeholders, without ignoring the inputs from others, is a means to building supportive relationships and guiding collaboration.
- Location and Availability – Geographic dispersion bears a significant impact on the effectiveness and efficiency of work, from both an operational and project oriented perspective. **Collocation** is always the preferred mechanism for team building, obtaining consensus and affecting collaboration. Given the increasing global nature of work and marketing

efforts, and expanding technology support for virtualized workforces, collocation may not be possible.

From a business analysis perspective, location is a key factor in determining:

- Techniques used to elicit information and requirements.
- Estimating hours needed to gather and analyze inputs.
- Language, communication methods, level of detail, and information formats.
- Determining the use of models and other graphical presentation tools.
- Identifying the forms and frequency of collaboration, including time zone differences.
- Selecting the tools to manage, trace, and share requirements with project stakeholders.

Culture

Culture may be one of the more difficult stakeholder attributes to identify. Few individuals belong to a single culture. Culture may be based upon geographic or national location, though is not identified by this criteria alone. People create culture based upon how they perform work, regularly interact with other people, interpret and share communication, question or interact with authority, view their role within society or within the business, handle conflict, and express personalities. As such individuals are almost always members of multiple cultures simultaneously. Although culture and complexity are different attributes, culture certainly has an impact on complexity.

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There are potentially dozens of established and accepted measurement systems that help us to understand or define cultural and communication differences from a social perspective. No singular tool is central to business analysis. You might want to become familiar with Myers-Briggs Type Indicator (<http://www.myersbriggs.org/>), the DISC assessment, or the motivational theories of Abraham Maslow (Hierarchy of Needs), Douglas McGregor (Theory X and Theory Y), or Frederick Herzberg (motivation-hygiene theory). Although detailed knowledge of these, or other tools, is not required for the PMI-PBA exam general knowledge is recommended for most PMI certifications. The DISC (dominance, inducement, submission, compliance) behavior theory of psychologist William Moulton Marston was modified to create a behavior preference assessment tool by industrial psychologist Walter Vernon Clarke. For more recent work, consider the research and theory presented in Tribal Leadership: Leveraging Natural Groups to Build a Thriving Organization by David Logan, John King, and Halee Fischer-Wright.

Stakeholder Groups

Business analysts utilize a range of tools to characterize stakeholders as sets. Sociologists would use the term **tribe**. A tribe is considered a common subset of society that tends to operate in an interdependent and often collaborative nature. While stakeholders should be considered and treated as individuals, grouping can help to identify characteristics common to a need, a solution, or the process best followed. Common stakeholder sets for a solution might include the end-user, the core project team, the development team, testers, vendors, the leadership team, etc.

A list of the more important tools with which a business analyst must be familiar includes: organizational charts and modeling, process modeling, risk analysis, stakeholder maps, job analysis and persona analysis. The last two are considered components of Business Analysis planning.

Job Analysis

Job Analysis is a technique used to identify the talents, skills, competencies, or other requirements needed to successfully perform a specific task or job. Job descriptions may already be available as components of **Organizational Process Assets**, in which case the BA can use the information to identify potential stakeholders with the *experience* to provide quality requirements or contribute to solution execution.

SKILLS:



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Note that the PM selects and manages the team performing the work. The BA and PM collaborate to identify the characteristics of the potential team members. As such, job analysis provides a general input or template for use in Project Resource Management.

Job Analysis may be used to determine ‘as-is’ states for work descriptions and needs, or to identify the ‘to-be’ state associated with the problem, need or solution. A BA may help to create new or revised job descriptions as a component of Business Analysis planning.

Outputs from job analysis include job descriptions; identification of training needs; information used for job posting, candidate review, and team selection; and elements used within performance appraisal processes. These outputs may be project specific, or support the operational nature of business analysis work.

Persona Analysis

Persona Analysis focusses more specifically on a class of users or process workers. The results are descriptions of stakeholder sets that might be used in models. A persona is ***fictional*** rather than representing specific individual or group characteristics. Personas often belong to classes of individuals, may be characterizations, or describe a form of interaction.

As a navigator, how would you characterize a ***Pirate***? Yo-ho, yo-ho a pirate’s life for me! Jolly, rum swilling, malfeasant, carefree, villainous, thieving, unhygienic individual willing to take your gold in the most efficient means possible? How about a ***cartographer***? Talented, detail oriented, graphical designer of navigable maps who will accept your money in exchange for a quality product?

Note that personas are about both characteristics and interactions. They help to define how you interface with the stakeholder set, as well as how the set might be placed within a process.

Information Technology projects often use personas to identify how systems interact with end users. Flowcharts and other models use the persona as a representation of various interactions with the solution. Due to scale, it is often impossible to interact with all stakeholders. The BA creates a class of user and associated persona to assist with the development of interface requirements. The general case suggests the creation of a persona to identify how users would interact with a system, a process, or use of product.

A persona may or may not represent an actual user or set with interest or influence over the project or other outcomes. As such, personas do not require the more detailed attributes associated with specific stakeholders and would NOT be placed in a stakeholder register.

SKILLS:



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A persona is written as a narrative that tells a story about the user class. They can be simple like the descriptions of the pirate or the cartographer previously provided, or contain far more detail about the goal, motivations, behavior, environment, demographics, needs, skills or focus of the class or group. Note that several of the persona attribute categories listed in the previous sentence were simply characterized in the prior examples. Clarity and precision, when possible, are preferred over detailed descriptions, although the latter may be necessary to assure full understanding by the development team. A persona description may use a template, and is commonly one or two pages in length within formal process frameworks. When we move into requirements analysis, the specific attributes associated with requirements clarity will be better defined. Use of common language sets is desired, or the creation of a Glossary of Terms may be required prior to persona description, or requirements presentation.

Personas are behavioral (and interactive).

Job Analysis is descriptive (and more detailed).

Assemble and Share Stakeholder Results

Whether or not BA efforts are formally presented, they should be shared with the PM, sponsor, or project team members to obtain feedback and confirmation of correctness (verification).

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Be very careful sharing specific stakeholder information. Laws control the storage and distribution of Personally Identifiable Information (PII), and you should be aware of the regulations, business controls, policies and standards in place within your organization before sharing or publishing related information.

The intent is NOT to stereotype. Use individual stakeholder attributes, job analysis, or persona creation to create a clear and measurable approach to conducting development work.

The primary purpose for stakeholder analysis is two-fold:

1. Setting the stage for the BA toward planning and monitoring additional, relevant BA work.
2. Assisting the PM and development team to obtain a clear understanding of the stakeholders and the best way to interact and collaborate throughout the project lifecycle.

Although ***Business Analysis for Practitioners: A Practice Guide*** places identifying the project lifecycle, determining the level of detail, and understanding the project context within the creation of the business analysis plan, this effort is more realistically prior and external to creating the formal plan itself. Your findings and related information will likely be documented within the Business Analysis plan. You won't be conducting all of the efforts suggested within the next four major sections of this module. In many cases one input or decision negates another. For example the project will conduct either a predictive or an adaptive (Agile) approach, not both. Predictive approaches suggest if not mandate a greater level of documentation detail and traceability than adaptive projects. While both predictive and adaptive projects require formal approval, the nature of the process and timing of approval and adoption varies greatly depending on the lifecycle approach. Verification and validation elements and approaches – effectively confirming delivery of the solution – also vary depending on the project lifecycle and the nature of the traceability.

Understand the Project Lifecycle

Are you crossing a vast, uncharted ocean, or sailing down a charted though constantly changing river way? Both suggest common navigational skills, although a very different application. The same is true with the application of business analysis and project management skills once a lifecycle approach has been determined.

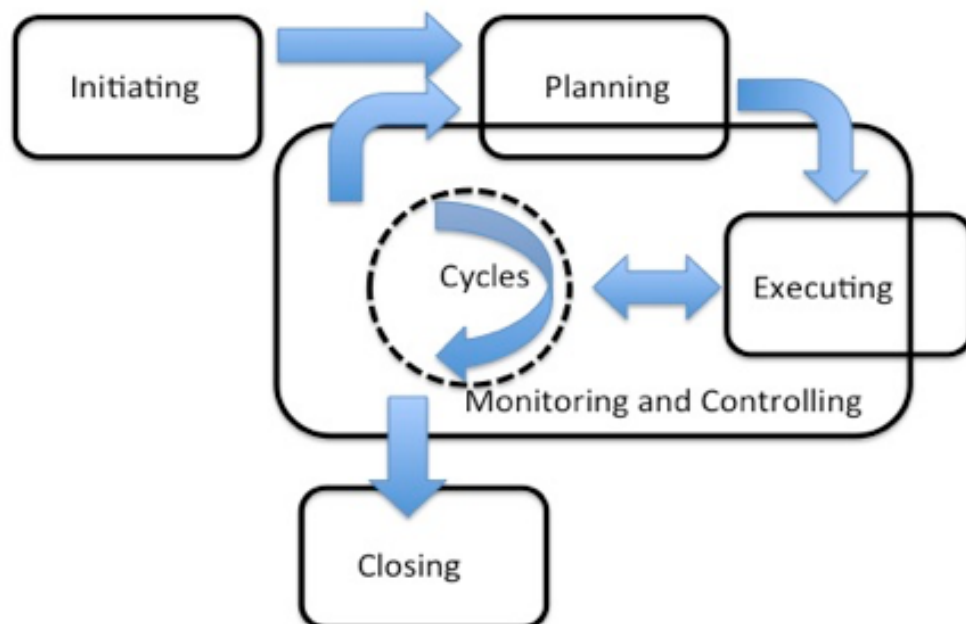
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Return briefly to Module One and review the material on Lifecycle(s). You must be aware of the project lifecycle preferred or pre-set by your business organization. In the ideal world, the PM and BA partner to identify the best form of lifecycle, related BA deliverables and project approach. The form of lifecycle is predicated upon the characteristics of the need, the urgency associated with product delivery, as well as the complexity and scale of the work required. It truly should not be mandated by business leadership, a PMO, or previous efforts. If you do not have the choice, and cannot influence the best possible lifecycle matching the solution, you still need to be aware of the strengths and weaknesses of each approach.

According to the project management lifecycle, a project passes from initiation through final administrative closure only one time. A product may be iteratively refined before passing to the closing process group. Alternately a subset of the components and deliverables may pass to administrative closure for review or acceptance by the customer or end user as they are completed. The delivery of the final component, deliverable or completed product signals final acceptance and the related formal administrative closure. The effort may cycle repeatedly through planning and executing processes, overseen using monitoring and controlling tools and techniques. You may predetermine the number of cycles by design, or the cycles may arise due to preventive and corrective efforts across the timeline. A predictive lifecycle is fully plan-driven and pre-planned. An adaptive lifecycle is fully change driven. Iterative and incremental projects lie between fully planned and fully change driven. Since iterative and incremental approaches are more likely pre-meditated, they tend to be more closely associated with predictive/plan-driven efforts.



The selection of a product lifecycle should be driven by the following characteristics.

Predictive

- Need, situation statement, and solution are predefined and known throughout.
- Minimize uncertainty or risk.
- Pre-define the scope of work (the addition of detail is merely referred to as **Progressive Elaboration**).
- The triple constraint: Scope-Schedule-Cost is predefined prior to execution.
- Business Analysis including requirements generation is completed up front and **Traceability** becomes the BA's primary function during the project effort.
- Deliverables are determined and documented prior to execution.
- Change control is predefined and formally managed.
- Business value is determined after final administrative closure.

Related terms include waterfall, cascade, plan-driven, traditional.

Iterative or Incremental

Recall that iterative and incremental vary in the course of action they follow, although both require significant planning and preparation prior to execution. Both are considered equivalent for the PMI-PBA exam, and are more likely associated with a predictive approach.

When you know the goal but need to refine the course to find the location, you will use an iterative approach. Juan Ponce de Leon reported potential locations for the mystical land of Bimini cited by the indigenous peoples of the Caribbean as home to the fountain of youth. The goal is discovery of the source of those waters. You chart a course and modify the location through refinement of your measurements.

When the goal is so large that you cannot chart it in a single season, you break the scale into smaller elements to assure successful application of resources and incremental measurement. You need to map all of the islands in an archipelago, designating possible safe harbor, sources of fresh water, and possible trading partners for each and every island. The goal is known here as well, and discoveries themselves are likely to be progressive. You know the extent of the resources and range of your vessel without replenishment, and must minimize the risk to ship and crew.

Many of the characteristics of a predictive project exist for either an iterative or an incremental project, though success for both is reliant on handling change – often less formally than within a predictive project.

The specific characteristics of iterative or incremental efforts, one or more of which may or may not be present, are:

- Business Analysis efforts are conducted extensively upfront, and then in smaller elements throughout.
- Requirements analysis is **time-boxed**.
- Split into phases, stages, or subsets that are intentionally repeated or refined.
- Work is performed sequentially with some overlap.
- High level scope is fully pre-defined, and then progressively elaborated.
- Scope for each new phase or stage is pre-defined before the stage is executed.
- Features are added iteratively or incrementally to create a single product.
- Need and solution become measurably more stable as work progresses.

Adaptive

Generally, adaptive projects suggest that risk or uncertainty are unavoidable, or at least indeterminate, yet there is a high perceived value to the need or solution. Emphasis is placed upon achieving and measuring **Value** versus minimizing risk. Value is therefore measured frequently and in small increments to provide feedback for future action. The need and the solution may even be unknown, unclear, or uncertain except in the highest terms. For instance, achieving a profit without any idea of the product to be designed, produced, or sold.

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Agile methodologies, as stated in Module One, are the most commonly mentioned form of Adaptive processes. Although there are many forms of Agile, learn to recognize the terms associated with Scrum-Sprint and Kanban in order to answer questions on the PMI-PBA exam.

The specific characteristics of an Adaptive Lifecycle are:

- The business analyst's work is continuous and constant, although far less formal (or at least far less formally managed and documented).
Traceability may disappear as a formal deliverable, even though the Traceability Matrix is the BA's primary toolset.
- Emphasis on business value versus risk.
- Time and cost estimates are fixed per iteration. For instance a sprint is typically set at 10 business days or two calendar weeks, and the team/resource size is limited to 8 members including the Product Owner and Scrum master. The scope of each iteration is therefore defined by the limits of the time, cost, and experience of the team members.
- Overall scope or general objective is stated up front, but specific requirements per iteration are defined at the start of each cycle.
- Cycles are short and fixed, and assessed for **value** only at the end of the cycle. (They may be **verified** daily at standup meetings.)
- Change is expected, managed through a **product backlog**, and reprioritized regularly and often.
- Product features are accumulated to create a release. Features may be replaced or refined until a release is complete. Releases are formally approved and constitute a completed set of iterations. Releases are assessed for value and formally approved.

Adaptive lifecycles are also referred to as change-driven, Agile, Extreme, or use a variety of other Agile methodology labels.

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The business analyst is responsible to assure that the team is trained relative to the selected lifecycle approach and terminology. Stakeholder experience relative to the formality or informality of the approach, including appropriate use of terminology, authorization and approval are critical to solution success. The role and authority of the PM and the BA must be clearly predefined in any case, since the different approaches clearly vary relative to stakeholder interaction and perceived authority. The PM and BA also have an opportunity to partner relative to specific BA deliverables, order and sequence of activities, level of formality regarding documentation, traceability, change control, prioritization, and authorization and approval.

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During business analysis planning, the BA regularly reviews Organizational Process Assets to glean information from archival records toward implementing internal best practices and/or improving upon mistakes and incomplete efforts from prior projects. A significant difference between Predictive and Adaptive projects is the legacy documentation that they create and how the information is recorded. You need to understand the differences between Lessons Learned created by predictive approaches and Retrospectives used in Agile projects.

Lessons Learned are contributed to by project team members and formally gathered and documented by the project manager. They are supposed to be filed as formal documents within the project archives during administrative closure at the end of a stage or phase, and specifically during final administrative closure. They may be created more frequently due to major events or project management efforts.

Business analysts seek insights from similar prior projects to identify estimates, metrics, and other processes that might apply to the current solution.

Retrospectives are scheduled when a release, phase or the full solution of an Agile project are completed. They may also be conducted on a scheduled basis or at fixed intervals. Retrospectives have been used for many years on Kanban projects, and migrated to use within the Scrum/Sprint approach. The primary goal is to determine where team performance can be improved (NOT to review the backlog of user stories or incomplete work).

Retrospectives follow a formal meeting outline, typical of many Agile methodologies to affect a common, rapid approach. Three simple questions are asked either collectively or in three cycles during the Gather Data step of the process: What is working? What is not working? What needs to change? The formal steps to the meeting may be asked on the PMI-PBA exam. They are:

- Set the Stage – context, tone, and intent of the meeting established.
- Gather data – Factual and relevant data is gathered relative to the three performance questions.
- Generate insights – team looks for commonality amongst the data, conducts a cause and effect analysis.
- Decide what to Do – apply a collaborative approach toward a course of improvement.
- Close the Retrospective – formal close with stated action or next steps.

The BA may review notes from previous Retrospectives in order to assess the team's preparation for the current solution and related efforts with which the BA may assist toward consensus, training, or value generation.

Understand the Level of Detail

The core of a business analyst's work during a project is associated with requirements elicitation, analysis and documentation; traceability and monitoring value; and assistance managing change control. The scope of BA work, the required work deliverables, and the formality associated with these elements is heavily determined by the selection of a project life-cycle. Nevertheless, the BA, PM, team members, and Sponsor need to work together to clearly define the nature and conduct of business analysis work. A Project Manager needs to carefully determine which of the many tools documented in the PMBOK® Guide might be used on each project without unnecessarily increasing project management overhead or costs. Consulting experience suggests that PM costs should not exceed 10% except as oversight for the highest risk projects. Business Analysts must apply the same considerations to assure that BA work does not cost so much time, effort or money that it diminishes the measured value of the product or solution.

There is no singular checklist for determining the proper level of detail. More is always better since this aids understanding and consensus. Understanding and consensus gain commitment from the team and greater likelihood of support and approval from the sponsor and end-users. The business analyst should continue to gather and organize copious notes and clarification, using communication and relationship building skills to gain understanding and commitment. Not all of this related work can be billed to a single project budget, however. The BA needs to achieve a clear understanding of deliverables, their associated effort and cost, and the minimal required elements to affect both project and product success.

The level of detail should be that which is necessary to produce product value and assure project success, but no more than is necessary.

Related considerations include:

- Minimizing the risk of poor or incomplete requirements and estimates.
- Guiding stakeholders toward understanding of the required commitment relative to their participation and to the work of the BA.
- Clarifying by whom and when signoff, prioritization, acceptance, change management, and approvals are made – all based upon the project lifecycle being applied.
- **Rolling Wave** planning or estimates suggest detail only for near term deliverables and broad variance in longer term estimates and deliverables. The horizon separating near and short term needs to be well defined.
- Provide BA planning flexibility by providing only high level commitments, while incorporating the potential for more detailed management or controls as required.
- Make certain that key BA deliverables essential to assuring and confirming solution value are well documented regardless of lifecycle approach. Key decisions that have to be managed as the effort progresses must be clearly stated up front.

Understand the Solution (Project) Context

The solution context incorporates the characteristics, both fixed and variable, that will be used to aid the sponsor, team members, and end users toward understanding the effort necessary to create Value.

From the realm of Project Management all projects are temporary and unique. This uniqueness suggests that there is no single best approach to business analysis for a project. Each project is created based upon a unique need, situation statement, solution, and business case. Look back at each of these elements. Hopefully you are the business analyst who created them, making your review brief and summary in nature.

A Business Case is the link between business goals and programs/projects.

The Business Case Hierarchy (Goal > Objective > Business case) defines the purpose of business analysis and project work within organizational context.

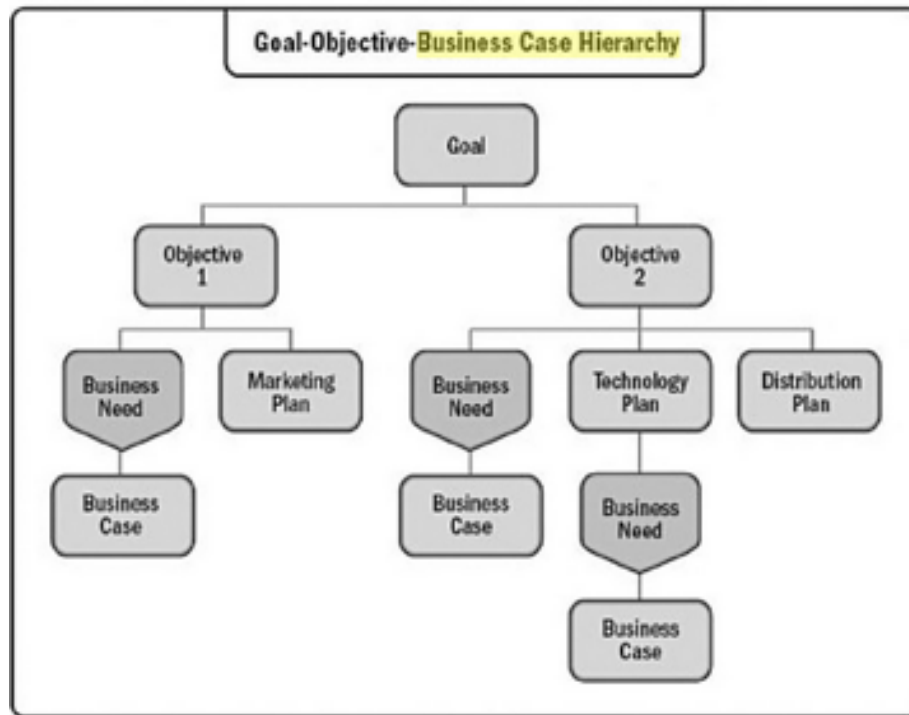


Figure 2-1. Example Hierarchy from Goals to Business Cases

The primary purpose of a project charter is to promote PARTNERING. The project charter derives from the business case and formally authorizes resources, including business analysis, to pursue the recommended solution.

Whether the business analyst created the Business Case and the Charter, or was assigned after they were created, these documents create the framework from which additional context is derived and ultimately understood.

Take a look at your organization or business standards that may mandate the nature of business analysis work. What must you provide for business analysis work to comply with regulations or internal standards (at a minimum)?

Remember always comply with regulations, surpass standards, and satisfy the customer to address quality.

Consider the following factors when determining the value of the solution and the associated value of BA work.

- Project size/scale
- Complexity
- Risk level and sponsor/customer risk tolerance
- Project and lifecycle type
- Stakeholder geographic distribution
- Timeline urgency and aggressiveness
- Regulations or imposed constraints
- Market conditions and competition
- Technology trends and capabilities (useful to complete BA components)
- Level of detail and formality required of deliverables
- Time deadlines
- Experience of the BA assigned (and available mentoring, support, or outsourced assistance)

Business Analysis work is time consuming and detail oriented. There are costs associated with this effort. Recall that understanding and setting expectations is

one means of creating trust in the BA (You!) and of affecting approval during solution delivery.

What value does the solution or product provide to the organization or customer? How does participation by a BA assure this value occurs? You need to clarify the value of what will be provided per specific project, rather than attempting to justify BA work in general.

Create the Business Analysis Plan

The business analysis plan defines the work to be performed and the deliverables to be provided by the business analyst. In most cases a business analysis plan is created specific to a particular solution or formal project. Less often, a BA may create a Business Analysis plan to identify and manage expectations relative to daily work, minor process changes or acquisitions.

A subset of the Business Analysis plan has historically been the **Requirements Management** plan. The term has different meanings for a project manager and a business analyst.

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Within the Project Management practice, a Requirements Management plan is a subcomponent of the Project Management Plan. In this context, the Requirements Management plan identifies how the requirements for the project and the product that it will deliver are gathered, analyzed, managed (including change management), and documented. Within the practice of Business Analysis, a Requirements Management Plan is a subset of the Business Analysis Plan. In the BA context, the Requirements Management plan identifies how requirements will be Elicited (formally gathered); stored and maintained (including decisions toward baselines, updates, change impacts) and how signoff, authorization, verification, approval and validation will be tracked. In order to minimize confusion relative to the use of the terms, PMI incorporates the work of the BA Requirements Management plan as components of the Business Analysis Plan rather than suggesting that they are a separate document.

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The BA follows the guidance provided in the Project Requirements Management plan. The PM focusses on making sure the work meets the requirements. BA requirements related efforts are focused on assuring and confirming that the Value of the product or solution meets the criteria set forth in the Business Case. The synchronization between the PM and the BA assures that the requirements address the problem/need without additional overhead, that all requirements are assigned work toward completion, and that no work is performed unless it meets a requirement. The BA must work closely with the PM to make sure that neither efforts nor content are duplicated. Duplication causes confusion and may result in incorrect or incomplete development efforts. The BA should work with the PM during planning to assure that both project and product management requirements approach are covered. The BA will then use the Traceability Matrix to assure that the product requirements follow the prescribed process and meet the desired value.

Remember you are the Navigator and the Project Manager is the Captain. No disputes or discrepancies on deck! Establish the PM/BA relationship and framework for requirements discussions before setting sail. Follow the established plans once underway.

Business Analysis Plan Elements

The business analysis plan covers the Scope of the business analysis effort. Scope suggests two concepts – work and boundaries. The BA plan therefore covers all of the work necessary to meet the need, and no more than the work needed. Hence the boundaries.

Document what you know, and how an understanding of this knowledge will affect your work. Much like a project scope statement, state what is within the realm of your accountability as well as what will be excluded given the current situation and criteria introduced by the environment.

Cartographers love maps. Navigators love to enhance them, steer by them, draw points and lines all over them, annotate them, stain them (with ink, rum, blood, coffee, food, etc.), wallpaper with them, and generally incorporate them into every aspect of work and life.

The business analyst feels the same about requirements. And the ideas that generate them. And the new ideas that they create. All those possibilities! Remember that one of a business analyst's strengths should be **Creativity**.

The business analysis plan is where we curb our creativity. Placing realistic time boundaries around the effort necessary to support a focused problem/need and related situation statement. Although this section covers all the elements that might be included within a business analysis plan, select only the elements appropriate to the current situation.

Requirements might be textual, tabular, in story form, graphical, modular, multi-format; high level or fully detailed and decomposed; user generated, facilitated, or designed and integrated; and simple or complex. The nature of the requirements format often matches the nature of the process, product, or project being corrected or enhanced. The selected project lifecycle, particularly within Agile frameworks, often dictates a specific requirement format, submission and review process, and tracking mechanism(s).

Regardless of the nature or state of the requirements, the role of the Business Analyst is to gather, organize, and present them in an understandable format to key stakeholders for approval and to the development team for delivery.

Estimating and Planning

When values and other information is unknown or more qualitative than quantitative in nature, the business analyst needs to guide stakeholders toward metrics used to validate the results. This effort begins with the selection of estimating techniques that fit the environment, life-cycle, and stakeholder characteristics. Some examples include:

- **Affinity.** Typically associated with Agile projects where team members group User Stories based upon size (often called t-shirt sizing, since the terms small, medium, large, extra-large, etc. are used).
- **Estimating Poker.** Also referred to as **multi-voting**. Most often associated with Agile methodologies, although useable for any decision process, this technique uses preset scales to guide participants toward a semi-quantitative value. The most common example is **the Fibonacci Sequence**: 1 1 2 3 5 8 13 21 34, etc.
- **Relative Estimating.** Often associated with Agile methodologies, this technique uses comparisons to affect evaluation. This technique has evolved from simple qualitative approaches like the **Queue sort** (Q-sort, shuffle sort, etc.).
- **Bottom-Up.** Estimating efforts from the smallest element and aggregating upward. (Often associated with work package or activity estimating associated with project Work Breakdown Structures.)
- **Delphi.** Use of two or more external subject matter experts who remain anonymous from other inputs, with an iterative review cycle until a unanimous conclusion is reached.

- **Wide-Band Delphi.** An approach similar to the Delphi technique, albeit with far more open communication and interpersonal collaboration. This method is often associated with Agile methodologies, since Agile teams are themselves the subject matter experts and do not have the time or resources to implement an external estimating effort.

Planning Tools

Planning tools are merely an acknowledgement of common requirements aggregation based on the form of project life cycle being applied to product development. The use of the following planning tools is therefore determined by the Project Manager as a component of project life cycle selection. The business analyst merely supports related efforts based upon prior negotiation with the PM.

- **Product backlog.** The repository for user stories as yet not selected for implementation in an Adaptive/Agile methodology.
- **Story Mapping.** More traditionally referred to as **Story Boarding**, this technique places User Stories in a sequenced order. The order may be based on a development sequence, a feature timeline, or other linear (versus associative) criteria.
- **Rolling Wave.** Rolling Wave may reference planning or estimating by application. The concept is based on the ability to more accurately assess or predict outcome in the near term versus the variance and randomness introduced over longer period of time or into the future.
- **Work Breakdown Structure (WBS).** The work breakdown structure or WBS is considered the preferred baseline document for Scope planning

and development within predictive, incremental, and iterative projects.
The WBS is owned by the Project Manager

Plan for Elicitation

Elicitation literally means to 'draw forth'. How will you draw forth and clarify the requirements so that the result is 'just right' as Goldilocks might suggest? The specific tools of Elicitation are covered in Module 5. You will need to know them in order to initiate elicitation planning. At the beginning, as with all efforts, start with what you know.

You will not know all of the tools you may need, and the specific steps you will take until the actual elicitation is underway. Once again, this is merely Progressive Elaboration. Nevertheless, you can create some boundaries based on what you know about the Project Life Cycle, level of detail, and context of the solution.

Factors influencing elicitation include:

- Stakeholder number, location, attributes and characteristics will influence which of the elicitation techniques will be applied. For instance, interviews require face-to-face efforts though are inefficient given large numbers and geographic dispersion. Questionnaires and surveys provide easy tabulation, though lack the personalization required for detailed or in depth analysis afforded by interviews.
- Project lifecycle, time constraints, and the time required by various elicitation techniques will support some tools and prohibit others. Predictive life cycles lend themselves to facilitation workshops like brainstorming, nominal group technique, and focus groups. Group sessions are not effective for Adaptive projects, suggesting more individual or autonomous input into a user stories **backlog**. If the project requires a quick launch, you will have to gather the requirements and related resources available, and learn/modify as you are underway.
- The types of deliverables required, and the level of detail associated with the requirements. Generally the greater the detail required, the more effort and therefore the greater the amount of time required to gather, analyze, refine, and document the information.
- Budget and resource limitations must always be considered. The PM controls the budget. You simply cannot spend more time than allowed by the project budget. You will have to identify how to allocate the time allotted and compensated to the most important elements of BA work. Elicitation is only one element.
- Finally, focus on tools and techniques with which you are familiar or which are required by the key stakeholders. You may solicit outside expertise, but should only do so when properly authorized and funded.

Remember as Navigator, you are an officer aboard ship. You need to make the Captain and the crew aware of the risks associated with insufficient requirements gathering and clarification. The location of reefs and rocks when near shore may be obvious as you sight land, and less a conscious concern while in deep water. You might use an existing chart, or perform depth soundings as you approach shore. Many methods work. Select and communicate the plan. Then adjust as needed.

Sequencing Elicitation

Consider a project management approach. You list all of the activities, potentially across multiple work packages. Only after you have the full list can you appropriately sequence the efforts. BA work is the same, and it integrates with all of the other project work.

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The BA and PM need to work together to determine which resources, including team members, stakeholders, and funds will be available and within what time frame. This will help the BA to suggest elicitation sequences that match the project approach and the need.



Sequencing of elicitation activities is based on multiple factors that must be identified and documented during planning. Among them:

- ***With greater business value comes greater risk (threat or opportunity), and the need for more detailed and time consuming analysis. This element includes factors like unknowns, uncertainties, and risk analysis for the product and/or the project.***
- ***Technical challenges suggest technology and competitive research.***
- ***Interfaces and dependencies, whether internal or external, rely on the availability of specific stakeholders or systems to affect resolution.***
- ***Third party or collaborative efforts, such as vendors or joint ventures extend beyond simple dependency by incorporating formal/legal negotiations.***
- ***Resource limits, specific skills requirements, or individual human resource availability and concerns also affect the schedule.***

Elicitation allows the Business Analyst to gather requisite information. Time must also be allotted for organization and analysis of the information either as or after it is being gathered.

Plan for Analysis

The second part of Module Five addresses analysis techniques in great detail. Despite the method selected for analysis, the effort requires planning and significant time commitment. Prior to and during analysis the BA is organizing requirements information into format(s) understandable to the sponsor, key stakeholders and development team. The nature of the project lifecycle, the format and the level of documentation detail influence the preparation and time commitment for analysis.

Requirements Prioritization

A project manager needs to document the methods or methods with which decisions will be made during the project. Options include autocracy, plurality, majority, and unanimity.

A business analyst documents how requirements will be prioritized relative to one another. Business value will always be the highest singular priority for a business analyst, although technology constraints may alter or limit the accomplishment of selected business requirements. Several factors may affect Requirements prioritization. Relevant impacts must be documented in the Business Analysis plan.

Examples include:

- The timing and frequency of prioritization reviews.
- The likelihood that priorities or key factors will change.
- Stakeholders with the authority to review or approve prioritization.
Common examples are the sponsor and the customer, although other key stakeholders may be identified.
- The technique(s) to be used for prioritization, including singular authority, voting alternatives, weighted scoring, poker voting, and various qualitative sorting methods.
- Much as in a RACI diagram, stakeholders will hold varied authority relative to requirements input, review and prioritization.
 - **Review/confirm** - stakeholders who have the ability to identify the applicability, accuracy or completeness of documented requirements.
 - **Verification** – stakeholders who have the ability to confirm that the requirements are correct for the stated situation and may move into further analysis or planning.
 - **Approval** – the stakeholder(s), usually singular, who approves the inclusion of a requirement within a project phase or cycle.
 - **Acceptance** – the stakeholder responsible for confirming that the deliverable associated with the requirement has been met.
 - **Validation** – the stakeholder who confirms that the product or solution provides the desired value and who typically signs formal administrative closure.

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The portion of the Business Analysis Plan that represents the equivalent Requirements Management Plan includes Metrics. A metric is a measurement system against which Value will be compared. It is important to identify the appropriate measurement system early. Target values may change, and will regularly do so within iterative or adaptive projects, but the goal must be clearly stated.

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The various project lifecycles apply review, verification, approval, acceptance and validation in different sequences, and the terminology may be confusing. The Business Analysis needs to define both the meaning of the terminology and its use for a given project. This discussion must include the PM and the team so that prioritization and approval processes are understood by all key stakeholders. This element is also a component of review with the sponsor so that the various roles are well defined before project or business analysis work begins.

The nature of the problem, need, situation statement, as well as assumptions and constraints within the business case may also predefine the prioritization of requirements. The Business Analysis plan should restate or clarify how related elements will be used to prioritize requirements or to identify and associate interdependencies. From the realm of project management, execution does not begin until Scope, Time (schedule) and Cost are fully defined to generate a bounded **Triple Constraint**. Scope, schedule, and/or cost may introduce factors that affect requirement priority.

Specific elements that must be considered by the Business Analyst include:

- **Value** – all high value requirements that confirm the ability to benefit from the planned opportunity or correct the cause of the problem should receive the highest priority.
- **Cost** - requirements may be prioritized according to various financial criteria including budgetary constraints (funding cycles, cash flow, pay periods, etc.); return or benefit for the cost expended; opportunity cost that identifies alternatives that might be a better use of the resources; alternative approaches to work completion; and risk analysis.
- **Difficulty** – the complexity or difficulty meeting the requirement given the 'as-is' state and identified gap toward 'to-be'.
- **Regulatory** – when compliance is mandatory, related requirements and deadlines must be met.
- **Risk** – Risk receives its own category, since the stakeholder tolerance, appetite, thresholds, and spectrum of response identify how the sponsor or customer prioritize the use of their resources and associated requirement prioritization.

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The PMI-PBA exam expects the candidate to hold an understanding of the terminology and application of the Risk Management Knowledge area from the PMBOK® Guide. Details associated with Risk planning, including the Risk Management Plan, risk identification, qualitative risk analysis, quantitative risk analysis, and formal risk response are the responsibility of the Project Manager, an accountable risk/safety officer, or a credentialed Project Management Institute Risk Management Professional (PMI-RMP). While the PMI-PBA exam does not incorporate detailed questions about risk planning and analysis, an understanding of the terminology is essential to recognizing and answering exam questions across several domains.

Traceability Approach

Traceability and the use of a Traceability Matrix are covered in Module 6. Related techniques and skills are to the Business Analyst as application of the Triple Constraint is to a Project Manager. (As I state in my Project Management courses, I triple-dog dare you not to consider the Triple Constraint as the correct answer when offered on the PMP exam. The Traceability Matrix holds the same form of significance for a Business Analyst.)

If you are an experienced Business Analyst, you want to create as elaborate a traceability mechanism as you can achieve. As a Navigator, you want the content to consist of the “most approved Modern” sources available. The Traceability Matrix just may be your legacy!



The Traceability Requirements Matrix is potentially far more involved for a Business Analyst than for a project manager. Recall that you want to assure that every requirement feeds the value proposition, no value is left out, no excess work is conducted, and that every key stakeholder has achieved consensus and commitment to both the effort and the result.

The Traceability Matrix demonstrates the relationships between requirements, identifies source, tracks attributes, shows prioritization, indicates status, notes approval and acceptance, monitors and controls change ... essentially gathers every relevant piece of information for approved requirements.

Not all requirements will pass through the approval process. They may not meet selection or prioritization criteria. They might be outside the scope of the product or the project. They might exceed stated constraints. The Business Analyst may document additional requirements if time and budget allow, but they won't be traced.

Time to create, organize, review, update, manage, and control the Traceability Matrix can become extensive. It is more important that you create a complete package of relevant requirements so that work can begin than that you have every detail documented before launch. Traceability efforts continue throughout the project and guide efforts toward Validation and later Evaluation. Before you spend the time, you need to plan the effort and communicate the effort to the PM and the Sponsor to achieve commitment to the effort that will be required.



The correct amount of traceability assures value and reduces negative risk. Too much traceability increases overhead costs without returning commensurate value. The PM and the development Team need an opportunity to participate in the definition of traceability for a project, and to provide feedback as related work continues to generate understanding, support, and trust for the BA's contribution.

Elements that affect traceability decisions and details include:

- The types and forms of requirements – textual, tabular, graphical, etc.
- The level of detail required by the project (or the product).
- Relationships between requirements, phases/stages, iterations/releases that must be tracked.
- Requirements attributes (discussed in Module 6) that assure value and project success.
- Requirement states that track progress (approve, defer, reject, open, complete, etc.).
- Tools available to track traceability (digital, paper, cloud-based, etc.)
- Guideline or standards used by the industry, organization, PMO, etc.

Create a plan, based on your knowledge and understanding of the Business Case and project environment that best serves organizational Value.

Communication Approach

Recalling that Communication is a business analyst's greatest skill, and People may introduce the greatest challenge, spend a few moments planning which of your many tools might be useful in the current situation.

The Project Manager owns the Project Communication Management Plan, a subset of the Project Management Plan. Follow the project plan if one exists. Contribute to the creation of a Communication Management Plan as a partner with the PM.

You might simply indicate the communication role that you will play as the Business Analyst within the Business Analysis Plan, or you may be asked to create a more formal Communication Plan if the project (via the project manager) or the organization so dictate.

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If a communication plan is built within the Business Analysis Plan, or as a separate document, agreement must be reached with the PM regarding who manages the work. A Business Analysis communication plan is different than a Project communication plan in that it further identifies how stakeholders will communicate with each other during BA work, and how they may prefer to gain access to requirements or the requirements process.

Remember the stakeholder analysis you have been and will continue to conduct? The BA often has a better sense of stakeholder communication needs than anyone else. The BA is documenting stakeholder communication needs and preferences as well as potential project communication needs.

Elements to consider include:

- Which requirements types, formats, and subsets will be communicated?
- Who requires communications and the information they expect?
- Preferences for summary reports versus levels of detail.
- Delivery methods and mechanisms.
- Formality in structure and function of the communication.
- Tools and techniques that may be used.
- Documentation repositories.
- Geographic dispersion and time zones.

As a component of the Traceability process, the business analyst will also identify stakeholders who will be accountable for reviewing, verifying, approving and accepting requirements. Related efforts and the methods used to achieve them are components of the Business Analysis Communication Plan.

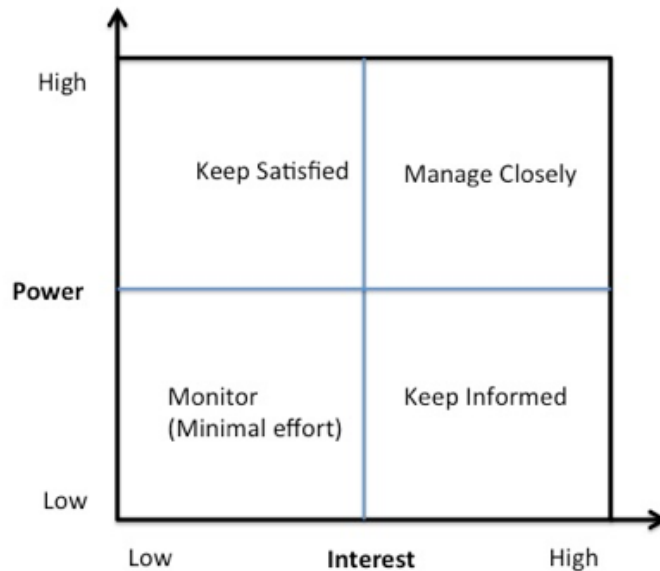
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The Stakeholder Power/Interest Grid, found within the PMBOK® Guide under the Stakeholder Relationship Management knowledge area, evolved from project communication management. Recognizing a stakeholder's position within the grid can assist the Business Analyst to determine appropriate interactions relative to requirements and information distribution.

Stakeholder Power/Interest Grid



Decisions Approach

The Business Analyst is considered a facilitator. Facilitation tools are critical during requirements Elicitation, as well as during development in order to identify and resolve conflict. When there are differences in perspective or design, the BA helps to achieve consensus. Agreement must be reached before work is executed. Understanding the types of decisions that must be made, the nature of the decision process, and appropriate levels of authority may be critical to successful project execution and the delivery of value at optimal cost.

From a business analyst's perspective, the most important decisions are those related to requirements.

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The project manager is the captain of the ship. During the project, they have absolute control of the work being performed. As the Navigator, you are more interested in assuring that the decided course is being followed, and that the goal will be achieved, and relatively less concerned about how it will be achieved. Given the position of authority required of the Captain, the Navigator often has a greater opportunity to generate relationships that provide relevant and timely information that will assist both the Captain and the crew to achieve their goals. You need to develop and document an understanding of the decisions required of stakeholders and their authority levels within the process.

Elements of the decision process include:

- The nature and types of requirements decisions to be made, and how they are approved.
- Roles and involvement in discussions, decisions, reviews, change management.
- Process when conflict arises, consensus cannot be reached and escalation is required.
- Required response or action plans and timeframes.
- How to document decisions, and how they interface with communications and traceability.
- Clear guidance regarding the tool or tools to be used for decision evaluation when participation or analysis may be required. Examples include decision trees, decision modeling, and decision analysis.

Verification and Validation

Verification and Validation are two very different terms. The simplest way to remember their application is Verity means Truth and Validity references Value.

Verification is identifying whether an element is true. You first Verify if the requirements are conformant or compliant with regulations, specifications, conditions and/or metrics defined for measuring the solution. This verifies a requirement. Verification of a requirement may also confirm that the BA correctly captured what the stakeholders said.

Validation identifies whether the product, service, or system addresses the problem or meets the needs of the customer and other stakeholders. Requirements are validated to confirm they will meet the stated need or situation statement. Validation typically incorporates approval and sign-off.

The PM will verify the work to confirm that efforts are compliant with the requirements (which were derived from standards, regulations, etc.). Verification is internal to the development team.

The PM and the BA will partner in delivering a solution to the customer and key stakeholders while obtaining Validation that the work results in a product that provides the necessary Value. Validation typically incorporates customer acceptance and administrative closure.

After delivery, the BA may be assigned to Evaluate the product or service. This includes work to transition the product through Validation into production/operations, and to confirm Value beyond project closure and into the Product Lifecycle.

The Business Analysis Plan addresses the work of requirements verification and validation, and potentially set the stage for eventual Evaluation.

Verification Elements include:

- The process for reviewing requirements relative to regulations, standards, or internal policies.
- Confirming that text, tables and/or models are clear and complete enough to be used effectively.
- Confirming that the requirements will cause the correct product to be built per the need.
- For iterative or adaptive lifecycles, identifying verification processes during development.
- Requirements will fit into multiple categories (discussed in Module 5). Verification will vary based upon requirements category, and a process for each may be necessary.

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Verification may include the use of checksheets or checklists to confirm completeness or define quality attributes.

Validation Elements include:

- Alignment of requirements to stakeholder intent.
- Alignment of requirements to business metrics.
- The identification of validation process options including walk-through, traceability, prototyping.
- Ensuring the correct product is being built. Note that Validation often happens AS the work is underway.

Define Requirements Change Process

The requirements change process may be informal or formal depending on the project lifecycle, the progress made toward requirements completion, and whether or not work has begun. Predictive lifecycles tend to use more formal change processes, including **Change Control Boards** and **Integrated Change Control**. Adaptive lifecycle projects tend to take an informal approach to requirements generation and submission, placing greater emphasis on Validation.

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Integrated Change Management as defined in the PMBOK® Guide comprehensively covers changes to requirements, the product, processes, the work, both formal and informal documentation, and any element that might fall within the oversight of a project manager. Integrated Change Management is composed of two general categories: Change Management and Configuration Management. Change Management includes oversight for changes to processes, work, and documentation. Configuration Management includes oversight and control for changes to the product or service. Configuration management may include elements like software version control during development, release management, and operational support.

Change management for a business analyst is focused on changes to Requirements. **This becomes the foundation for Traceability.**

Elements for which a business analyst should have oversight include:

- How requirements and requirements changes should be proposed or submitted.
- How requirement change requests will be reviewed.
- How change decisions will be documented and communicated.

- How changes that affect models, traceability or more comprehensive documents will be made and distributed, including setting delivery and time expectations.

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From a requirements change management perspective, it is most important to understand the Impact of a particular change. The change request or suggestion must be evaluated to determine the impact it will have on other requirements, the value of the proposed solution, resolving the root cause of a problem, and other interactions including the work (scope, time, cost).

Whether the requirements change control process is formal or informal, the effort and roles necessary to manage requirements change must be well documented to affect efficiency. In particular the Business Analysis plan needs to identify who:

- Proposed changes.
- Conducts the impact analysis and other assessments.
- Participates in requirements change discussions.
- Approves changes once analyzed, discussed, and presented.

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If the project plan requires a specific change management plan, then the PM and the BA must collaborate to determine who documents and manages the plan, whether it is part of the Project Management Plan or the Business Analysis Plan, and who monitors requirements through the change process. The Requirements Traceability Matrix is a tool that may only be used to track status, or it may be a foundational tool for the change management process. Authority, accountability, responsibility, and other change roles might best be represented

Solution Transition and Evaluation

The Business Analyst performs Solution Evaluation to determine if the product or service meets the expected business Value. Was the root cause of the problem solved? Was the need met? Were **Key Performance Indicators** met?

Transition occurs as a project affects closure and the product is delivered to the customer. Evaluation is conducted before and after a solution is implemented. The details for these efforts are discussed in Module 7, but should be considered and documented at a high level as a component of business analysis planning. Evaluation includes testing by the team, operational teams, user representatives, actual end-users, and other key stakeholders. Evaluation helps to confirm compliance before each delivery and administrative closure, assuring a higher rate of acceptance. Evaluation also helps to confirm that production and maintenance issues were taken into account during and post transition from development toward operations.

Project life-cycles influence the timing of evaluation efforts.

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Project Lifecycles are introduced in Module One. Within Predictive Lifecycles, formal evaluation is typically conducted just prior to product delivery, with frequent modifications handled within the Change Management process. If a project is Incremental, then Evaluation is conducted as each phase or stage nears completion, and again as the complete project is completed and integrated. During an iterative project, monitoring and controlling efforts continue to refine the outcome using the appropriate metric, and formal evaluation is performed according to a predetermined plan. Adaptive lifecycles suggest a variety of evaluation approaches, depending on the methodology selected. For instance, informal evaluations occur per Sprint or iteration, with formal evaluation and signature occurring per release, as releases are integrated and upon completion of the final product.

Evaluation elements include:

- Criteria and acceptance thresholds/levels.
- Qualitative and Quantitative metrics.
- How the completed Solution will be evaluated (the big picture goal).
- When and how often evaluation will be conducted.
- Evaluation techniques to be used (testing, observation, focus groups, surveys, interviews, etc.),
- Requirements for special measurement devices, software, or tools.
- How results will be analyzed and reported.
- Estimates of time and labor that may be required to conduct evaluations.

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Solution Evaluation may and often does extend beyond the life of the project. The Business Analyst may be asked to continue evaluation for a fixed period of time after product delivery, on a one time basis or at regular intervals in the future, or as requested at a future point in time. The potential cost and impact of such efforts should be identified within the Business Analysis Plan. The project budget will not support related efforts following final administrative closure. The primary reasons that such activities are not performed following product delivery are lack of communication, lack of understanding, lack of commitment to the process, or lack of funds to continue evaluation. Follow-up evaluation confirms the Value of the solution, and indirectly the value of Business Analysis. The Business Analyst can prevent most of the issues associated with Solution failure by pre-meditating and planning for additional Evaluation efforts, and having the plan reviewed and approved.

Plan Business Analysis Work

Planning is the primary area where project management and business analysis work overlap. This is probably the primary reason that a hybrid PM/BA role has evolved. When it is difficult to separate work activities, they are assigned to a single individual. The purpose for planning business analysis work defines the overlap and the separation of authority, accountability, and responsibility so that team leadership operates optimally.

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The PM is responsible for the Project Management Plan and all of the work down to the activities level, including assurance that the BA work activities are integrated and completed on schedule and budget. The BA supports the PM in the accomplishment of PM efforts, particularly relative to understanding organizational business processes, stakeholder relationships, and the project goals and objectives. The BA also has specialized skills sets that become the focus of the BA work. The BA and PM should discuss and negotiate their roles as a partnership, including team members as appropriate in the development of the plan so that team members are committed and engaged in work for the leadership team.

Since not all of the possible skills and techniques associated with business analysis will be contributed to every project, the BA needs to prioritize efforts and deliverables when listing the actual work and activities that will be formally added to the project plan.

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BA Planning most specifically considers the end product or solution; BA work products that are integrated into project processes and the product particularly the requirements; the life cycle and its impact on elicitation, decisions, traceability, and change; stakeholder locations and the effect on elicitation, communications, and the impact on schedules and timing.

Business Analyst experience includes advanced communication, facilitation, negotiation and conflict management skills. While related activities may be part of the expected deliverables, there is a greater tendency to associate the application of such skills as components of a BA's day to day work.

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Since dealing with cultural issues is a BA skill, it should not require significant upfront planning. Related responses and application are situational rather than fully planned.

Planning decisions are foundational to organizing the Business Analyst work. The BA spends a significant amount of both informal and formal time strategizing, organizing information, and understanding interactions (between people, systems, and requirements).



If no other work is accomplished or contributed by the BA, typical minimums include: fully understanding the Business Case, generating clear requirements and designing requirements traceability, and defining acceptance criteria.

As the Business Analyst considers the creation of an activity list to be integrated within a project, activity attributes including resources, assumptions and constraints should be noted. In particular, essential BA activities can be identified by noting dependencies between BA work and specific tasks, components, phases, or resources.

To arrive at the business analysis activity list, the BA decomposes the work, just like a project manager directs the decomposition of the **Scope** to create a **Work Breakdown Structure**.

Deliverables

Much of the work of the BA, much like the ship's navigator, is operational, situational, or responsive. Only some of the information gathered is provided as a formal project deliverable. Document and organize everything as your time allows, and be prepared to add Value when requested. This demonstrates leadership and professionalism. Regardless of such opportunities to contribute, make sure you are ready with the assigned deliverables on time and in correct detail. Focus on the requirements and value over application of skills.

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A deliverable is “any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase or project”. You want to understand this definition to clarify the work you contribute. Unique – filter out all the extraneous content and address the current scenario. Verifiable – consider and incorporate the product success metrics. Tie the work to a specific process, phase or the project as a whole. If you can’t affect these three elements, then your work is not well enough defined or you are identifying your general role.

Only a Business Analyst understands business analysis work. From a project management perspective, you ARE the Work Package owner. No one else dictates what work you can perform or how to conduct that work. You do need to coordinate with the PM, the Sponsor, and key stakeholders to insure that the work you are proposing meets their needs and can be integrated into the plan while meeting cost and schedule constraints.

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From a business analysis perspective you are the expert. If you have properly strategized, planned, and achieved approval for your work, then you rely on your plan and your skills. You don’t need to ask the Captain how to do your work, or if you are doing the correct work, once the plan has been integrated.

Determine Tasks and Activities

Analyze the required work, breaking it into manageable and measurable activities that may be integrated with work performed by others. You are decomposing the work into activities and tasks. Although the terms activity and task tend to be interchangeable, they have subtly different meanings for a BA.

Activities are elements of work you (the BA) perform. Other team members have their own activity lists.

A task is a completed element of work that may integrate multiple activities. Tasks tend to be iterative, can be monitored with checklists, and are often integrated across work packages.

For example, one of your deliverables is a navigable map. One of your work packages is to create a new map using the starting map template you gathered before the voyage. As you navigate that new course, you are supporting a map generation work package with the update-map activity. The task includes depth soundings from one crew member, water temperature and current from another crew member, and a positional setting using a sextant or GPS device that you may take or delegate to another trained crew member. When you enter the data and mark the map, one instance of the task is complete, although the activity continues.

You might identify your activities and the related tasks from experience, through brainstorming, interviews, lessons learned or retrospectives from prior projects, or a **decomposition model**.

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A decomposition model is more comprehensive than WBS decomposition. A decomposition model breaks any high-level object into smaller components for analysis. Projects use a decomposition model for Scope. A business analyst may use a decomposition model to analyze organizational structure, work products, business processes, functions, or any other information that can be divided into smaller elements for clarity. For the PMI-PBA exam, remain aware that decomposition reaches well beyond scope, and may be used to gain greater clarity for any complex information that needs to be understood.

A decomposition model cannot be used to show sequences or process steps, although it shows some level of interaction based on the organization of the diagram. Another name for a **decomposition model** is a decomposition **diagram** because they are graphical in nature. (Within business analysis diagram means any graphical representation rather than text or a table.)

SKILLS:



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The Scope Management Plan and the effort to decompose the Scope into work packages, creating a WBS is the authority and accountability of the Project Manager. Scope, Scope Management, and WBS are project management terms. Although the BA has the skillset to support WBS creation using a decomposition model, this is outside the realm of your accountability (unless you happen to be a hybrid PM/BA).

Timing and Sequences

The timing and sequence of activities identified in business analysis is identical to the process used in project management. Look for activities that are dependent upon other work, or upon which other work depends. The other activities or work may be within the realm of business analysis, project management, development efforts, approvals, or interactions. Activities with no prior dependency or upon which many other activities depend should be placed first. Follow a time-line or sequence from earliest to latest (typically from left to right on a timeline).

Consider natural order, called hard logic within the IT industry as a mandatory dependency. Look for external dependencies like contracted efforts, vendor input, and resource availability. Add negotiation or facilitation activities as may be appropriate to business analysis work.

Although you are planning your contribution to a single, specific project, you should take into account other BA efforts, other needs analysis, project support, or efforts being considered and conducted within the organization. Until you are assigned full time to a project, other needs may suddenly become your priority.

As you consider the timing and sequence of activities, update the attributes to include information regarding contractual or other obligations, staffing and acquisition needs, complexity and risk factors, requirements to obtain or provide training to affect the activity or related tasks (integrating efforts).

Roles and Responsibilities

A good business analyst, project manager, key stakeholder, or team member will find themselves engaged on multiple operational and project related efforts simultaneously. A **RACI** diagram is regularly used by both project managers and business analysts to identify the various roles necessary to conduct work, and the parties responsible for conducting the work.



The use of a RACI diagram is introduced in Module One, and described in greater detail within Module Two – Needs Assessment. Project management references the use of a Responsibility Assignment Matrix (RAM) of which a RACI diagram or chart is one example. The PMI-PBA exam regularly references only the RACI diagram although other formats may be used.

The business analyst must determine the roles and responsibilities necessary to conduct business analysis work. You are not performing this work alone. The PM, sponsor, key stakeholders, and team members will each contribute to the generation of requirements, their analysis, prioritization, review and approval. Everyone needs to clearly understand the role they will play.

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The PM will create a RAM/RACI diagram for the project. The BA has no authority to modify or control this diagram except as allowed by the PM or through the approved change control process. The BA needs to create a separate RACI diagram that identifies roles and responsibilities relative to requirements accountability, responsibility, consultation, and information. The PM and the BA must both collaborate and communicate clearly regarding the purpose of the two (or more) different diagrams and their use. The purpose of a RACI is to reduce confusion regarding participation, not to cloud the waters.

SKILLS:



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Remember that as a navigator, you are an officer, one of the leaders. You should maintain your own RACI diagram representing the deliverables over which you have authority, accountability, and control. You will use your RACI diagram to manage the work that you need to coordinate with other analysts, facilitators, and team members relative to the completion of your deliverables.

Resources

The role performed by a business analyst relative to resources has a different focus than performed during project management. Remember that the Business Analyst is concerned with requirements and providing business value.

The business analyst may review resources necessary to perform BA work, both tasks and activities, and communicate related needs to the project manager. More importantly, however, the BA is reviewing the work and resource plan put together by the PM for project effort.

SKILLS:



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The BA partners with the PM to assure that applied resources are in the best interest of providing project and more importantly product value. The BA may also have experience with the sponsor, key stakeholders, and team members that will assist the PM with appropriate resource assignment and related management considerations. If the BA is aware of potential resource conflicts, cultural differences or other stakeholder concerns, the BA should use appropriate negotiation and communication skills to affect the best possible project outcome.

Contribution to resource identification, training, management, and relationship enhancement is a key business analysis deliverable. The time, budget, and coordination necessary to affect this effort must be negotiated and incorporated into the business analysis plan.

Estimate work

The BA has completed evaluation of deliverables, work, activities and tasks, sequences, roles, and resources. The PM was a partner in this effort, as well as the sponsor, key-stakeholders, and team members. You now need to estimate the time and cost associated with performing and completing business analysis work for inclusion in the project management plan.

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Project management offers a range of estimating techniques that vary in their accuracy and variance. A BA should be familiar with the various approaches, and apply the method provided in the project management plan or preferred by the project manager. Examples include top-down, analogous/rough order of magnitude, range of estimate, parametric/approximate, definitive, three point estimate, and bottom-up.

Although you do not need to perform estimating problems on the PMI-PBA exam, you need to understand the 3 point estimating technique. There are several options:

- Three point average: $(\text{most optimistic} + \text{most likely} + \text{most pessimistic})/3$.
- Three point estimate (sometimes called erroneously a PERT estimate) based on statistical variance of a Bell/Normal, Triangular, or Beta distributions: $(\text{most optimistic} + 4 * \text{most likely} + \text{most pessimistic})/6$.

Generate the time and cost estimates for your contribution based on the method preferred by the PM and your experience. When time allows and experience is available, have peers review your estimates for accuracy and completeness. Remember to use a secondary reviewer whenever possible.

SKILLS:



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Since Business Analysis planning and estimates are conducted early in the project planning cycle, revision due to Progressive Elaboration is inevitable. Work with the PM to determine responsibility and the method to be follow as changes arise.

Prepare to Analyze BA Performance

As with any other team member, performance metrics should be determined in advance for the business analyst. Metrics may be determined by the organization for more operational or functional contributions, and by the project manager in more projectized efforts. Continuous learning and skills improvement is a goal for all professional business analysts. Participation in personal goal setting and measurement assures the best possible performance using existing skills as well as future growth and value.

Assemble the Plan

Although the work associated with the project may be fully documented within the Project Management plan, the BA should contribute a work plan that outlines relevant BA work with time estimates and other responsible (or accountable) parties.

A sample business analysis work plan is provided in the Appendix.

The business analysis work plan should list the deliverables, work packages, and activities in hierarchical or outline form for ease of review, tracking and updates.

Explain the Approach

Business analysts are experts at documentation. Considerable contemplation and analysis has been conducted to this point. Organize the notes. Explain the process, the alternatives, and the reason for the approach being taken.

SKILLS:



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More than any other reason for explaining or justifying the approach that will be taken to perform business analysis, the BA is aware of managing stakeholder relationships and expectations. Documentation minimizes uncertainty. It shows all the stakeholders that their needs and concerns are being considered and that Value is the prime directive. You learned from Lessons Learned and prior analysis and project management documents in the course of planning your efforts. You are merely contributing your input to benefit other business analysts and project managers so that their results might be even more effective.

Review

The business analyst requires participation, support, and commitment from stakeholders in order to conduct business analysis work. Elicitation requires early and focused participation from stakeholders in order to assure completeness, appropriateness, and that all needs are raised and addressed. Key stakeholders commonly know more about existing processes, problems, and opportunities than PMs, BAs, or development team members. The information that stakeholders possess is key to solution success.

In order to achieve success, a bi-directional trust must be established. Once you have a business analysis plan in place, or perhaps as you are assembling portions of the plan, you should meet with influential or interested stakeholders to make sure their needs are being addressed, to help them understand why the design approach is being executed and as a first request for their participation.

You also need to provide information to stakeholders who will be prioritizing, approving or validating requirements so that they can adequately prepare for participation and add the project efforts to their agendas.

If the project will have a formal change control process, potential change control board members should be made aware of the need, the situation statement, the business case and the business plan as soon and as thoroughly as possible in order to assist them with appropriate change evaluation and decision methods.

Potential subject matter experts should be recruited as soon as possible to assure their understanding, availability, and commitment. A review of the business case and business analysis plan may provide the introduction even before project planning is formally underway.

Obtain Approval

Approval of a business analysis plan may be formal or informal. Minimally the plan requires informal approval by the sponsor, the project manager and the business analyst. These three create the leadership team that will champion the project to success. A signature assures authorization for the business analysis work, much like the signature on a Project Charter authorizes the PM to use organizational resources to establish a project.

Follow an organization process if one exists. Ask the sponsor, PM, key-stakeholders, and project team members to help establish a process if one does not exist.



The approved Business Analysis Plan provides a baseline against which subsequent efforts may be measured. Just as with any baseline, changes must be evaluated and managed to assure that they provide sufficient value for justification.

Module 4 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) Which form of project requires formal business analysis planning and approval?
 - a) Predictive projects
 - b) Incremental projects
 - c) Adaptive projects
 - d) All business analysis work
- 2) Which element most dictates the amount of work and nature of the deliverables performed by the business analyst?
 - a) The project management plan.
 - b) The project life cycle
 - c) The value of the work provided.
 - d) The business analysis plan.
- 3) Which project management plan component will receive the smallest business analyst contribution?
 - a) Requirements management plan
 - b) Communication management plan.
 - c) Stakeholder management plan
 - d) Quality management plan

- 4) Which alternative best describes responsibility for creation of the business analysis plan?
- a) The business analyst creates the plan and submits it to the PM for approval.
 - b) The business analyst and the project manager build the plan together.
 - c) The business analysis plan is derived from the business case.
 - d) The business analyst, project manager and development team develop the business analysis plan together.
- 5) The business analysis plan has been generated, and reviewed by the team, the project manager, key stakeholders and the sponsor. Who formally signs the business analysis plan?
- a) The sponsor.
 - b) The project manager.
 - c) The sponsor and the project manager.
 - d) The sponsor, the project manager, and the business analyst.
- 6) Which of the following is not a key element of the business analysis plan.
- a) Refining stakeholder analysis
 - b) Identify the project life cycle.
 - c) Define traceability and change management
 - d) Creating a requirements Traceability Matrix.

- 7) Which statement best reflects the completion of formal stakeholder analysis?
- a) It is planned during business analysis planning and completed during elicitation and analysis.
 - b) Stakeholder identification starts during needs analysis and continues throughout the business analysis cycle.
 - c) You should always be asking the question, "who else might have input or requirements regarding this solution?"
 - d) Needs assessment identifies the stakeholders while elicitation and analysis refine the attributes.
- 8) The project manager enters your office at 7:30 am indicating that he has a meeting with the sponsor at 8:00 am. He insists that you provide him with two copies of a well-designed stakeholder register, a copy of the business case, and your initial list of requirements. What is the realistic response?
- a) Suggest that he postpone the meeting until you can generate the requested materials.
 - b) Provide him the materials, and offer to accompany him to the meeting since you understand the sponsor.
 - c) Be honest, telling him that the request should have been provided much earlier. This enhances the integrity of the relationship.
 - d) Say nothing, and scramble to put together as much as you can in 30 minutes.
- 9) Which stakeholder attributes are most likely to impact business analysis work?
- a) Attitude, Complexity, Culture, Experience, Influence
 - b) Interest, Knowledge, Power, Legitimacy, Urgency
 - c) Intent, Spirit, Commitment, Flexibility, Expertise
 - d) Intellect, Maturity, Leadership, Organization, Compassion

- 10) The project manager is developing the Resource Management Plan. Which stakeholder analysis tool might you use to best assist the PM?
- a) Persona Analysis
 - b) Job Analysis
 - c) RACI diagram
 - d) Stakeholder Register
- 11) You have been asked to develop a Persona Analysis to assist with the creation of a process framework. What are the aspects of a persona analysis that make this tool appropriate for the work?
- a) Fictional, class based, interactive
 - b) Detailed, behavioral, skills based
 - c) Work based, general, simple
 - d) Clarity, precision, specific
- 12) The PM has asked you to share stakeholder information with the core team. Before distributing the stakeholder register to this project team, what might you need to do?
- a) Have every core team member sign a confidentiality agreement.
 - b) Remove PII from the document and mark every page according to confidentiality policy.
 - c) Separate the stakeholder register into groupings and share only key-stakeholder information.
 - d) Provide all the information you have, since this aids the full understanding of interactions critical to core team member roles.
- 13) Select the five project management process groups.
- a) Open, Plan, Implement, Manage, Close
 - b) Plan, Design, Implement, Test, Transition
 - c) Initiate, Plan, Execute, Monitor, Control, Close
 - d) Requirements, Scope, Cost, Schedule, Quality

- 14) Which of the following is not an example of a predictive project?
- a) Waterfall
 - b) Traditional
 - c) Phased
 - d) Cascade
- 15) The Project Manager has selected an Agile approach. Which project characteristics most likely drove this decision?
- a) Time-boxed work schedules
 - b) Constant uncertainty and change
 - c) No formal goal
 - d) Team skills and experience
- 16) You have just been hired as a business analyst. Your first assignment is to help train key-stakeholders regarding a recently approved Agile lifecycle project. Which documentation will help you effectively learn about previous Agile project execution within your new organization?
- a) Lessons Learned
 - b) Business standards
 - c) PMO guidelines
 - d) Retrospectives
- 17) Which statement best identifies the level of detail necessary for business analysis work?
- a) Gather as much detail as possible, and take copious notes, particularly with regard to understanding stakeholders.
 - b) Make certain that business analysis work never exceeds 10% of the project's administrative budget.
 - c) More is better because it aids understanding and consensus.
 - d) Whatever might be necessary to produce product value and project success, but no more.

- 18) A Project Charter identifies the project manager by name, states the goals of the project, and authorizes the project manager to use the authority level of the sponsor or signer. How does a business analyst perceive the primary purpose of a Project Charter?
- a) Formally authorizes the business analysis work.
 - b) Authorizes the business case to proceed.
 - c) Creates a partnership amongst the key stakeholders.
 - d) Generates the assumptions and constraints used by business analysis.
- 19) What are the components of a Requirements Management Plan?
- a) Gather, analyze, manage, and document.
 - b) Source, owner, (change) controls, acceptance
 - c) Elicit, store, maintain, manage, verify/validate
 - d) Assess, Analyze, Prioritize, Implement
- 20) You are asked to perform a facilitation session for an Agile project. Why would you recommend against this option?
- a) You can't get everyone needed together in one location given the short time frames for an Agile project.
 - b) Users create their own individual stories that are placed into a backlog, so group sessions do not fit the methodology.
 - c) Facilitation requires a formal process and formal outputs. Agile is always informal.
 - d) Agile projects are time and cost constrained, and facilitation is always expensive.

- 21) Why should a business analyst sequence elicitation activities?
- a) Sequencing work activities is required by the Project Schedule Management Plan.
 - b) Much like project management, sequencing activities after all of the work has been decomposed enables economies of scale and interrelationships not visible within single work packages.
 - c) Elicitation cannot be performed without proper sequencing.
 - d) Elicitation sequencing identifies the number of hours required for business analysis work.
- 22) Which of the following is not a stakeholder authority relative to requirements prioritization?
- a) Verification
 - b) Approval
 - c) Validation
 - d) Evaluation
- 23) Requirements Validation uses metrics, similar to quality metrics in a project management plan. Which metrics are appropriate to Business Analysis planning?
- a) Cost, Time, Scope, Quality
 - b) Cost, Value, Risk, Regulatory
 - c) Difficulty, Compatibility, Opportunity, Problem
 - d) Regulatory, Risk, Cost, Quality
- 24) The business analyst must gather and document all of the requirements submitted for a project. Which of the following is the least valid reason for omitting requirements from the Traceability Matrix?
- a) They do not meet the selection or prioritization criteria.
 - b) They exceed stated constraints.
 - c) The business analyst did not have time to incorporate them.
 - d) They are outside the scope of the product.

- 25) Verification of requirements includes all of the following, except?
- a) Review versus regulations and standards.
 - b) Confirming text, tables, and models are clear and complete.
 - c) Acquiring a key stakeholder or customer signature.
 - d) Determining if the correct product will be built.
- 26) Which of the following statements represents requirements validation?
- a) The customer approves and accepts the product.
 - b) The requirements align with business metrics.
 - c) The project manager accepts the requirements and begins implementation.
 - d) Prototyping is complete.
- 27) Which of the following is considered the foundation for traceability?
- a) Requirements attributes.
 - b) Business metrics
 - c) Change management
 - d) Prioritization
- 28) Product evaluation _____.
- a) Confirms that the work is complete and is performed as components are delivered to the end user.
 - b) Verifies the product satisfies the customer and can be performed at any time.
 - c) Assures that the product matches the intended value.
 - d) Is only conducted during projects through final administrative closure.

- 29) What is the primary reason for planning business analysis work?
- a) To determine the required time and cost.
 - b) PM and BA work overlap. Planning reduces duplication and confusion, assuring that all work is done by someone.
 - c) So that the team knows what the business analyst is supposed to do.
 - d) To obtain approval from the sponsor.

Module 5 - Requirements Elicitation & Analysis

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

The PMI-PBA domains were introduced in Module Two. Recall that **Elicitation** is the drawing forth of information and **Analysis** is the organization of the results. Relative to a project, the results are organized toward understanding and approving a requirement that solves a problem or addresses a need. ***Business Analysis for Practitioners: A Practice Guide*** groups Elicitation and Analysis because they are interrelated techniques and toolsets that provide the development of clear requirements. As with many business analysis tools or techniques, do not forget that they may be applied to the operational conduct of business analysis (the day-to-day efforts) rather than merely to project focused outcomes.

For example, any dialog with another person which provides information that might be useful toward understanding organizational culture and internal processes, identifies key stakeholders and what keeps them awake at night, or yields insight into a current situation is called an **Interview**. Interviews can be planned, prepared, and carefully conducted. They might just as readily be spontaneous, hallway or parking lot conversations.

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As you study each of the Elicitation techniques, consider informal examples that you use or encounter every day. The PMI-PBA exam uses situational questions. If you are at a cocktail party that includes co-workers and any work related conversation arises, you are gathering information that might be useful for increasing the value of the organization. What tools would you use? This is a small group of people in conversation, so this is an interview. Use open ended questions and active listening.

As you learn and review the content within this module, the emphasis is on preparing requirements initiated through Business Analysis efforts that started with Needs Assessment, a Business Case or a Project Charter. It should also be noted that many of the Organizational Process Assets that you discover while researching 'as-is' processes and states were created using exactly the same tools during PREVIOUS business analysis efforts. Elicitation and Analysis are the techniques through which text, tables, and diagrams are created in order to clarify the problem, need, or solution in appropriate context. An experienced BA may utilize the tools anytime organization and clarity are needed.

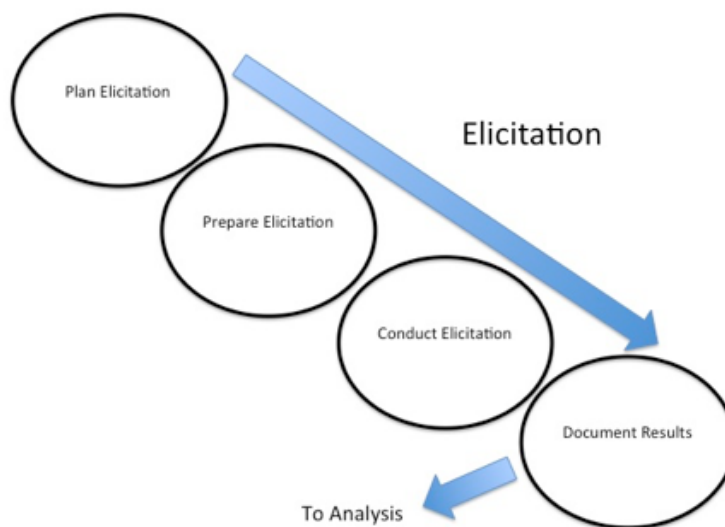
Most texts and exam sources tend to separate Elicitation and Analysis because of the content volume. While you might conduct multiple elicitation sessions before you perform detailed analysis, you cannot analyze until you elicit. The desired or suggested form of analysis often dictates the form of elicitation and the participants selected. Just as often, the information drawn from elicitation lends itself to a specific model or form of documentation. The two techniques are truly interdependent.

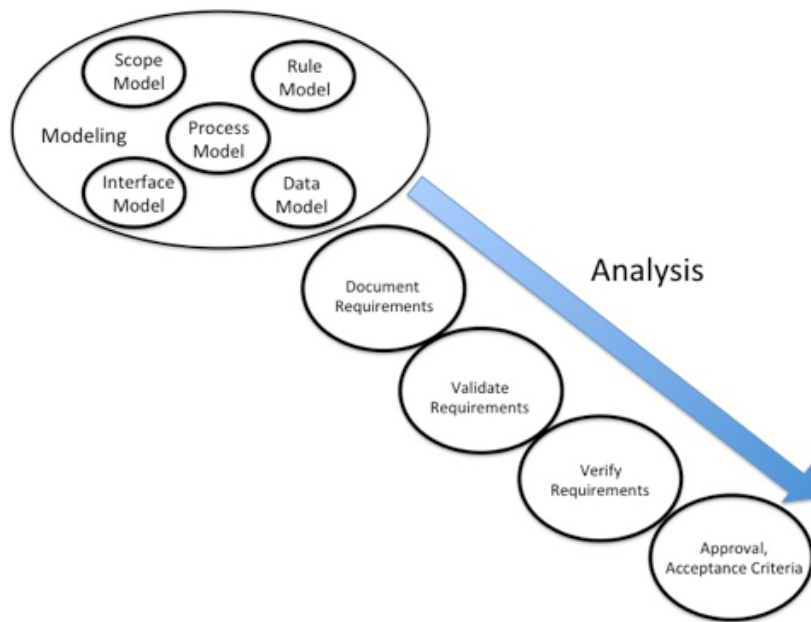
Business Analysis for Practitioners: a Practice Guide lists the steps, interspersed with several clarification sections, in the following order:

- Planning For Elicitation

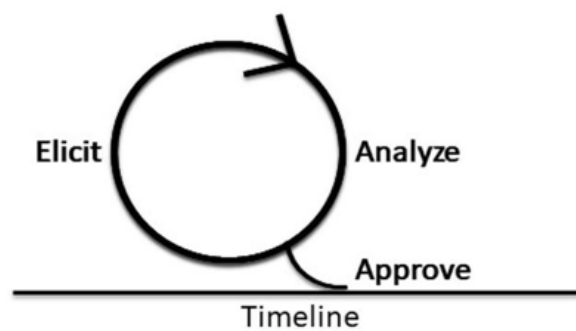
- Prepare for Elicitation
- Conduct Elicitation
- Document Outputs
- Complete Elicitation
- Requirements Analysis
- Models
- Solution requirements
- Validating requirements
- Verify Requirements
- Obtaining Approval

In Module Two, I introduced a model identifying a possible sequenced elicitation and analysis effort.





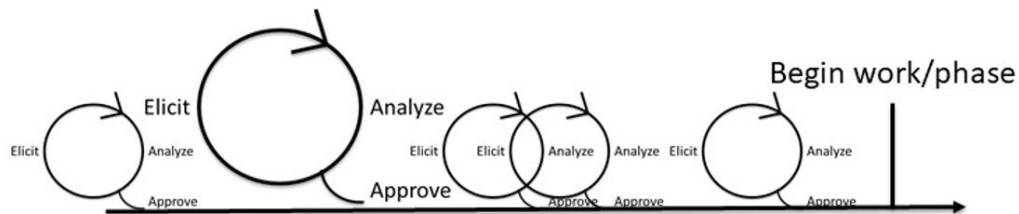
Bound together, elicitation and analysis may happen formally or informally at any time. You are merely collecting information, then organizing its storage and presentation. I am referring to the following diagram as the ***elicitation-analysis cycle***, though this is not an official term or concept.



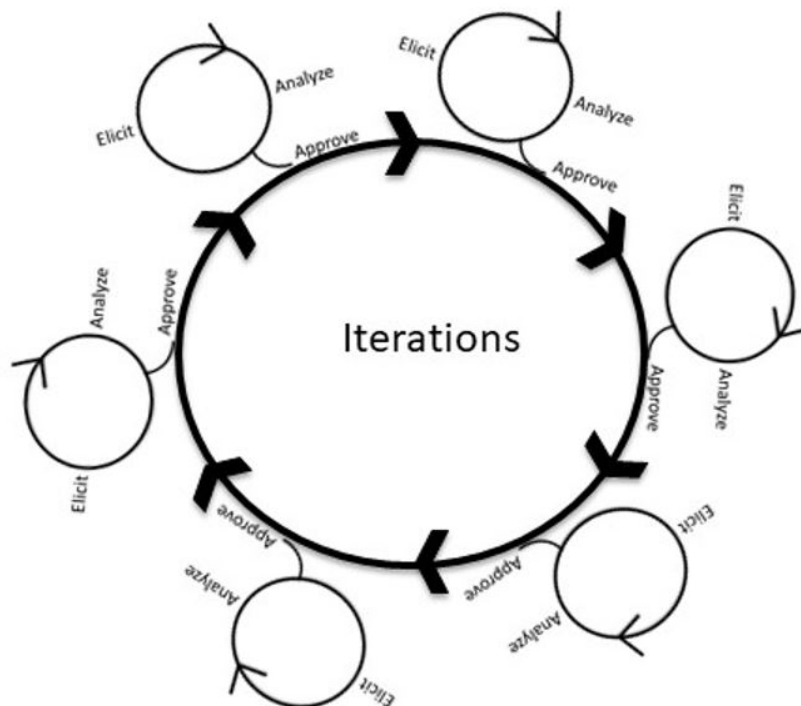
The scale of the effort might be minor or significant, which will dictate the amount of planning, preparation, and time spent eliciting information. The

volume, diversity, and complexity of the data gathered determines the form and the amount of time necessary to analyze and organize the information.

The elicitation-analysis cycle fits predictive, incremental, iterative, just-in-time, or adaptive lifecycles. The tools selected from within the elicitation and analysis sets are different depending on the project life-cycle. A just-in-time project might be the result of a single, simplified elicitation-analysis cycle.



A predictive lifecycle gathers, integrates and approves all of the requirements during planning and prior to execution. The scale of each elicitation-analysis cycle may vary and overlap, although a completed plan is prepared and approved before resources are expended. A similar approach is used for an incremental project, although the plan is per stage or phase rather than for the solution in aggregate.



An adaptive lifecycle is designed to contain multiple elicitation-analysis cycles of approximately equal size depending on the time and resource constraints placed on the development team. In the diagram above, the curve between each arrow point is an independent iteration. In Agile terms each iteration might be called a Sprint. The number of iterations necessary to complete a release or the completed product is typically unknown, so the size of the center circle would vary.

An iterative project would likely start similarly to the predictive diagram previously provided, and then shift into the smaller, repetitive cycles of the adaptive approach after the first phase is underway and gathers results. Additional elicitation and analysis refines the organization and clarity of the information, guiding the next execution effort.

Stakeholders seldom express clear, complete requirements. Some may identify a symptom, others a want rather than a need, and still others share only the elements with which they are aware. The business analyst wants to draw the big picture, or as much of the picture as is possible, before expending company resources. A business analyst seeks the root-cause for a problem before resolving it. Given an opportunity, the business analyst looks for competitive advantage, alternate approaches, and the best means to get started before moving forward.

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You may be tasked with discovering entirely new territory, where mere clues to the destination and alternatives must be creatively extracted and examined. Or you may start from the explorations initiated by your predecessors and look for opportunities to extend their work. You may discover maps with incorrect information that causes ships in your fleet to run aground or take unnecessarily long routes. Regardless of the assignment, your skills will help you to generate requirements by logically assembling the facts and presenting them in a format that is understandable to your sponsor, the captain of the ship, and the crew members whose commitment you need to move the effort forward. Some information sources will be obvious, others will require careful planning and relationship building. Once your skills are known, you will be tasked with gathering and organizing information for all forms of exploration. Never forget to spend your time where the efforts generate value.

SKILLS:



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The PMI-PBA Exam identifies five categories into which professional business analysis typically falls:

- *Support executive decision making*
- *Successfully apply influence*
- *Assist with negotiation or mediation*
- *Resolve conflict*
- *Define problems*

Note that each of these categories require strong interpersonal and communication skills. They rely on the creation and maintenance of trust, even amongst antagonists and parties with disparate ideas. The effort always includes participation and consensus, and is never about collusion, force, deception, or retreat. Stick to factual information. Check for correctness.

Requirements

Before we delve into the process, tools and techniques of elicitation and analysis, we need to re-emphasize that the purpose for both is clear **requirements**.

This module, and related questions on the PMI-PBA exam focus on understanding the characteristics of great requirements, and the attributes associated with gathering, tracking, and implementing them.

As such a specific section of this module will be dedicated to requirements elements, independent of their elicitations and analysis.

Plan for Elicitation

You already have a Business Analysis Plan. Use the Business Case, the Project Charter and the Business Analysis Plan as the basis for planning your elicitation. Note that you are not creating a new plan, you are merely performing **Progressive Elaboration** as you get closer to conducting the actual elicitation. You are refining requirements. In order to add details to the information you already have, you need to discover what might be missing. This requires asking several questions, finding the information from the correct sources, and verifying the input to confirm that it fits the situation statement you are attempting to address.

Remember that you are attempting to remain efficient. Cost effective. Rather than reaching broadly, filter your options to those with the greatest potential for positive return.

What information are you attempting to discover? Where or from whom might you obtain input? Given the potential sources, how would you most effectively get timely answers? Since you have multiple options, where will you start and what sequence will you follow?

Finding Information

Information might be found:

- Within documentation – Organizational Process Assets and archives from prior projects; current documented processes; internal standards, policies, and guidelines; **enterprise architecture** elements; industry or global business publications; an Internet search.
- From people – internal stakeholders, other business analysts, the sponsor, project managers, team members, end-users, vendors, external customers – anyone who has the needed information..
- From models – diagrams of processes, system interactions, workflow, data models, business rules, business domains.

Although you may find a clear answer from a single source, it is always best to seek at least two sources or to conduct a review to confirm that the information is both clear and accurate. You want facts rather than opinions.

Techniques

The technique you utilize will be based on the potential sources identified in the prior step. As you consider each source, consider alternatives which identical information, and the best means to acquire or approach the source given the work you have been allocated.

Sequencing

One source of information often leads to another. Try to identify a realistic starting point. You may only receive limited access to some individuals, so you need to start with other sources first in order to refine your questions and prepare. Documentation may be the best place to start, though some individuals might only be available to you within specific time windows earlier during the project effort. Some sources may be readily available, suggesting you focus your efforts first on sources with limitations.

List all of the possible sources in a table called an **Elicitation Plan**. List the questions that need to be answered first. Then list the source or sources next. Third, list the possible method(s) to elicit the information, and finally place sequence numbers on the activities you have defined. Note that you may discover that questions placed later in your sequence may be answered in preceding activities, allowing the method to be dropped while saving both time and effort.

Question/Information	Source	Method	Sequence
How many crew are needed?	• Captain • Archives	• Interview • Research	3
What skillsets are required?	• Captain	Meetings	2
How do we recruit crewmembers?	Key stakeholders	Meetings	4
Who has voyaged to the destination?	Potential crew	Survey	5
Are there existing maps/charts?	• Archives • Other navigators	• Research • Interviews	1

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Using the following table, or a template from the Appendix, create a list of five questions that need to be answered for your project. For each, identify at least one source, one potential method (don't worry about precise elicitation techniques for now), and then identify a sequence for your activities based upon your assumptions or understanding of the availability, relationships between questions, and possible discoveries through the process.

Question/Information	Source	Method	Sequence

What were some of your assumptions?

Could you use a different method to obtain the information?

Why would you start at your first action?

Prepare for Elicitation

For each source or elicitation session you want to set a specific objective. Remember that objectives are specific, measurable, attainable, relevant, and/or time bounded.

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A founding principle for mediation or negotiation is understanding both yourself and those for and with whom you will be negotiating. You might want to look at Blake-Mouton Conflict theory from the PMBOK® Guide or as referenced on the PMP® certification exam. Start by placing yourself in the other person(s) perspective, using their frame of reference as a starting point. The ideal goal is to arrive at full understanding and consensus. Consensus is not win-win. Win-win is compromise wherein both parties must give up a need or desire in order to achieve a different desire. Win-win may also be perceived as lose-lose by some participants. Consensus is full collaboration and commitment to a mutual solution.

A good mediator or negotiator goes into the meeting understanding what they have to offer, and what they need or want to take away from the meeting. Sometimes you get away with full understanding and agreement, other times you will merely be satisfied with escaping with your skin intact.

Minimally understand the objective; the question or questions that you need to have answered. Be prepared to learn more than you expected, and to discover other information, different priorities and other sources as you elicit information from each stakeholder.

You also need to justify the time necessary to conduct the session. Justification may need to be provided to the project manager, the participants, and as an element of your work. Remember also, to follow the project management plan

and your business analysis plan. If you can save time and money by efficiently gathering the information, close the session and move forward.

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The selection of Elicitation Techniques is based upon participant availability, lifecycle, expected deliverable, and time constraints to conduct and complete the elicitation and analysis. Other considerations are subcomponents or subsidiary to this list.

Determine the Participants

If your source includes people, then you need to identify the specific individuals or groups, and the characteristics of those whom you will elicit.

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Resource availability ***is more important than*** project lifecycle ***when soliciting elicitation. These tend to be the two key influences when determining the best means to elicit information. People provide the best answers, and you need access to the right people early in the project. Resource availability includes the geographic distribution of the participants, the differences in time zones and work schedules, the priority and commitment they place upon the project (or its cause/need), as well as limitations that the demand for their time places upon their availability. Resources, in this instance, includes both individuals and specific groups or teams of people. Some forms of elicitation require the presence of several people simultaneously for best results. As you consider the sources of information, consider potential challenges and means to solicit their timely participation.***

Determine the Questions for the Session

Whether the session is informal or formal, premeditating your questions shows professionalism, more efficiently utilizes everyone's time, and assures that you are focused on the appropriate topic. The questions do not need to be in a specific order, although the sequence and type of questions can influence the success of the session.

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Generally, you should start with simple introductory questions in order to draw everyone into the session and increase participation. As you progress through the session, ask more difficult or comprehensive questions as participants are more deeply considering the topic. Finish the session with more simplified questions as a means to wrap up the session and provide everyone a sense of accomplishment. This approach also helps the session to end on a positive note. You should typically end the session by asking if anyone has questions or additional comments, and asking if there are other people (stakeholders) who might have input that could influence or assist with the desired solution.

Conduct Elicitation

Elicitation is conducted in four sequential steps.

- 1) Introduction – set the tone, purpose, timing and pace (duration and energy), and identify the overall purpose of the session. If there are ground rules, they should have been distributed before the meeting for review. During the introduction, establish the ground rules and associate them with the purpose. This allows the facilitator to manage the session by referring back to the purpose and the ground rules.

2) Body – the use of business analysis soft skills to draw forth information. Skills include professionalism, body language, tone, active listening, preparation, mediation/negotiation, leadership, coaching, and creativity amongst a much larger list.

- You need to understand question types:
 - **Open Ended** – any form of answer is acceptable.
 - **Closed Ended** – questions with a limited or framed response. Note that ‘yes’ or ‘no’ is a form of Closed-Ended question, although far from the only type. Asking ‘How many’ suggests a number, and a single numeric response is also closed ended.
 - **Contextual** – a question requiring an answer only within a given context, for instance the subject at hand. “What do you want for lunch?” when asked just before noon, implies today or within the next few minutes and suggests an ensuing action.
 - **Context-free** – General questions that could be used at any time. They are typically framed as introductions, ice-breakers, or lead-ins to more formal content.
- The “Right” Questions. Actually, there is no such thing, and the consideration of a “right” question is a trick. You will not know whether you have the relevant information until you start to analyze after the session. The best approach is to ask lots of questions, and capture all the potentially relevant information that you can. You can always filter after the fact.
- Listening. Active Listening does not mean being a myna bird. The goal is to paraphrase, or ask relevant **Open Ended** questions in order to keep a dialog going. The **Five-whys?** approach is an example of active listening as the facilitator attempts to gain a more detailed and relevant understanding of the issue or the information. Participants tend not to share what they

believe others, including the business analyst may already know. Active listening shows interest, and demonstrates both that you want to understand more clearly and that you desire to be part of the solution.

- 3) Close – Wrap up the questions, or other related activities including group breakouts, board work, document review, etc. Run down and get ownership confirmation for any action items, including action items to be externally assigned. **Thank the participants for their participation.**

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Three specific questions (phrased as appropriate to the session type) should always be asked.

- *Are there any additional questions?*
- *What might we have missed or should we have discussed but did not?*
- *Who else might contribute to the topic(s) discussed?*

4) Follow-up. Take time to document and analyze the information, at least at a high level. (This is not the detailed analysis that will follow the aggregation of most relevant information). The follow-up should be relatively soon after the session, while the information and relevance is fresh to the participants. ***You might do this at the end of some group facilitation sessions to affect clarity and prioritization of materials – for instance on a white board or collaboration software.*** The goals and purpose of follow-up are:

- Look at the full set of data and consolidate or eliminate duplicate and irrelevant (to the topic) information.
- Verify that the notes were captured correctly, and that any abbreviations, acronyms, terms, and definitions are consistent and understood.
- Uncover additional questions by reviewing what you have.
- Reinforcing that the information captured is valuable – a key to maintaining stakeholder participation and commitment.
- Give each participant some time to digest the process and the information to aid with further questions and idea generation.
- Provides opportunity for clarification.

Elicitation Techniques

Document Analysis

The business analyst reviews existing documentation in order to identify relevant information. This may be a common starting point for BA elicitation. Some of the information may be gathered, and questions formulated prior to conducting additional elicitation. This may create greater efficiency, and more effectively guide subsequent sessions toward a viable and desired solution. The benefits of document analysis include:

- Objectivity versus subjective input. Both are valuable, although objective input will better guide work efforts.
- Documents often contain information that is general in nature, or information less commonly known to single individuals. Regulations, guidelines and standards are examples of documents useful for elicitation. The problem with such documents is that they may be out of date, and therefore less relevant to the current situation. Nevertheless, they can provide historical context.
- Written information, if well designed, tends to be more accurate and concise than information captured based solely on individual perspective.
- Written documentation may contain more context and background than the information with which an individual is familiar. Access to existing information also reduces the amount of time the BA needs to spend (and cost the project) relative to elicitation.
- Up to date information is a good means to create an 'as-is' presentation that can set the foundation for any elicitation or inquiry regarding desired 'to-be' states.

Interviewing

Conducting one-on-one dialogue or information gathering sessions. The four step elicitation process is followed, although on an individual basis. Although interviews are typically one-on-one, there could be up to five or six people

involved in an ongoing dialog. (Note this is not the same as a focus group or other small group facilitation effort.) An informal question and answer session amongst the sponsor, project manager, business analyst and a few key-stakeholders would be considered an interview.

Interviews are best when confidence is needed, sensitive information is to be discussed, or the interview is with an upper level manager or stakeholder who's availability is limited. An interview might also be indicated if the business analyst needs to delve deeply into a specific subject without limitation or interruptions. One-on-one is ideal. Up to five interviewees is achievable.

Interviews might be **structured** with formal questions and a predefined agenda or timeframe and the goal of obtaining all the desired information. They may also be **unstructured**. Unstructured interviews may start with a single, premeditated question or might be spontaneous based on your preparation to apply interactive skills.

The other classifications for interviews are **synchronous** (real time or live), and **asynchronous** wherein an interview is conducted via email, video recording, or other interactive digital media.

Synchronous interviews are always preferred since they allow the interview to obtain information or interact based upon body language, facial expression and other communication nuances. They also enable immediate clarification, active listening, and open questioning – all techniques that provide more immediately valuable information.

While video and teleconference technologies continue to improve, they are not preferred since they eliminate the ability to best resolve conflict, allow individuals to participate from disruptive or less than ideal environments, reduce the ability to facilitate collaboration and consensus, and may be disrupted by technical challenges or lack of technical experience on the part of the participants.

Brainstorming

This is a group elicitation technique. The goal is to prompt innovation and creativity when the topic may not be clear to the facilitator, the customer, or the development team. Output from the collective group is typically greater than from single interviews. Common challenges with brainstorming include lack of full participation, dominance by specific participants due to cultural or political relationships, too rapidly narrowing the focus on singular issues, and a lack of prioritization or relative value. Brainstorming is a great method to gather large volumes of general information regarding a project that is large scale, complex, or will require commitment from a large number of stakeholders. Brainstorming sets the stage for consensus.

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Specifically relative to Brainstorming within the field of business analysis, the session must include an effort to filter or eliminate duplicate or poor ideas before progressing to Analysis. This may be done during the session itself or as an element of the Follow-Up. This may be a PMI-PBA question.

A sample step by step Brainstorming procedure is included in the Appendix.

Facilitated Workshops (aka Requirements Workshops)

Facilitated workshops are all group elicitation. Technically, brainstorming is a form of facilitated workshop, although ***Business Analysis for Practitioners*** places it in a separate category since far less formal preparation is necessary. There is also a distinction, since brainstorming is often about general information gathering, while facilitated workshops are more focused on the generation of specific requirements.

Facilitated workshops commonly share characteristics:

- Participants are cross-functional.
- In many cases the first expression of needs may arise during facilitation. As understanding and interactions increase, stakeholders will start to articulate their needs relative to one another or to the situation.
- Conflict and synergy together are expected to produce more accurate and operationally viable solutions.
- They are designed to foster team building, trust, and consensus as much as define the solution and the work.
- Communication is improved, and the improvement carries beyond the facilitation session.
- Agreements tend to be both understood and more binding versus merely documented requirements.
- The development team learns about the purpose, context, and alternatives for the problem or opportunity.
- Collaboration leads to better results than compromise or acquiescence.
- Single stakeholders are less likely to possess influence higher than their recognized authority or accountability over the solution.

Facilitation Preparation

Many people in one room at once bears a high cost. Preparation is required for efficiency and respect for the associated cost.

- Work with the PM, project team, and stakeholders to prepare an **Agenda** prior to the meeting.
- Distribute a formal agenda with the meeting invitation, or if separately with at least two days for consideration.
- Identify and clarify the group decision making process to be used before the meeting, and restate it during the meeting introduction.
- If any technology is used for the conduct of the meeting, the BA or responsible facilitator must assure the operation of the technology at least 30 minutes before meeting start. Reserve a room with enough time for setup and breakdown.
- Any materials to be distributed or used during the meeting must be prepared in more than sufficient quantity and prepared well before the meeting starts.

Invitations

Although you may invite individuals by name, you want to focus on the roles of the participants relative to the problem or opportunity. The goal is to have representatives for each/all desired roles present in order to affect a comprehensive solution that can affect consensus amongst as many concerned parties as possible during the session.

- Avoid participants who do not have a reasonable role/impact on the issues identified on the **agenda**. They may have input, but on a different agenda. Seek just the right audience.
- Assure attendance by those you do need by focusing the topic and demonstrating a respect for participants' time.

Tips for Session Facilitation

Set guidelines up front. Urge participants to stay on topic, avoid side conversations, and eliminate external distractions (phone, email, text, tight appointment scheduling, etc.).

- Include introductions and/or name tents and call upon people by name. This approach allows everyone to become a part of the process and solution. You may also use this technique to draw answers from introverted participants.
- Start the meeting on time (or within stated tolerance limits – like 5 minutes). Gain and keep momentum. Do not stop for latecomers. Hold breaks and bring latecomers and the distracted up to speed during the break.
- Assign roles that aid efficiency and participation. Examples include a separate facilitator, scribe, topic owner, timekeeper so that the facilitator (PM, BA, or external resource) can focus on the dynamics and communication to extract information.
- Use a whiteboard, flip charts, or other visible notetaking tools so correction and enhancement can be made during the session rather than at the end or during follow-up.

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The Project Manager and Business Analyst can often learn more by watching and participating rather than facilitating. The Captain and the Navigator can get a better sense of the crew's progress by watching the First Mate guide the work as they keep their eyes on the near environment and the horizon. Context is often as or more relevant than single pieces of information.

Focus Groups

A group facilitation technique that brings together specifically pre-qualified stakeholders and/or subject matter experts to focus on a specific set or singular topic. The group represents the skills or focus without requiring that all related stakeholders are present.

Focus groups are often used to gain feedback for partial ideas, prototypes, samples, or for specific clarification. They are **prequalified** against very specific criteria for the agenda. Group size of 8-12 is optimal. ***The facilitator for a Focus Group require skills or experience*** to guide an efficient meeting of this type. Since the group is focused and specific, they should reach more complicated or detailed stages much faster. Body language, facial expression, jargon, and experience reaction to the topic are key elements of focused discussions.

The drawback of a focus group is group pressure or group think. This is another reason that the facilitator for such a session is critical.

Collaborative Games

Collaborative games is a newer elicitation approach to facilitate simultaneous collaboration, innovation, and creativity. Change is pain! The concept of change, and various stakeholder perspectives related to change, can deter any attempt at collaboration and consensus. Endorphins are the neurotransmitters that help to block pain pathways. Laughter, fun, and play are known to release massive amounts of endorphins into the brain, thereby reducing the conflict associated with some perspectives associated with change. As such, games and play may enhance the potential for collaboration.

Three game formats are explicitly described in ***The PMI Guide to Business Analysis***.

- **Product Box.** Split the group into two or more teams. Provide each with a blank paper box, art supplies, and the instructions to decorate the box as they would like to promote the most important features of the product. Given limited surface area, the teams are supposed to identify the features they believe are most important.
- **Speedboat.** Draw a large picture of a boat with multiple anchor chains hanging from it. Provide participants with post-it notes in the shape of anchors. Participants list each problem or concern with the current product on an 'anchor' and stick it to an anchor chain. The game is supposed to uncover problems without focusing on the cause or contributors.
- **Spider Web.** Draw a circle on a large sheet of paper representing the product. The group is split into teams that brainstorm independently and then reconvene to place pictures of other products or features around the product circle that they believe are in some way related. Links labeled with unique relationships are drawn between the pictures and the product as well as amongst themselves. The result looks like a tangled spider web.

NOTE: These approaches are supposed to reduce the aversion to change and to circumvent some conflict situations. Since confrontation (of an issue or an opportunity) better leads to collaboration and consensus, the games approach to elicitation will not likely uncover major issues or factors related to stakeholder perspective and should best be considered a tool similar to brainstorming relative to its ability to uncover or identify diversity more than to solve technical problems or fully resolve conflict. As with all games, the purpose and the rules should be carefully explained prior to game play, and an experienced facilitator should guide the process.

Delphi Technique

Though not highlighted in *Business Analysis for Practitioners*, the **Delphi Technique** is considered a group facilitation technique. The technique uses experts to help identify or clarify needs, solutions, and definitive requirements. The experts are kept anonymous from one another while their input is collated, compared or ranked by the business analyst and then re-circulated amongst the experts for feedback and revision. The cycle repeats until near consensus is achieved. Unique to the field of Business Analysis, *Delphi Technique* is considered a means to achieve **Unanimity**. This means that facilitation by the Business Analyst must be repetitively cycled until a single, common set of answers has been identified and confirmed.

Observation

Observation is more typically an individual elicitation technique, although it may also be conducted on a group basis. The most common reason for *Observation* occurs when the information being gathered is best discovered in the actual environment where the problem or opportunity exists. For some stakeholders it may be easier to describe a process or an issue by demonstration rather than description. In related instances, talking about or describing a process may actually disrupt the process flow itself. Remember that some stakeholders have difficulty describing an issue even if they fully understand the cause or the symptoms.

Observation also allows for the collection of objective information and the comparison of multiple instances or results for later comparative analysis.

Cognitive studies identify that the more complex the task, the more difficult it may be for a skilled worker to describe unless they are experienced at teaching others by decomposing the work into smaller activities or elements. The observer may ask for a demonstration, or based on the nature of the situation

may ask to be a **participant observer** who would be guided through the effort by the subject matter expert.

Issues may be observed first hand, while questions are asked and gathered as they arise. While the questions may be informal, preparation is still of the essence so that emphasis is placed upon understanding the situation rather than merely duplicating the issue.

Visualization is a powerful tool, particularly when provided within the appropriate context. Another way to paint a picture is through stories, which are typically created via experience or visual observation.

There are four categories of Observation:

- **Passive Observation** – the Business Analyst observes without asking questions or interrupting the effort. This approach is often preferred when the workflow is critical to business operations. Clarification may be requested after the notes are organized and analyzed or multiple observation sessions have been conducted. This is one of the least effective forms of elicitation and is the weakest forms of observation.
- **Active Observation** – The observer may ask questions during observation, and as the process allows may interrupt or ask for repetition of selected steps in order to achieve clarity. This will minimally disrupt the timing of workflow, and may both negatively impact productivity and the results of the process.
- **Participatory Observation** – A hands-on approach where the observer performs part or all of the process as a means of gaining understanding or clarification. Learning and understanding are often affected by allowing people to conduct the effort themselves. Participatory Observation takes advantage of this habituated human tendency.
- **Simulation** – the work is recreated with a manual or digital tool, or an alternate process that then recreated the work. Examples include training tools or training systems that emulate the work to be achieved, or performing work in a prepared environment so as not to disrupt production processes. As a navigator, you will often work on a copy of an original, or a subset of a larger map so as not to destroy or incorrectly modify the original.

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Note that Simulation has distinctly different meanings for business analysis and project risk management. Within project risk management, Modeling is the term for manual emulation of probabilities (like flipping a coin and noting results). Simulation refers to calculating risk scenario probabilities via the use of a computer. ("Do you want to play a game?" "Yes, Global Thermonuclear War." – Wargames). For a Business Analyst, Simulation identifies a manual or automated means to recreate a process for the purpose of observation. Add this to your study key for the PMI-PBA exam.

Prototyping

For business analysis, prototyping is considered a form of elicitation. This fits within the project management description of prototyping, although from a different perspective.

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Within the domain of project management, Prototyping is conducted when the customer lacks clear specifications. Prototyping is one of three methods, along with Joint Application Development and Quality Function Deployment (also called Voice of the Customer) used to assist the customer to develop clear specifications and requirements. This fits the role of prototyping within business analysis, since the purpose of all Elicitation is to generate clear, verifiable and objective requirements.

Prototypes are any tangible working model of the product or solution. Website wireframes and sample screens are considered prototypes, and offered as the most common example within the PMI-PBA context. An alternate term for prototype is **Mockup**. Within business analysis, prototyping **requires** multiple iterations and is dependent upon **Progressive Elaboration**. A prototype may be the precursor to that actual product, or it may be a model upon which the product is based.

Seeing is understanding, and the goal of prototyping is ultimately to allow the customer to provide feedback and clarity based upon tangibles rather than perspectives. Prototyping may be used for predictive, incremental, iterative or adaptive life cycles, although is most common as a standard component of Adaptive/Agile approaches. For Agile methodologies, the prototype is not considered a mockup, rather it is considered an early version of the product itself. Prototypes are typically deployed when a stakeholder cannot clearly identify specifications, which is consistent with adaptive life-cycles.

Business Analysis identifies two forms of Prototypes:

- **Low-fidelity** – commonly created with pen & paper, on a whiteboard, or using a software modeling tool. These are mockups rather than the product itself. Specific examples you may encounter are: wireframes, interface screens, building renderings, floor plans, blueprints, product sketches, interim drawings.
- **High-Fidelity** – a representation of the final product (rather than an early iteration). A high fidelity prototype may actually provide limited functionality. The solution may be limited to single device, environment or condition that allows the product to be sampled or tested. Reviewers and testers may be able to manipulate some characteristics of the prototype. As an example, a website might enable navigation testing or data entry attempts, though initially not both features. Within **High-Fidelity** there are two subsets:
 - **Throwaway** – these are discarded once the review is confirmed. These are often used to develop specifications for tools and processes to create the final product. An example is the manual creation of a product that will actually be produced through an automated process.
 - **Evolutionary** – the finished product as it passes through the development process. A website is a perfect example of an evolutionary prototype. For an Agile project, only the requirements development process would be considered an **evolutionary prototype**; once the actual Agile project effort begins the work is considered **Evolutionary Development** rather than an **evolutionary prototype**.



The two most common forms of Prototyping with which a business analyst and project manager must become familiar are Storyboarding and Wireframes.

- *Storyboarding displays a series of images or illustrations representing a navigational or time sequenced process. The story boards themselves are static until the related product is generated, then they are archived. Storyboards are considered a special form of prototyping as they do not focus on the product as much as the experience, process or cycle.*
- *Wireframes are also static drawings or schematics used to define functionality (again not the product itself, and not specifically the experience). The purpose of a wireframe is to describe the logical flow of features or functions without an emphasis on the appearance, content, or details. In a web site context, wireframes include elements such as header, footer, navigation or side bars, labeling, page titles, the placement of data, navigation links, placeholders, and images.*

Questionnaires and Surveys

Both questionnaires and surveys are lists of questions requesting or requiring a response from a specific audience. The format could be face-to-face, although both are more commonly implemented in digital or paper format. Surveys and questionnaires are most often selected as an elicitation technique when the audience is large, geographically distributed or both. An alternate reason to use a questionnaire or survey is to obtain information within a short timeframe, although historically **4-7%** of people respond to surveys or questionnaires even when mandated to do so. There are several major weaknesses for questionnaires and surveys:

- There is no opportunity for clarification or context, even if the answer is written rather than selected.
- Questions are most often closed ended, limiting the outcomes to known possibilities and responses. (Creativity and alternatives are diminished.)
- Respondent sample size and audience is critical, and respondents may not represent the actual audience as much as those predisposed to answer, including significant outliers.

In order to overcome the limitations associated with questionnaires and surveys, there are several recommended elements:

- Determine the number of recipients by calculating the necessary response and calculating the sample size given a 4-7% response.
- Statistically analyze for variance and outliers, which requires that the survey incorporate demographic or organizational information to assure relevance.
- Promote participation by clearly stating the importance of survey results to the organization and individuals when it is distributed.
- Acquire an upper level champion (potentially the project sponsor) to promote and communicate before and during the survey regarding its relevance and importance.
- Submit deadlines and reminders to assure receipt and closure within the necessary timeframe.

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A formal survey process is composed of six steps:

- 1. Develop questions – relevant to the situation, with sufficient clarity, range, and structure to affect necessary answers.*
- 2. Determine recipients – the audience should be representative of the needed demographic and sufficiently large to generate the required statistical response.*
- 3. How to administer – determine whether in person, web based, email based or other means will be used to both distribute the questions and acquire the answers. Modern digital solutions often enable rapid distribution, audience filtering and validation, and near immediate tabulation and analysis of the results.*
- 4. Incentives? – people like to be thanked or compensated for their time. If you need answers, then incentives are a certain motivation. If you are going to use project resources as incentives, then you need to get this authorized within the project budget in advance.*
- 5. Test on sample audience – before spending the money for distribution, collection, analysis, and compensation you need to test the questions, response, and analysis on a small audience to confirm appropriateness and effectiveness of the survey plan.*
- 6. Plan for tabulating and reporting – the data is useless if it cannot be tabulated and analyzed. Determine how you will collect, aggregate and analyze the information before you even submit the survey. No stakeholder wants to spend their time answering questions only to later discover that the information was dismissed or the effort was wasted.*

Complete Elicitation

Regardless of the approach taken, the business analyst needs to aggregate all the data, organize it into appropriate categories, and confirm that sufficient and clear information is available to proceed. You will never have the resources to conduct every form of elicitation, and may often be restricted to less than ideal inputs. If there is any aspect of Business Analysis that can affect project success, unclear or incomplete requirements will result in project failure faster than any other cause. Proper planning and execution of Elicitation will receive the support necessary, and enable the BA to request additional input and clarification as the project progresses. If you start poorly, obtaining consensus and commitment will be harder to later achieve.

The following may be indicators that you have sufficiently elicited information:

- The stakeholders **verify/confirm** or approve the initial follow-up and results, and **validate** that the results meet their needs.
- The model appears complete and without noticeable gaps.
- The prototype is successful.
- An objective is identified or reached.
- Solutions are now clear, and Needs can be cited by most participants.
- Stakeholders repeat themselves, suggesting now new content will arise.
- The amount of time required by stakeholders to answer extends noticeably, suggesting distraction or that deeper analysis will be needed (and the latter is the next step for the BA).
- High level requirements have been verified by two or more independent sources.

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The PMI Guide to Business Analysis introduces the term Confirm instead of the term Verify to identify the correctness of information captured. As a business analyst you should always use the same term to represent the same meaning. This prevents confusion and misinterpretation. Throughout this course, Verify means correctness and Validation means provides value.

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Agile projects do not separate elicitation and analysis. Each user story is captured, analyzed and placed either on a Kanban Board or into a Backlog for selection and implementation. Business analysis efforts are a component of the work performed during the iteration or Sprint, such that elicitation and requirement sizing are part of the same step. Agile projects move swiftly past the high level details toward decomposition and feature analysis so that work may begin. Additional high-level and detailed requirements will arise as the work progresses, often causing work efforts to be replaced by subsequent requests, requirements, or analysis and understanding. Elicitation is informal and may use only modified subsets of the alternatives presented in this Module.

Business Analysis for Practitioners identifies four significant challenges to successful elicitation and recommendations for each:

- 1) Access to appropriate stakeholders – Focus on the information, not the individual. Remember your analysis of sources and identify an alternate source that might provide the information.
- 2) Stakeholders do not know what they need – prototyping, storyboarding, or wireframes might guide the stakeholders toward a solution more efficiently.

Alternately remind participants that the goal is to discover a solution to the immediate problem or opportunity and assist them to visualize or review relevant questions, context, and information already available.

- 3) Stakeholders focus on a solution rather than requirements – many participants already have a singular solution in mind. Work towards a set of integrated requirements. Decompose high level elements until the relationships start to become apparent. Prepare for ongoing clarification. The Five-Whys? technique is one example.
- 4) Insufficient detail is generated or captured – Stakeholders may not understand the process or context to be able to add detail. Offer models, visual representations and examples to help participants understand the context and level of detail needed to affect a solution.

Requirements

Analysis is the creation of requirements that are clear to the sponsor, key stakeholders and the team. They represent the problem or the need, fit the situation statement, identify the value and a means to measure it, and can be delivered by the development team. This sounds like a tall order, though is achievable if an appropriate understanding of requirements characteristics is maintained.

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It is the Business Analyst's responsibility to review the solution to confirm that requirements are met. In order to achieve this and confirm Value, the effort must start with the generation of requirements that can be used for that purpose.

Before specifically addressing Analysis, we will look at requirements terminology and context. Requirements should have a clear **format** to assure that they are complete. Requirements fall into several **categories**, which help to determine their potential value, relative priority, source, analysis, ownership, verification, and traceability. Requirements of several **types**, that help to determine the categories into which they may be placed. Requirements also include **characteristics**, some of which must be present for a requirement to be considered 'good'. Requirements have **attributes** that can be identified and tracked for clarity and control purposes. Requirements also flow through a **sequential process** that assures the categories, types, characteristics, and attributes have been properly captured and documented as close to the source of information or classification as possible. Some of the elements arise from the nature of the requirements themselves, and some are defined by business analysis to assist with traceability and management.

Requirements Format

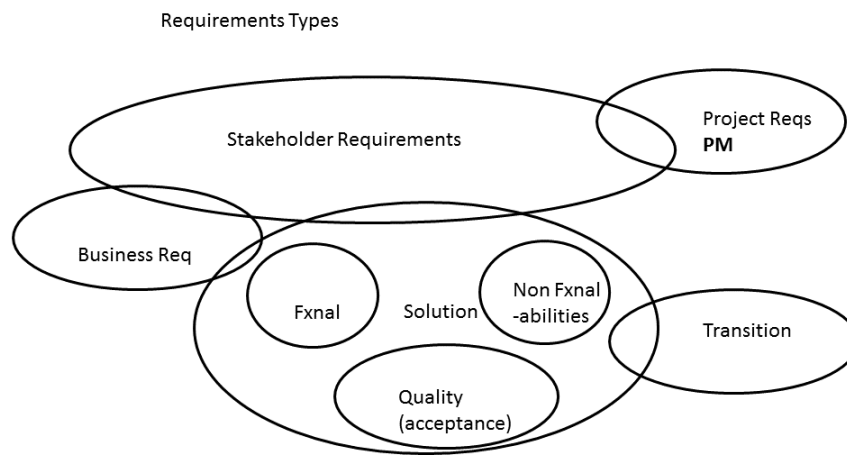
Some of the more detailed elements associated with Requirements Analysis involve the use of **models**. Several models have very precise or specific modeling languages used to describe and characterize requirements within the model. If you learn or follow a specific modeling language, you will conform to the format dictated by the model. Regardless of whether you capture a requirement using a pre-designated model, or merely capture them as a list of text elements, maintaining a consistent format helps to assure that thought has gone into the process.

Formal requirements should minimally include: a **subject, imperative, action verb**, an **object & conditions**. Many requirements start with the conditions under which the requirements do/will/must exist since the conditions regularly identify the problem or opportunity being addressed. For example,

When in uncharted waters (condition) the navigator (subject) will (imperative) capture and record (action verb) longitude and latitude readings (object) every quarter hour (additional conditions).

Requirements Types

Requirements types are based upon their derivation, in other words the consideration that suggests their inclusion. This is different than the source of the requirements. Sources may include regulations, guidelines, organizational practices, sponsors, key stakeholders and developers. Requirements type is a grouping that aids the assignment of categories, attributes, and other characteristics based on the concept of 'ownership'.



Requirements types as displayed in the preceding diagram include:

- Stakeholder – provided or described by stakeholders as a need or a want.
- Business – provide value to the business. These may be monetary (NPV, IRR, etc.), regulatory, **Key Performance Indicators**, or other criteria placed upon the solution to address business **Value**.
- Product/Solution – the specifications and criteria that define the product or solution, what it does, how it will perform, how it meets the stakeholder needs, and how it will be measured for quality. Product/solution requirements may be separated into four sets:
 - Functional – what the product does.
 - Non-Functional – how the product performs.
 - Quality – how the product is measured; the criteria for acceptance.
 - General – any other product requirements that do not fall into the other three sets, although most should.
- Transition – elements necessary to transfer the product to the customer and to provide ongoing value. There are several possible subcategories, the most common being testing, training, and placing the product/solution into operation.
- Project – project requirements are the work effort and resources necessary to design, integrate, build, monitor, control and manage the project and business analysis processes.

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For the PMI-PBA certification you need to be able to separate the ownership and accountability of requirements types. Project Requirements and Quality Requirements are owned by the PM. Functional, Non-Functional, and Quality requirements together are parts of the Solution Requirements along with Business Analysis Work, and these belong to the BA. As such the only overlap is relative to Quality requirements, which helps to define verification and validation of the requirements (domain of the BA), and verification and validation of the product creation (domain of the PM). The BA also owns Evaluation of the product, which incorporates confirmation of Business Requirements and generation of the Transition requirements, working for the PM.

Since you will likely see more detail regarding the distinction between functional and non-functional requirements, here are some ways you might differentiate them.

Functional requirements: what the Product does

- **Functional** requirements can be derived from scenarios, situation statements and use cases.
- **Functions** come from the BA and Business Subject Matter Experts.
- Functions include Technical specifications like: wireframes, screen mockups, and process flows.

Non-functional requirements: also called **Quality of Service Requirements**

- Deal with the environment in which the product will be delivered or used.
- Environmental examples include security controls like Authentication, Authorization and Access
- Generally any condition that might end with the use of **-(a)bility**: compatibility, availability, desirability, marketability, usability, etc.

- Non-functional requirements would not indicate what the product does, but they might indicate the system on which the solution operates (compatibility) or other conditions that must be met.

Requirements Attributes

Requirements attributes are accumulated or used during Planning, Eliciting, Analyzing, Tracing and Managing requirements. The more detailed the attributes, the better you can understand, trace and manage the requirements, although they may be too complicated for some stakeholders and developers. There is a fine line between appropriate and too much detail, and this consideration includes the cost of generating and tracing all of the attributes as a component of the BA's efforts.

The most commonly applied attributes are:

- Absolute reference aka Unique **Identifier** * - a unique label or number
- Author – creator of the requirement
- Complexity - dependencies, interactions, conflicts, etc.
- **Ownership*** – accountability for delivery
- Priority – regulatory, numeric or mandatory/recommended/optional, etc.
- Risks – opportunities and threats, EMV, responses.
- Source (of requirement) – by type, identification, etc.
- Stability – interrelationship, dependencies, work progress
- **Status*** – requirement lifecycle
- Urgency – timebox, time frame, delivery date
- Date completed – Administrative closure
- Project Objectives – relationship between requirement and goals/objectives.
 - *To **Trace** requirements you MUST have: identifier, status, owner.

Common Status terminology includes:

- Open or Proposed: have not been analyzed or approved
- Active: Open and in process
- Functional: Solution behaviors that can exist in any state

Each status may have subsets or use terminology specific to a development methodology or configuration management system.

High level acceptance criteria might also be tracked as a requirement attribute, based upon usage or usability (non-functional requirements) rather than the detailed metrics associated with Quality and verification. This guides the results toward the Quality of Service desired by the customer, which may also be less tangible.



Although Risk Identification, Qualitative, Quantitative and Response analysis are the purview of the Project manager or the Risk Manager, Business Analysts often learn about the risk tolerance of a sponsor, customer or key stakeholder before the project is even chartered. As such, requirements Risk Status captured by the BA typically revolves around identifying the thresholds and risk responses desired by the stakeholders. This may be used to help identify other attributes like priority, urgency, or complexity.

Requirements Categories

Requirements categories are groupings that assist different groups or classes of stakeholders to find requirements with which they are most involved or interested. Examples include:

- Function – the input from the stakeholders that define the product, also used by the BA, PM and team to design and develop the product.
- Priority – to assist with assignment during Adaptive project efforts, and resource management during predictive projects.
- Testability – requirements that will specifically be used by testing teams or to confirm acceptance.
- Scope – the project work, including the Scope Statement and WBS (this is owned by the PM, but may be tracked by the BA along with other Traceability depending on the Business Analysis Plan).

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“The 100% rule” is a term from the PMBOK® Guide that refers to WBS entries. (The rule states that all Work Packages must roll up to higher levels so that nothing is omitted; in terms of resource allocation, interdependency, or sequencing when project planning is performed.) The term is important to Business Analysts since the role of the BA is to assure that all objectives (the top of the WBS) are addressed by requirements and that all requirements are incorporated into the development and delivery planning.

Requirements Packages

Requirements ***packages*** are a specialized deliverable created by the Business Analyst during Elicitation and Analysis. They are not always required or present, and should not be generated unless specifically requested and approved by the Project Manager. The focus of a **requirements package** is meeting ***communication requirements***. As such they are often, though not always, defined in the project Communication Management Plan.

- Unlike other requirements deliverables that suggest inclusion to create consensus and commitment, they are created by the BA ALONE and then provided as prescribed by the Communication Management Plan or Business Analysis Plan. They are delivered per the Communication plan or directly to the PM.
- Inputs include the charter and providers of requirements. The Content of a Requirements Package should be declared precisely. Their purpose is to assure that complex information is clear and concise.
 - Details are easy to understand
 - Graphics are easy to absorb
 - Everything is included in the package
 - Constraints, assumptions and dependencies are incorporated.

One way to describe a requirements package would be a reference key for the information being provided, or guidance for the use of the documentation.

Requirements packages might incorporate a description of requirements formats, types, attributes, categories and processes used to create and manage the documentation.

Requirements Verification, Validation and Approval

The terminology and sequence associated with requirements review, placement into the project plan, status, completion, and acceptance can be extremely confusing. There are just a few guidelines designed to clarify the many processes that are typically unique to a project lifecycle, modified by internal business guidance, or become the vernacular for a given PMO, group, or team.

According to business analysis **requirements** are always processed in this order:

confirmed > approved > validated > implemented

- **Confirmed:** Reviewed during elicitation and follow-up to confirm correctness.
- **Approved:** Signed off by the accountable party, typically associated with the requirement type. (For instance, key-stakeholders approve business requirements, while developers may identify and approve technical or system requirements.)
- **Validated:** Shown to deliver value relative to the business need, situation statement or business case. Many requirements might be confirmed and approved, though found to be of lesser priority or significance to project success. This is not validation of the product, it is validation and incorporation of the requirement into the project plan.
- **Verified** – As the author, I am placing Verification here to aid with clarity in the sequence. Verification is the process of determining if requirements meet quality criteria (consistent, complete, etc.). A BA works with the customer to affirm that the requirements meet needed Value – that's validation – then further reviews ONLY the requirements that add Value to determine if they are correct.
- **Implemented:** Incorporated and traced as a project work element.

Requirements approval typically requires three (3) signatures whether the signatures are formal or informal: 1) the business requirement owner, 2) the solution team recipient, 3) the Business Analyst. This assures that the requirement is clear, and as prioritized can be implemented by a team member who understands the work necessary.

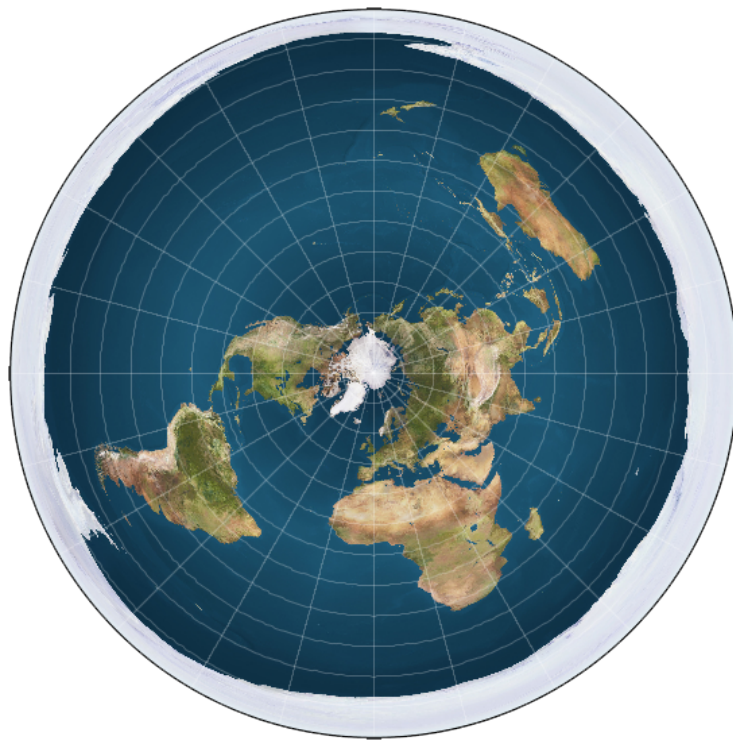
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For the PMI-PBA exam, carefully read the question to determine whether verification and validation address Requirements, which would be part of the Elicitation and Analysis domain or verification and validation of the Product which is addressed by the Evaluation domain. The tools and approach overlap, though are also unique in many instances.

Analysis

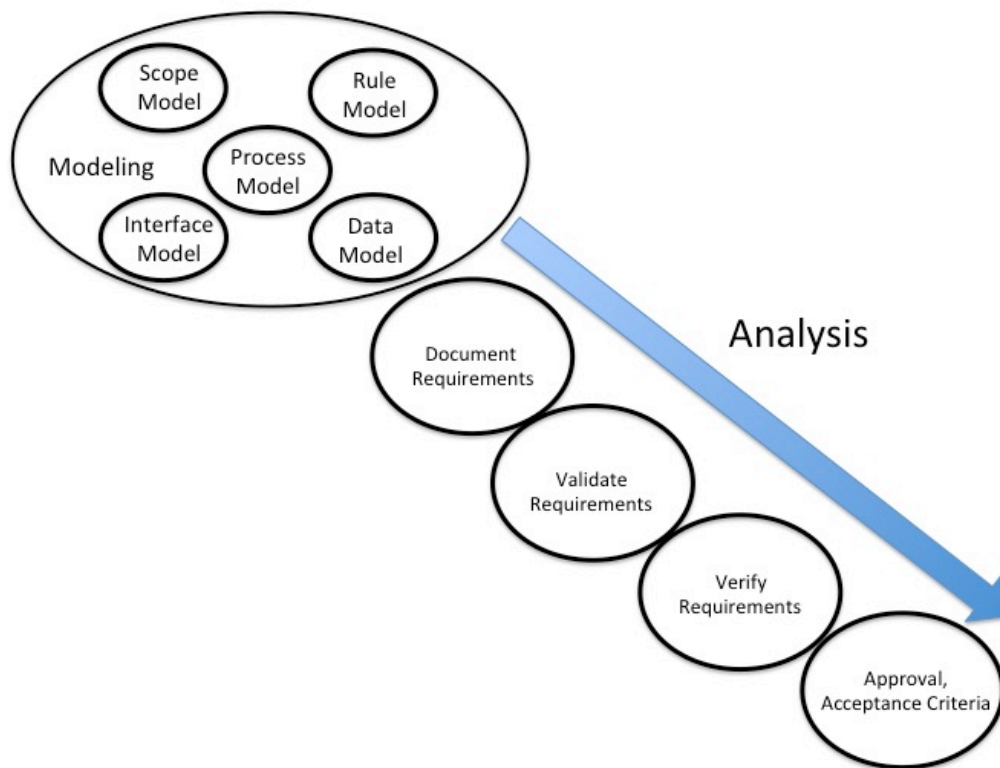
As the navigator, you are responsible for gathering the existing knowledge and insight, as well as the problems, needs, situation statements and the purpose for the project. You need to make sense of all the information you have gathered. You are the individual responsible for plotting the course into the unknown. The captain will make sure that the team has the skills and the tools to achieve the destination. Just sailing into the unknown will not do much good without a reasonable and realistic course, however.

Think back to what it must have been like when all documented knowledge suggested the world was flat. The navigator needed to generate a map of the unknown. There are monsters out there, by the way.



Then we decided that the world was a sphere. Well, at least some Hellenistic Greek astronomers proved the theory in the 3rd century BC. Thank you Magellan and Elcano for circumnavigating (1519-1522 AD). That's 18 centuries, by the way. You don't have that long in today's technological environment to get the facts straight. The earth is actually not quite a sphere. It is flatter at the poles, wider in the middle, and slightly larger in the southern hemisphere – an organic pear shape of sorts. Thank you NASA for the proof. The earth's shape constantly changes due to the pull of the sun, planets and most notably our moon. The tides cause the ocean to rise and fall. The bottom, the reefs, the rocks, and those sandbars are not always the same depth beneath the keel. Oh, brave navigator, you had better plot those changes well. Don't forget the weather changes, the seasons, global warming, El Nino and El Viejo, and all those modern sea monster stories. You need to convince the sponsor, the team, and the key stakeholders that this endeavor is possible. (Don't worry about the project manager, he loves change and is ready to lead anything!)

Analysis is about gathering the facts and the requirements, then building a model that places as many puzzle pieces as you have available into an understandable whole. Visual models help to set boundaries. As you analyze, you can go back to elicitation to fill in the puzzle pieces. Remember, elicitation and analysis are iterative. Start with the best map available, add new content, and progressively elaborate as you go.



Modeling

Modeling is the most diverse and detailed aspect of business analysis. If you are new to the field of business analysis, this is the topic within which you have the most to learn. Modeling may be informal, like the use of a white board or graphic software to draw a picture. Or it may be formal, with specific business rules, diagram formats, and defined structures.

Requirements are modeled in order to demonstrate relationships, confirm completeness, provide clarity, and identify gaps.

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As you prepare yourself for modeling, whether you are creating graphics or tabulating information, you need to remain focused on your goal. That goal is clear, simple, precise description of information. A portion of your focus needs to recall the persona and the individual characteristics of your audience. Are they visual, auditory, focused on facts (written data), in need of asking their own questions? The human tendency is to demonstrate and display all that you have learned. Your further tendency is to present the information in a format that is comfortable and impactful to you. Your audience needs to walk their own path to understanding. Your presentation of information leads the way to that insight.

Consider finding and reading the works of Edward R. Tufte or Garr Reynolds (listed in the bibliography/references at the end of this book) that provide powerful insights into methods for presenting information. You can always layer information on top of a simple infrastructure, enhancing the details and interactions. If you start with too much detail, you will lose your audience, and stripping away the layers only adds to the confusion created by the original message.

This can be a difficult lesson for any presenter to learn, and all the more challenging for the navigator who understands the starting point, the route, the goal, and all the stops in between. Just try to remember, you are selling the vision and the solution.

Simple sends the message.



Business Analysis for Practitioners identifies five model categories. You will need to identify which category each model belongs within, and the specific characteristics of several common models. The following table is recreated from ***Business Analysis for Practitioners, Table 4-2 Models Organized by Category.***

Category	Definition	Example Models
Scope Models	Models that structure and organize the features, functions, and boundaries of the business domain being analyzed.	• Goal and business objectives • Ecosystem map • Context diagram • Feature model • Organizational Chart • Use Case Diagram • Decomposition model • Fishbone Diagram • Interrelationship Diagram • SWOT diagram
Process Models	Models that describe business processes and ways in which stakeholders interact with those processes.	• Process Flow • Use Case • User Story
Rule Models	Models of concepts and behaviors that define or constrain aspects of a business in order to enforce established business policies.	• Business Rules Catalog • Decision Tree • Decision Table
Data Models	Models that document the data used in a process or system and its lifecycle.	• Entity relationship diagram • Data flow diagram • Data Dictionary • State Table • State diagram
Interface Models	Models that assist in understanding specific systems and their relationships within a solution.	• Report table • System interface table • User interface table • Wireframes • Display-action-response

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Although the approach may be both costly and impracticable, best practice suggests that at least one model from each category be considered as you perform analysis. This assures that all of the information you have gathered will be represented in an appropriate model. In practice, constraints prevent this approach and often only one or two models are necessary to assist the team to understand the solution. Predictive projects, given their complexity and risk elements, are more likely to utilize multiple models.

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Look at each of the Definitions in the Models Organized by Category table. For each model Category, select and write down a use toward which you might apply a related model. If you are part of a team breakout, feel free to discuss options with team members in order to achieve better understanding. You may refer to the model examples for ideas, though you should be placing more emphasis on the description rather than memorizing the example list. Once you understand the purpose for each model category, identifying possible examples, forms, and approaches becomes much easier. The goal of this exercise is to discover what you already know.

Scope Model
Process Model
Rule Model
Data Model
Interface Model

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The goal of this course is to raise your awareness of business analysis models. Proficiency associated with many of the models listed would require one or more weeks of coursework, followed by months or years of application. A good business analyst is aware of the model most appropriate to a solution, and will recommend SME's capable of building and maintaining related models as needed for new endeavors. If the organization in which you work uses a specific model it is in your best interest to become more proficient in that singular model before attempting to incorporate or recommend alternatives. The goal is for the team to reach a common understanding, and many models within a given category can achieve that objective. Throughout this module, the goal is to help you to understand the conditions under which each model may be applied and the differentiation characteristics of the more common models.

Specific models are selected based upon five sets of criteria. Pay attention to the selection criteria as you consider which model might be most appropriate.

- Methodology – some project or systems development approaches dictate the use of a matching or integral model. Some models may not be required, but best match a particular development approach.
- Project Characteristics – if the project is about people, several models are specifically focused on people and their interactions; if the project is about systems or services then data and interface models may be most appropriate. Look at the input and output types for the project, which can often identify the form that the model should take.
- Evolution of the project cycle – some models lend themselves to the project planning effort, others to design and implementation. Models that provide higher levels of detail tend to be useful earlier in a project, while more detailed models best match projects that are decomposed, better defined, or well underway (e.g. iterative or adaptive projects).
- Model Categories – this is where ***Business Analysis for Practitioners*** suggests at least one model from each category be ***considered***.
- Level of Abstraction – some models provide the big picture (the map of the earth), while others provide every essential detail (topographic maps that provide elevation lines and multiple symbol sets). Select the type that meets the current need.

Modeling Languages

Modeling languages are somewhat independent of model categories. Modeling languages establish specific symbols, syntax, and terminology so that the components of the model can be understood and clearly interpreted by anyone who knows the language. Like any language they can be difficult to learn well, though a few introductory elements can be used to begin the process of differentiating the languages and understanding the information they present.

You will be expected to understand the differences between the four modeling languages provided in the following table, and a few examples of alternate approaches to the well-defined languages.

Modeling Language	Overview
Business Process Modeling Notation (BPMN)	Complex business processes, change focused
Requirements Modeling Language (RML)	Visually model requirements for stakeholders
System Modeling Language (SysML)	Complex system analysis, incorporates some UML
Unified Modeling Language (UML)	Used for Design models, applicable to requirements
Various alternatives	ISO, IEEE and IT practice have introduced other visual and modeling standards.

BPMN

Business Process Modeling Notation (BPMN) is most commonly used for **Workflow** diagramming. It is a well-established graphical model for specifying business processes.

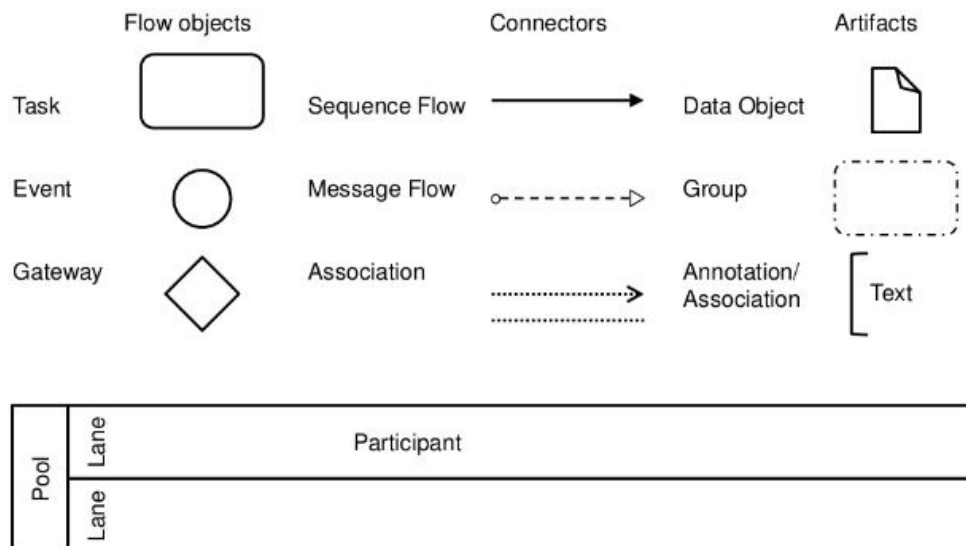
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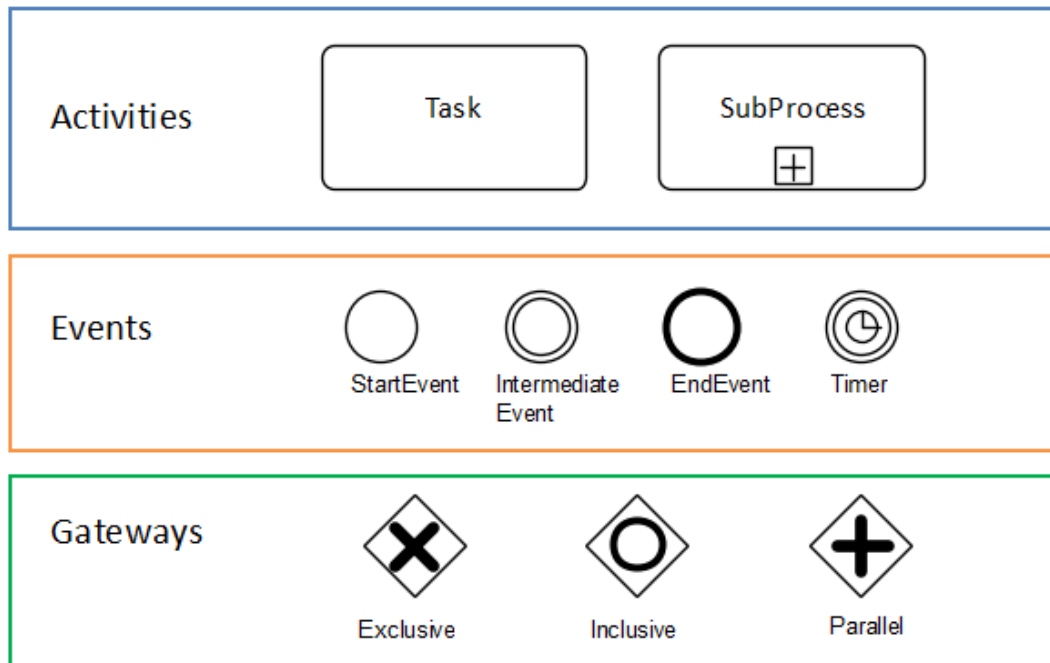
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BPMN is an open industry standard developed by the Business Process Management Initiative (BPMI). It is currently maintained by the Object Management Group [<http://www.omg.org/>]. This organization also offers BPMN standardized certification, and free guides that describe the notation. The meaning of the shapes and symbols are a part of the standard, although many independent vendors implement tools that apply the standard with some graphic license. BPMN is currently at version 2.0, updated in 2011.

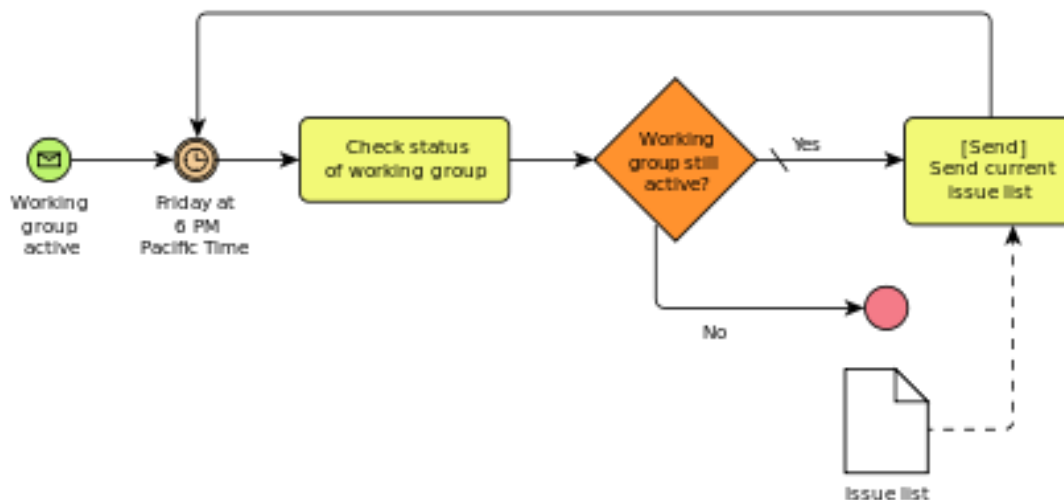
BPMN has four common sets of elements: flow objects, connectors, artifacts and (swim)lanes. Examples of the basic symbols are provided in the following diagram.



Symbols may be refined for clarity as in the following example. Note the common use of circle variants to represent events: simple circle (start), layered circles (intermediate event), bold circles (end event) and a circular clock (timer).



An example of BPMN Notation



RML

Requirements Modeling Language (RML) is based on **goals** and **objectives**, unlike UML and SysML which are based on design and interaction. RML contains language subsets and variants that fall within four categories. You do not need to understand all the variants in any detail, though may choose to use the following outline to differentiate between the subsets of RML.

- **Objective** models help to define requirements relative to the objectives they help to achieve.
- **System** models help to define the elements that define how a system or program must perform, enabling developers to interpret the requirements for coding purposes.
- **People** models demonstration the interactions between people, or the interactions between people and elements of the solution.
- **Data** models identify how data is created, read, updated and deleted.

Note that each of these model types or forms may exist independent of RML, although RML provides a structured language that can be learned, applied and taught to enhance clarity.

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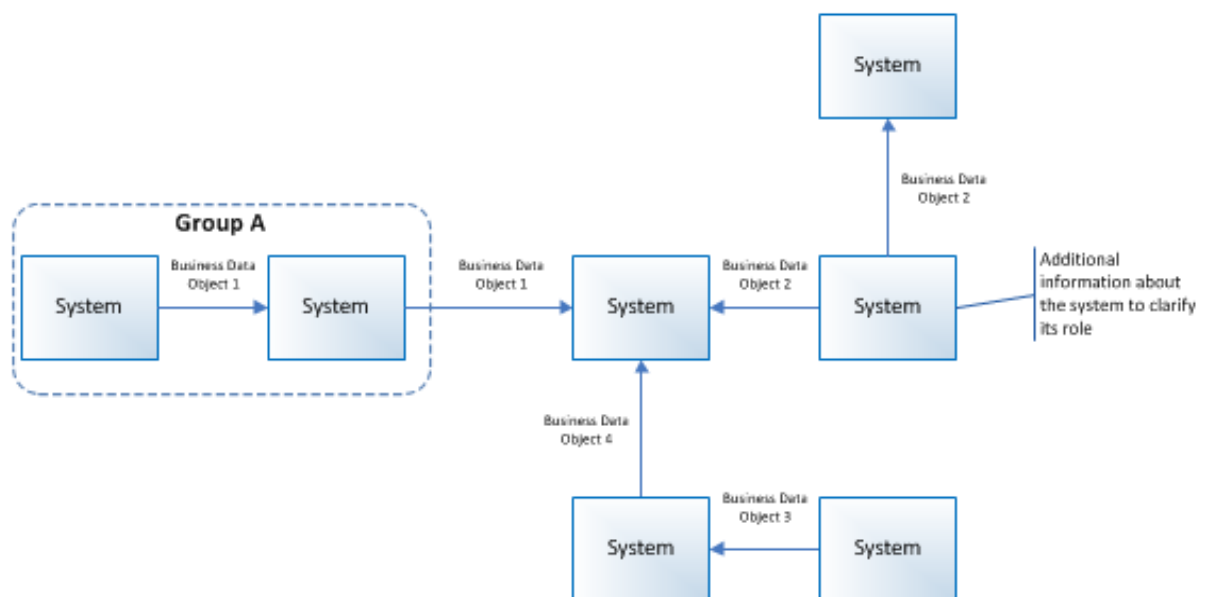
Pay attention to the acronym CRUD (create, read, update, and delete). The term is referenced in standard database design, interface development, and security controls amongst other information design and administrative solutions. CRUD always suggests a Data model rather than a system or other model type. For the PMI-PBA exam, associate CRUD with Data models and RML.

The following outline provides examples of the four **RML** model categories:

- **Objective Models** including
 - Business Objectives Model (BOM)
 - Objective Chain
 - Key Performance Indicator Model (KPIM)
 - Feature Tree
 - Requirements Mapping Matrix (RMM)
- **System Models** including
 - Ecosystem Map
 - System Flow
 - User Interface (UI) Flow
 - Display Action Response Model
 - Decision Tree
 - Decision Table
 - System Interface Table
- **People Models** including
 - Org Chart
 - Process Flow
 - Use Case
 - Roles and Permissions Matrix
- **Data Models** including
 - Business Data Diagram (BDD)
 - Data Flow Diagram (DFD)
 - Data Dictionary
 - State Diagram
 - State Table
 - Report Table

Common uses of RML include product line engineering, goal conflict resolution, hazard/threat models that identify the objectives rather than the processes.

An **Ecosystem Map** is an RML **systems** model that shows which systems interact with each other and the nature of the relationship. The Ecosystem Map shows all of the systems in the solution ecosystem, which allows you to systematically ensure that you analyze all of the systems. The figure below shows a template for an Ecosystem Map. Note that this model identifies that an interaction or flow exists, but not the detailed nature of the interaction, the data flows, or the programming necessary to affect development.

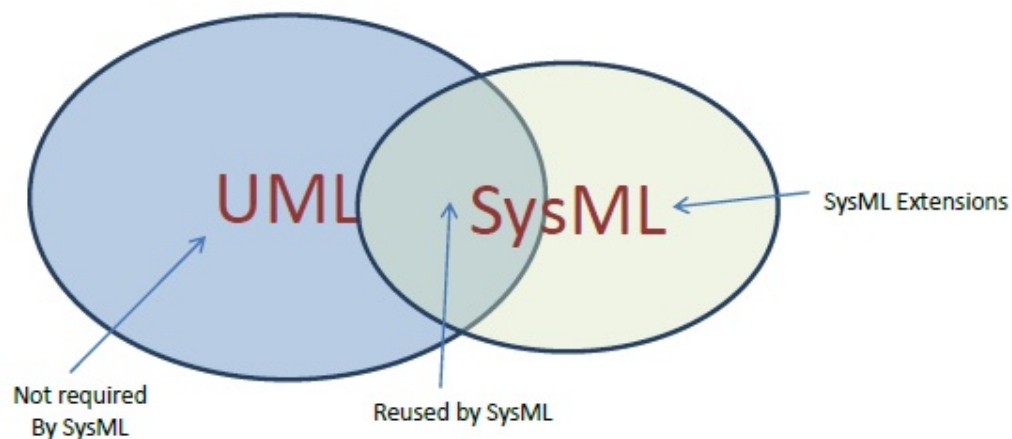


RML tends to be higher level than SysML or UML, as an interim step in reducing goal and objectives toward requirements.

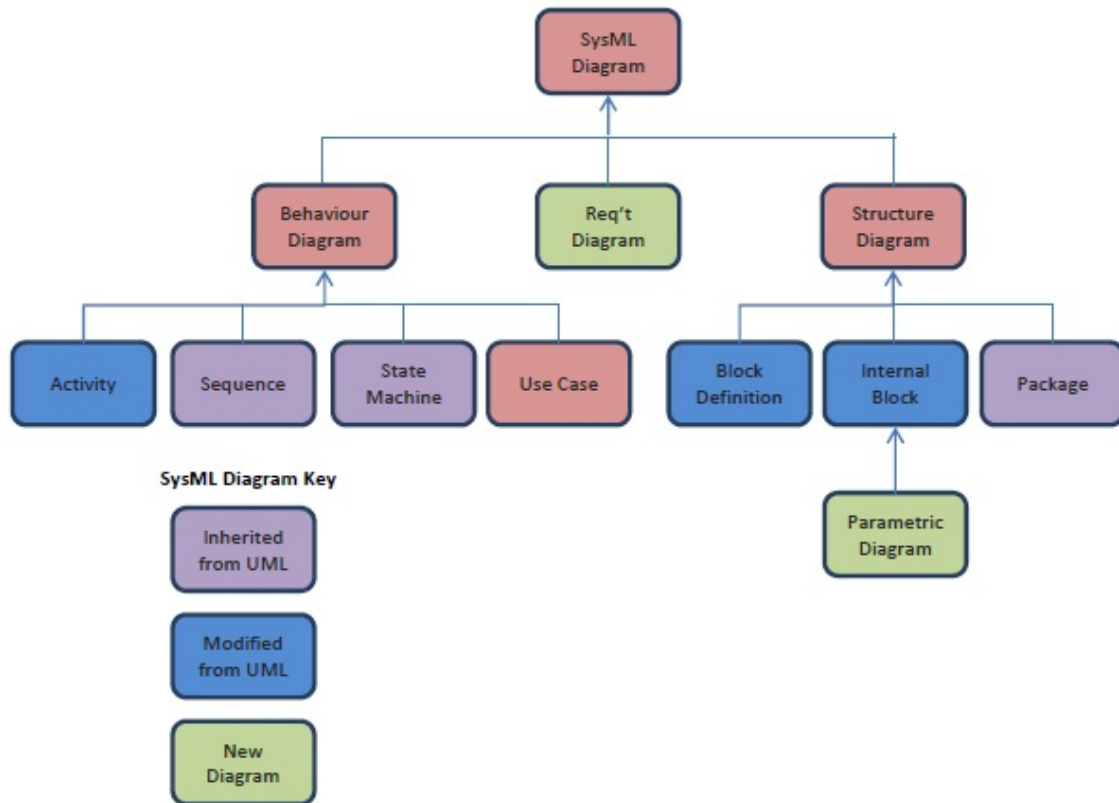
SysML

The Systems Modeling Language (SysML) is designed for engineering systems. SysML supports the analysis, design and verification of complex systems including hardware, software, information, personnel, procedures, and facilities in a graphical notation. SysML provides graphical representations based on a semantic foundation for modeling system behavior, requirements, structure, and parameters. The language was designed to integrate with other models using the OMG (see BPMN above) XML Metadata Interchange (XMI®) interface.

SysML is both a subset and an extension of UML, as submitted to OMG in November 2005 and accepted as a standard in 2006.



SysML uses the concept of the 'block' as the basic unit structure to represent hardware, software, information, personnel, procedures, and facilities. Block definition diagrams and internal block diagrams represent system structure.



SysML Diagrams include:

- Use Case Diagram – high level functionality delivered via system interactions
- Activity Diagram – Illustrates the flow of data and control between activities
- Sequence Diagram – interactions between collaboration points
- State Machine Diagram – identifies transitions due to system event responses

UML

Unified Modeling Language (UML) general-purpose software engineering language created in 1995 and standardized as an Open model in 1997 by OMG. UML was registered as an ISO standard in 2005. UML's primary focus is to visualize the design of a system. UML is based upon Object Oriented programming. Key terms include activities, components, software components, and user interfaces.

UML diagrams are classified in two main types:

- **Structural** diagrams identify the software architecture.
- **Behavioral** diagrams identify the functions of the system.

Both UML diagram types/categories contain common subsets that have also been standardized.

Structural diagrams include **Component Diagrams** and **Class Diagrams**.

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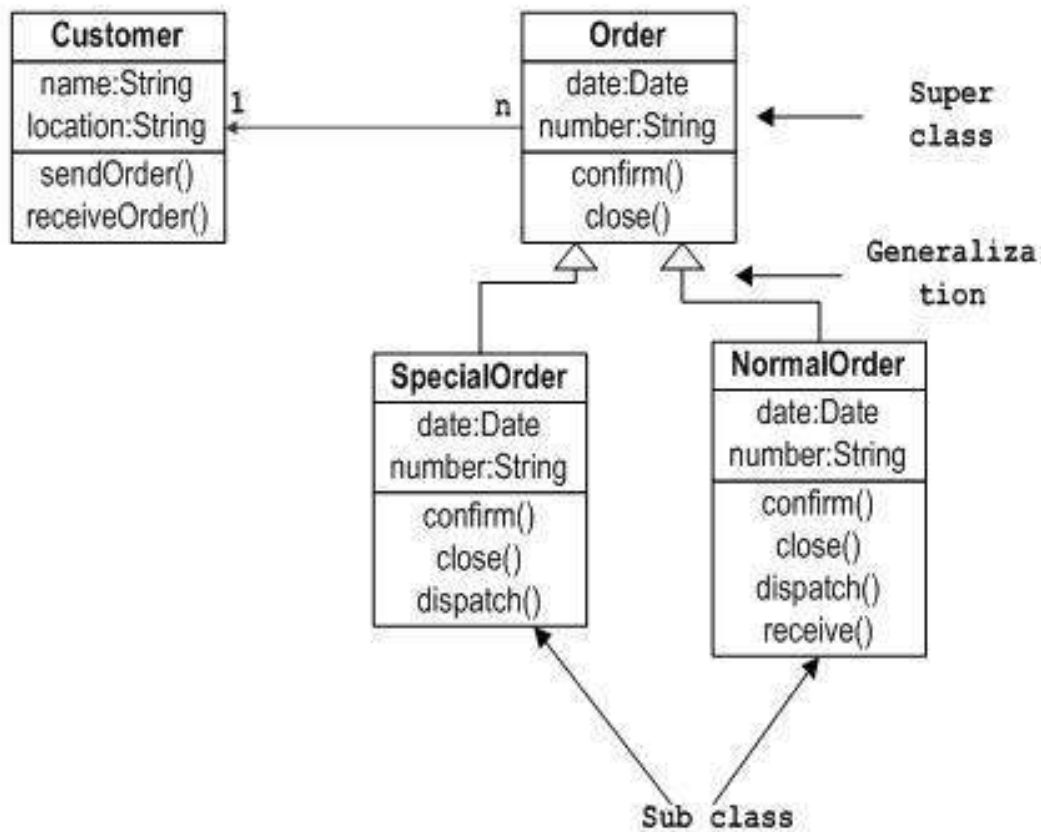


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Class Diagrams, used for Object Oriented Modeling with UML are NOT a specific Business Analysis Model tool. They are considered more technical than ERD (the Crow's Foot Diagram), and therefore require a Systems Analyst to prepare. You should be aware of Class Diagrams as a component of UML, though are less likely to be asked to prepare one unless you happen to possess System Architecture as well as Business Analysis skills.

Class Diagrams add Behaviors (aka methods or operations) to a model in order to generate coding instructions. Classes are similar to entities, both types use attributes for data elements. Both show relationships and cardinalities. Behaviors are shown below the attributes in a Class Diagram.

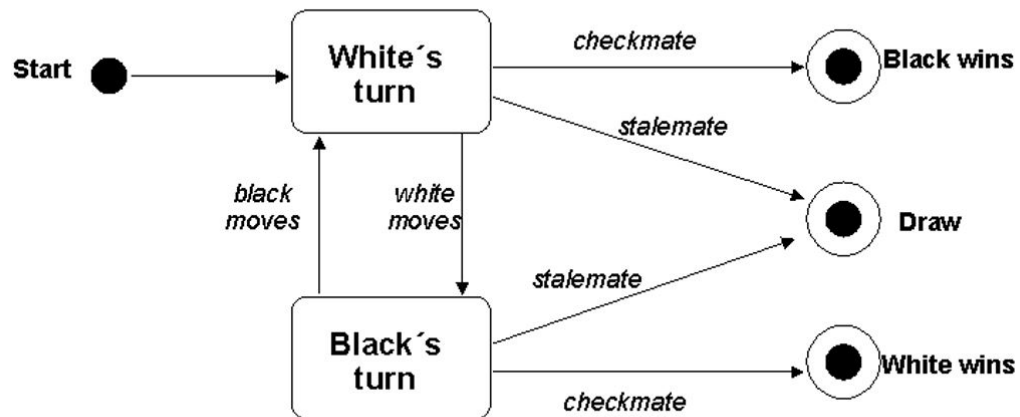
Sample Class Diagram



Behavioral diagrams include Activity Diagrams, Use Case Diagrams, Sequence Diagrams, and Communication Diagrams.

UML can also be applied to other model and diagram types, for instance the following **State Diagram** uses UML notation to document the core sequence in a chess game.

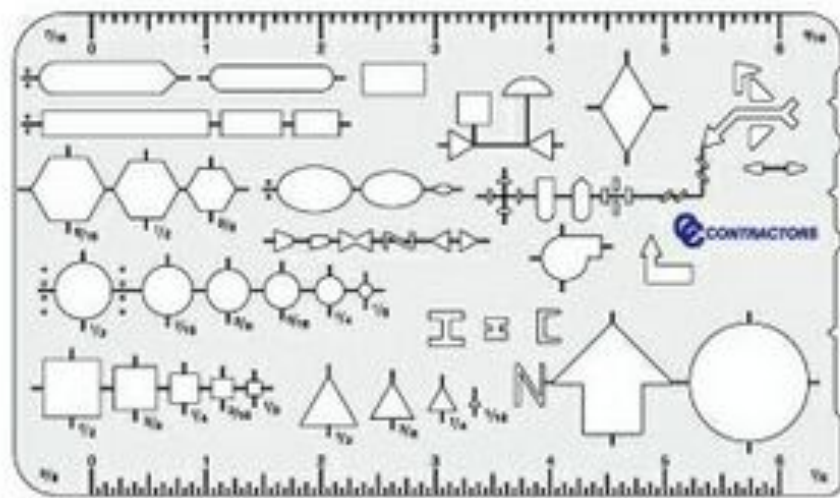
Chess game



It must be noted that any of the aforementioned types of diagrams may be created without using BPMN, RML, SysML, or UML. Use of the standardized notation helps stakeholders and developers familiar with the notation to rapidly understand the model. These languages continue to be applied to models that precede structured language adoption and standardization.

Various Alternatives

Many forms of structured documentation exist. Early developers used stencils that established standard shapes and their application. Architects, engineers, and other technical trades follow specific guidelines for their drawings and annotation. The release and evolution of software tools like Visio™ continue to expand notation capabilities with and without standards based oversight. The key point is to establish common understanding between the requester and the developer providing the product.



Perhaps one of the most common templates used with software engineering is the “crow’s foot” notation used to show **cardinalities** associated with component relationships.

For this example, we will look at an **Entity Relationship Diagram (ERD)**. ERD is a data modeling tool used since the early 1970’s, well preceding the use of standardized modeling *languages*. ERD is composed of five elements:

Entity (rectangle/box); **attributes** (listed inside box); **Unique ID** (identifier); **Data relationship** (lines); and a **Cardinality** (numerical characteristics of each relationship).

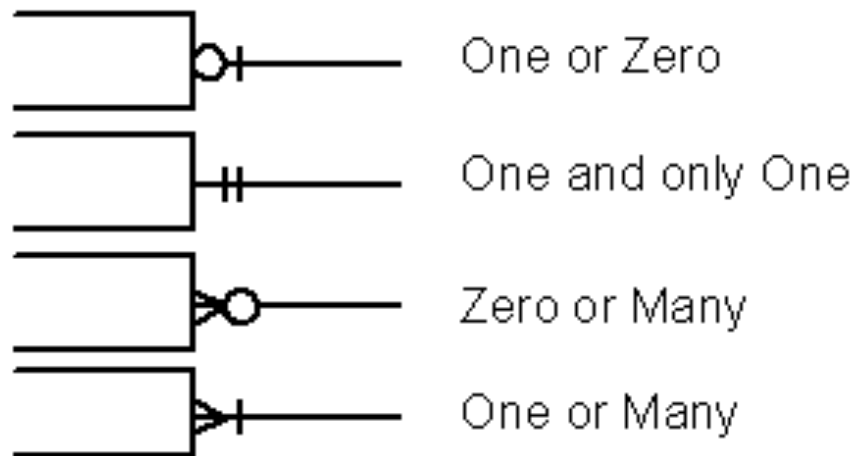
Since we are looking at the concept of a cardinality, let us more clearly define this element. Cardinalities are about the unidirectional or bidirectional relationship between two entities. In simple terms, the data or relationship flows one direction, the other direction, or in either direction. Sometimes the relationship is mandatory and sometimes the relationship is optional.

When you grab silverware at the end of a food service line, you probably need at least one of the following though not necessarily all four – spoon, knife, fork, napkin. As a navigator, your relationship with etiquette, the captain and the cook might require all four. Crewmembers may neglect all four, use their hands, and wipe the excess off on their pants. You would draw the relationship differently for each unique entity.

Common notation for cardinalities include:

- Optional (o, O, open diamond).
- One (1 or small single line).
- Many (M, black dot, or crow's foot).

Summary of Crow's Foot Notation



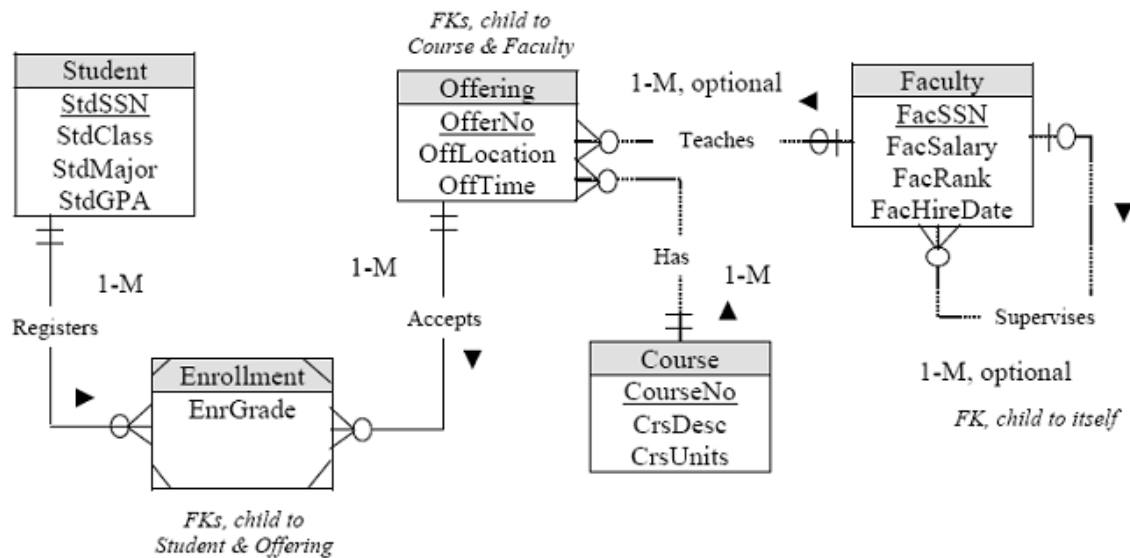
The cardinalities may be placed at both ends of the line representing bi-directional business rules.

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The following is a diagram representing the relationships between students, courses, individual course offerings/sessions, the course instructor, and the faculty database for an education registration system.



See if you can identify the nature of the following relationships:

How many offerings per course?

How many courses per offering?

How many faculty members per offering? Is the relationship optional?

How many enrollments per student?

How many offerings per enrollment?

Analysis (from the PMI Guide to Business Analysis)

The PMI Guide to Business Analysis offers seven processes associated with analysis. You should take a look at page 176 of the Guide to get a sense of the disorder and lack of organization associated with the Guide's presentation of analysis.

- 7.1 Determine Approach
- 7.2 Create and Analyze Models
- 7.3 Define and Elaborate Requirements
- 7.4 Define Acceptance Criteria
- 7.5 Verify Requirements
- 7.6 Validate Requirements
- 7.7 Prioritize Requirements (and other info)
- 7.8 Identify and Analyze Product Risks
- 7.9 Assess Product Design Options

The tools and techniques are not grouped by model category, not organized by project life cycle selection, include elicitation tools and techniques, and recur without pattern or explanation. For each of these process groups, pay particular attention to the **Outputs** for each process, which are singular and effectively name the process group. The best conclusion that might be offered, is that the business analyst must understand each of the model categories and their potential application in order to **Tailor** your approach to each situation.

Models

You have now looked at several types of models while in the process of learning about modeling languages. This section takes you more deeply into the five model categories: Scope, Process, Rule, Data, and Interface.



Once you understand the categories, you may also want to look at other ways to filter for the most appropriate model. Keep your eyes open for a few common factors that might cross model categories. For instance, only a small number of the models incorporate people. They exist as subsets of the Scope, Process and Interface Models. Although they affect people, you won't find models that specifically incorporate people within the Rule or Data Model categories. The challenge learning models is that they can be overlaid. One model can be integrated with another. Start simple and overlay elements only when relevant stakeholders understand the notation for each layer. Maintaining complexity can yield poor results.

Scope Models

The goal of Scope models is to identify a simplified, high level scope of the solution. Then to start identifying the objectives and ultimately the specific work that will have to be performed to meet the goals and objectives. Scope Modeling will typically include supporting documentation like stakeholder registers or list(s), business process/decomposition diagrams, and assumptions & constraints. The emphasis of a Scope Model is to provide clear understanding for all stakeholders equally without emphasis on clarity for a specific stakeholder set (for instance the developers). Most other model sets provide the greater details required by the development team. Scope models are used earlier in the Project Lifecycle.

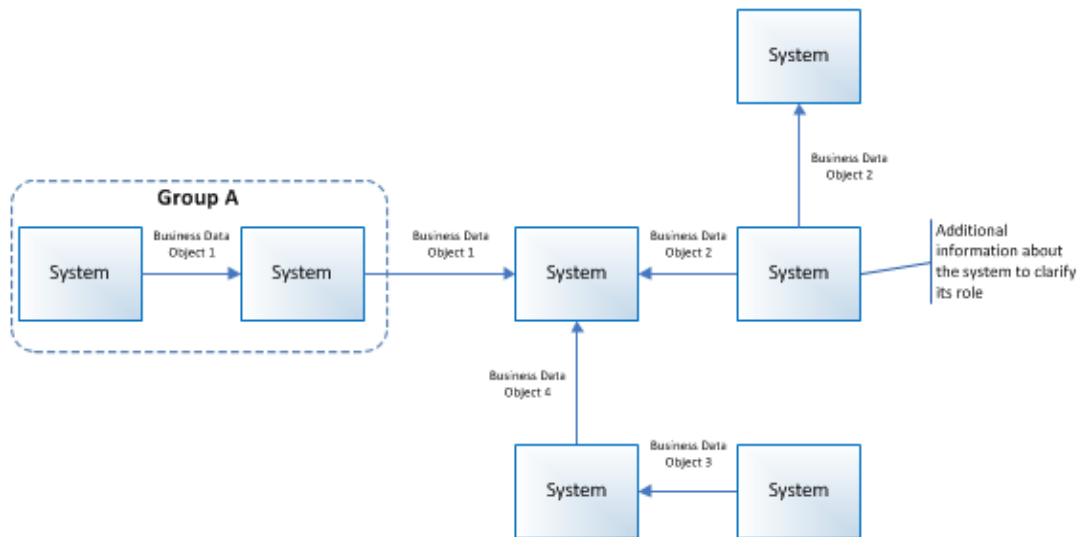
- **Goal Model and Business Objective Model**

Map the problem or opportunity to a specific objective or objectives, and then map the requirement or feature to the objective. This is a simple diagram mapping elements by their unique identifiers, and seeking to assure that no problem, objective, or feature stands alone.

- **Decomposition Model**

A decomposition model is also called a Decomposition Diagram when in graphical format. The information might be listed as an outline or in tabular format. The most common forms with which a Business Analyst should be aware are the **Organization Chart** and the **Work Breakdown Structure**. Creation of the WBS, per the PMBOK® Guide falls into the domain of the PM.

- **Ecosystem Map**



This example of an Ecosystem map was provided in the RML section. Note that it maps the relationships between systems, demonstrating at a high level where changes will have to be planned. **High Level** is a key consideration, since Ecosystem Diagrams will likely include systems that may not be directly impacted by the solution being developed. Their purpose is to assure inclusivity – nothing is accidentally left out.

- **Context Diagrams**

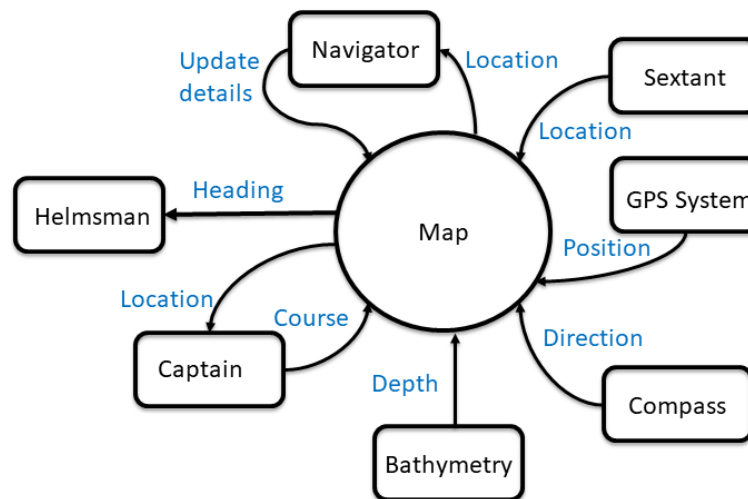
Context Diagrams are far more detailed than an Ecosystem map. They include all of the systems being touched by the solution, and only the in-scope systems. They also include any systems inputs and outputs as well as others systems and user profiles (called **actors**) that provide input or output to the systems. In this type of model, a person or actor is represented as a box or an interface (though people shapes more common to Use Case Diagrams may be used).

Context Diagrams have a specific structure:

- The system or solution under development is at the center of the diagram, typically drawn as a circle or an oval.
- Interfacing systems are shown as boxes.
- Interfacing users or user sets are also boxes (or people figures).
- Lines connecting the boxes show actual interfaces and the data flow between them.

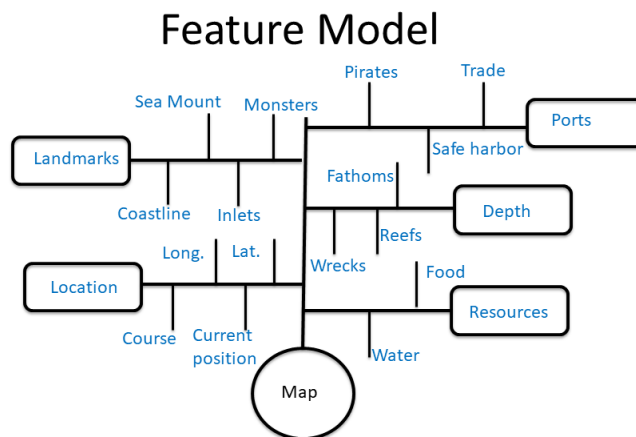
A simple context diagram for a mapping system is provided as an example.

Context Diagram



- **Feature Model**

A feature model is a visual representation of all the features of a solution, arranged as a tree or hierarchical structure, showing the relationships as sets. Features are sets of requirements, rather than the requirements themselves. The diagram may differentiate between existing, planned, and future elements of a feature or feature set by using color coding, highlighting, shading or other graphical elements. A key or reference diagram should be provided to clarify the use of the symbolism and graphic differences. The following diagram shows some simple features associated with a map.

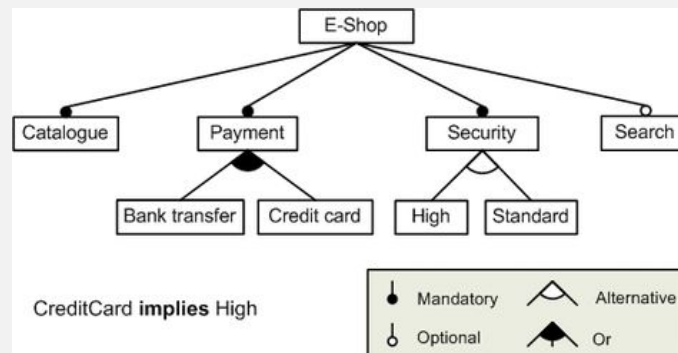


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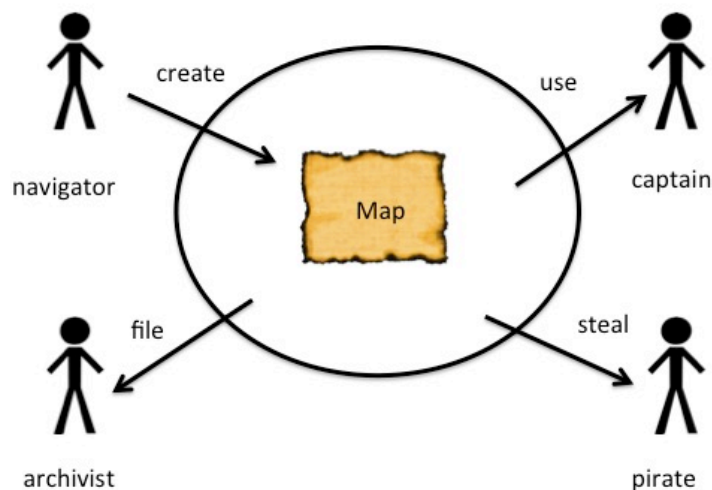
Feature models were introduced as a compact representation of all the products within a Software Product Line (SPL) in terms of "features" as a component of the Feature-Oriented Domain Analysis (FODA) method by Kang in 1990. The original model is hierarchical and formal in structure (as in the following diagram). Current implementations tend to be more flexible and oriented toward both stakeholder and developer understanding. Recall that feature models are an approach to obtain clarity and understanding for scope; not all the reviewers will have a technical background.



- **Use Case Diagram**

A Use Case diagram shows all in-scope **Use Cases** for a system. Use Cases are activities, typically represented by verb-noun format, that represent the subject-action-object of a requirement. The system is represented by an oval in the middle, and all the people (subject/object) are represented as **actors** using stick figures. The purpose of the Use Case diagram is to show interactions. This is one of the People centric models. These diagrams can help summarize features or requirements, without specifically stating how they will be accomplished, the cardinalities, or other factors that may be relevant. Use case diagrams are powerful for tracking and reporting the status of features and functions, and are readily understood.

Use Case Diagram



Considerations for Use Case Diagrams

- Less technical and easier to review.
- Often referred to as narrative flow of events.
- Commonly used for internal users and internal processes, though may include external relationships.
- A Use Case is indicated for Predictive Projects. (User Stories are associated with Adaptive Projects.)

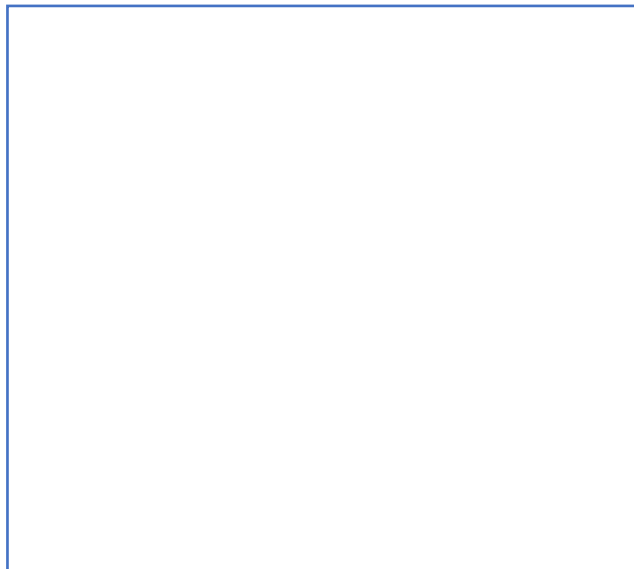
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An alternate approach to drawing a use case diagram would be to put an oval with the verb-object for each interaction in the center with a line from each actor placed on the exterior. For example the ovals would state create-map, use-map, steal-map, file-map. As a quick exercise, redraw the Use Case Diagram using ovals within the center, and attaching a stick figure to each with a connecting line or arrow.

Map System



Process Models

Process models describe the user to stakeholder related elements of a solution, process or project. They tend to show the relationship between elements in more detail than Scope models. They may be graphical, though are more often detailed textual tables or documents. There are three main categories: Process Flow, Use Case and User Stories. In Scope modeling we referenced Use Cases and User Stories. Scope diagrams draw a picture showing each and their high level relationships. Process models delve more deeply into the relationships and the handoffs.

- **Process Flow**

Process flows are also called **Swimlane diagrams, process maps, process diagrams, flow charts, workflows, Value Stream Maps, or SIPOCs**. This is the one form of process model that is decidedly graphical in nature. We mentioned swimlanes when we described BPMN (see earlier in this module). BPMN may be used for process flow notation, although is not required. A process diagram should either reference people interactions or system interactions within a single diagram for simplicity. Other types of diagrams are used for human-system interaction. Process flow diagrams may exist for as-is processes, or be developed for to-be solutions.

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SIPOC: that stands for suppliers, inputs, process, outputs, and customers is a Six-sigma tool. SIPOC is used to identify processes associated with continuous process improvement and includes a methodology for reviewing processes toward problem correction, performance enhancement and opportunity generation.

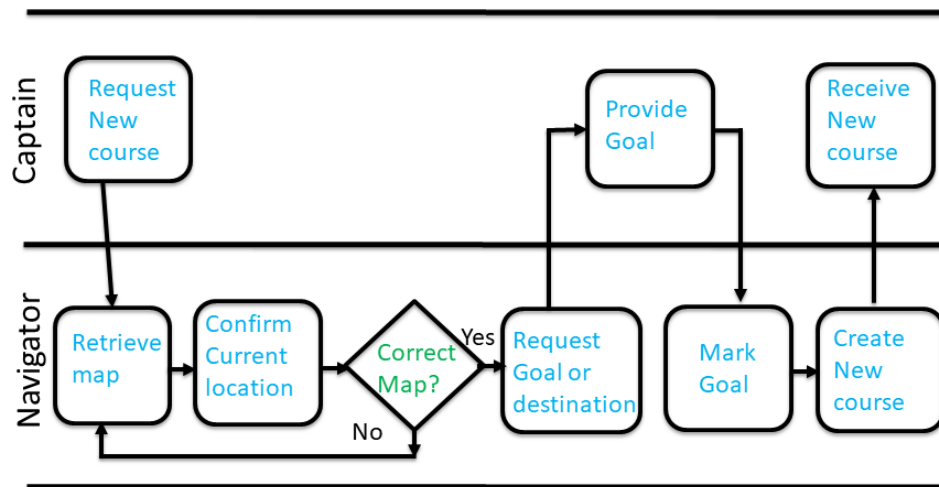
Value Stream Mapping is a comparable component of Lean (a form of Six Sigma methodology) that maps a product from its earliest stage all the way to customer delivery. Equivalent names include Material and Information Flow Mapping. Value Stream Mapping is not the same as SIPOC since the approaches are different, although both are related to continuous process improvement.

Process flows focus on people interaction, and therefore often can be used to identify which key-stakeholders will Validate related requirements as meeting their needs, or Verify requirements as complete and correct.

Key Performance Indicators may be ***added*** to a process flow to identify the metrics used when testing or validating the product.

Process flows lead to requirements by identifying the interactions, though not necessarily how they must be performed. The following simplified swimlane diagram shows how the captain and navigator interact to update a course, though does not include all the steps that either conducts to perform each step.

Process Flow



- **Use Case**

The Use Case is the second form of Process Model. Use Cases step through the process creating scenarios that describe the interactions between people, systems, or people and systems. Use Cases are common for every project lifecycle except Adaptive (which use User Stories as defined next). A Use Case Scenario describes a set of actions, reactions, and results. Use Cases are typically stored in textual documents or tabular form. Once you have a set of use cases, you can draw or redraw a diagram using the identifiers to reference details about each of the scenarios and their interactions.

A template may be used to assure that common information is captured per Use Case. Examples include:

- Goal/identifier – what is the **unique** objective and/or a label
- Description – Explanation of goal
- Actors – participants, interactions
- Organization/Business Benefit - purpose, reason
- Trigger – Predecessor, cause
- Precondition – What must be in place first
- Normal flow/process – Steps to complete action
- Post conditions - Outcome(s), results
- Alternate Flow – Other steps to achieve desired outcome
- Exception Flow – Errors, disruptions, responses to related risk

Use Cases are not standalone requirements by themselves, though they help to define the details in other models and diagrams with greater clarity. They may be used to develop both **functional** and **nonfunctional** requirements, and serve as the foundation for either. Use Cases may represent scenarios that are re-used or have similarity across several process interactions. This enables an understanding of common elements, code, and opportunities in order to achieve economies of scale.

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Pause here for a moment. Make certain that you understand the difference between a Use Case and a Use Case Diagram. Use Case Diagrams are simplified and graphical. Use Cases are far more detailed. A Use Case may start with the verb-noun approach of a Use Case Diagram, and then elaborate the details. You are effectively moving toward Good Requirements that have subject – action verb – object- etc. Modeling languages can help you to create a Use Case Diagram. Modeling languages often describe the attributes used to record a Use Case, and may be used for this purpose as well. Remember the purpose of a modeling language is to generate guidance for development. Use Cases are referenced regularly on the PMI-PBA exam. Consider the more generic description: the description of a scenario or steps necessary to complete a successful interaction and/or its alternatives.

The following is an example of a Use Case for the Plot Chart Location step from the prior Process Flow Diagram.

Field	Elements
ID	Nav-02
Description	Plot current location
Actors	Navigator
Benefit	Knowing location to set course
Trigger	1) Request from captain 2) 6, 12, 18, 24 bells 3) Before entering port 4) Site landmark 5) Site other vessel 6) Locate resources (food, water, etc.)
Precondition	Correctly ID appropriate map
Normal flow/process	1) Place map on chart table 2) Use GPS, Sextant, Compass to obtain latitude and longitude 3) Find intersection of lat/long on map. 4) Mark location 5) Look out porthole(s) for possible landmarks per map Cross check readings/markings
Post conditions	Current location noted on map grid
Alternate Flow	Review course markings and headings from prior marks for probable location. If in port, location known
Exception Flow	We are lost, suggest captain sail by dead reckoning or magic compass.

- **User Story**

User Stories are typically used with Adaptive/Agile methodologies, though can be used within any methodology. (For the PMI-PMA exam, always associate User Stories in the Adaptive/Agile methodology context.) They should be simple enough to be created on a 3x5 inch index card, and typically are for Agile methodologies. A post-it note will work as well, leading to use on a Kanban board.

A User Story should always be of the format:

As an **<actor>**, I want to be able to **<function>**, so that I can **<business need>**.

Actor is the role or interaction that the stakeholder has relative to the solution.

Function is the feature or solution element desired or needed, often in customer or results oriented terms. **Business need** is the purpose or justification, in simple terms, for the desired feature.

As you might imagine, even a simple effort might result in hundreds of User Stories. The User Stories do not themselves define the complete requirement, or describe the work necessary or how the result will be achieved. These latter elements are defined by the development team.

In order to assure that a User Story is usable, each User Story should be checked against the elements of the acronym **INVEST** (Independent, Negotiable, Valuable, Estimable, Small, and Testable).

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Revisit the section on Basic Agile Terminology in Module One. Refresh your understanding of the terminology as introduced. Now that you understand the use of the term Actor, you may associate it with the term Role. Remember that a set of associated User Stories is called an Epic. Look for key words as indicators for the context of questions on the PMI-PBA exam. Association of key words often provide a context that may be used to identify the most appropriate answer. Project lifecycles are a key determining factor in the selection of business analysis tools. User Stories suggest an Adaptive lifecycle, and the use of Adaptive or Agile specific techniques.

The Testable element of Invest suggests that a User Story contains a means to confirm that it is complete and verifiable. As User Stories are grouped into Epics, the verification may also reflect completion of a release. A release may be composed of one or more Epics, since Epics are usually related User Stories. All of the User Stories/Epics are stored in the Backlog for review and prioritization. The process of selecting, refining and prioritizing User Stories prior to implementation is called **Grooming the Backlog**. User Stories, or perhaps more appropriately Epics, describe multiple elements of a solution effectively identifying a feature or function.

Here is an example of a **User Story**.

As the Captain, I want to be able to identify our nautical position, in order to set the ship's course and achieve our destination.

Rule Models

Rule Models help to identify the value underlying the solution. They focus on the **Business Rules**, policies, and **Decision Frameworks** that must be supported for the project to be successful. The goal is to identify both what *should* and what *should not* be allowed or supported by the solution. Rule models effectively help to create boundaries. An important element in identifying Rules is that they do NOT incorporate technology, they remain at the level of the business or the value proposition.

- **Business Rules Catalog**

A table or list of business rules, relevant to the proposed solution, that incorporate attributes that identify the constraints or boundaries of any solution. There may be an extensive list of Business Rules found in **Organizational Process Assets**, or they may be developed uniquely during requirements analysis for each product/project. As with all requirements they should be verified by key stakeholders.

Business rules contain specific attributes for ease of identification, interdependency, clarity, and impact. The most common attributes are:

- Unique identifier – specific designation
- Title – label or name
- Description – statement or rule
- Type – classification or category
- Source – reference or background information
- Dependence – other business rules upon which this rule depends or that are dependent upon this rule.

The following table offers business rules relative to the use of Maps.

BR ID	Title	Description	Type	Source	Dependence
BR – N01	Map Access	Only officers will be provided access to maps	Constraint	Maritime law	BR – OF1 (Officer definition)
BR – N02	Marking Maps	Maps will only be marked in pencil	Constraint	Resource maintenance manual	

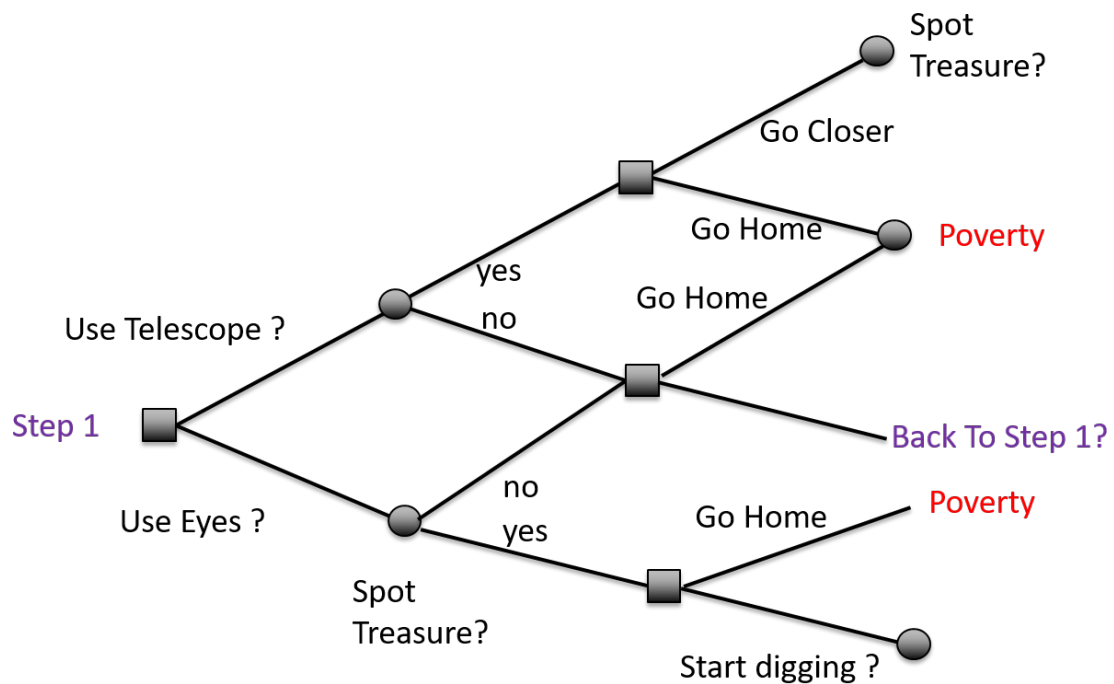
- **Decision Trees and Tables**

Although very different in their appearance and interpretation, Decision Trees and Decision Tables are grouped together as common rule model set.



Although someone trained in statistics or risk management would very strongly disagree, business analysts make the distinction between Decision Trees and Decision Tables based on the number of choices per option. Decision Trees are supposedly used when each choice leads to two outcomes (yes versus no). Decision Tables would be used when there are more outcomes or greater complexity. In fact, either approach may be used. The Decision Tree is more conducive to providing clarity because it is diagrammatic.

A **Decision Tree** is composed of four elements: a choice or condition point (represented by a square), choices or conditions (represented by branches), an outcome point (represented by a circle or dot), and outcomes or actions (also represented by branches). You build a decision tree from left to right starting with the first choice or condition, and continue expanding the tree to the right as you identify additional choices and outcomes.



A **Decision Table** uses the same four elements, and builds a cross-reference table split top and bottom. The top rows contain the choices or conditions, and the bottom rows contain outcomes. The columns indicate individual rules. The points at which rows and columns intersect enable you to demonstrate where a rule interacts with both a choice and a possible outcome.

Sailing	Rule 1	Rule 2	Rule 3
Condition/Choice	Problem ahead	Stalled?	Site land
North	Y		
South	N	Y	
West	N	N	Y
Outcome			
Change direction	X		
Start rowing		X	
Drop anchor			X

Note that Decision Tables can be more difficult to create and to interpret if not properly created. They lend themselves to a single left to right process, where the outcomes are sequential rather than iterative as suggested by the above example. The key is to sequence the questions in the appropriate order, and that order must represent the correct decision priority.

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The PMI-PBA exam does not ask you to create, solve, or interpret Decision Trees or Decision Tables, but you do need to hold a basic understanding of their differences and possible applications. Decision Trees are integral to Quantitative Risk Analysis within the field of Project Management. Risk responses are often identified by a Business Analyst, and the Project Manager may ask you to assist with Risk Analysis. You may want to understand the use of Impact and Probability to calculate Expected Monetary Value ($EMV = p * i$), and the application of EMV to Decision Trees to enhance your BA skills. Impact Analysis is a Business Analysis skill and technique addressed separately in this book.

Data Models

Data Models focus solely on the relationships between data, how the data is related to the process, or how data is changed by a process. (Remember **CRUD**? Created, read, updated, and deleted.) Data models exclude People. They may be used to refine Business Rules, when the rules identify data that must be read to apply a condition or that results due to a condition being met (such that it would be created, updated, or deleted).

- **Entity Relationship Diagram (ERD)**

We looked at an Entity Relationship Diagram with alternate notation to a Modeling Language. Specifically, we focused on the use of the Crow's Foot notation to identify the **Cardinalities** that provide the relationships between data elements. ERD is the cornerstone model for associating data within any Database solution, or for solutions relying on data. Most IT projects rely on some form of Data Model, and ERD is the most common model applied by business analysts other than the implementation of a modeling language. The ERD displays the data entities and their relationships.



Return to the Exercise earlier in this module and review the Cardinality assignments for the Educational Data system.

Unlike other model sets, Data Modeling tends to use several model types together, reinforcing one another. **Data Dictionaries** are potentially used to **support** each of the other data models. Data Dictionaries are a requirement for ERD (and other Data Models).

- **Data Dictionary**

A Data Dictionary is created in tabular format to identify the data fields, their attributes, types, and potential values relative to the solution being implemented. Data dictionaries may be predefined by International standard (X.500, LDAP, etc.) software provider, application requirements, database design, or existing organizational implementation. Whenever possible, a business analyst should reference and use existing Database Dictionaries, defining only attributes or values that may be required for the specific solution being designed. It should be noted that a BA may create a Data Dictionary that reflects the requesters' perspective, from which the developers will generate a more technically correct dictionary for implementation purposes. (The BA does not need to be familiar with specific database notation or attributes.)

A possible data dictionary for a mapping application:

ID	Data Object	Field Name	Description	Unique Value	Data Type	Format	Values
MAP01	Map	Lat	Latitude	N	Numeric + single alpha	nn nn nn.nn A	0 – 90; N or S
MAP02	Map	Long	Longitude	N	Numeric + single alpha	nn nn nn.nn A	0-180, E or W
MAP03	Map	Hemisphere	Global hemisphere	N	Alpha	N	N, S, E, W
MAP04	Map	Depth	Ocean depth in feet	N	Numeric	N to nnnnn	0 – 36,070
MAP05	Map	Treasure	Treasure Location; combines MAP01- MAP04	Y	Alpha Numeric	Combine seq values of MAP01- MAP05	As above

- **Data Flow Diagram**

A Data Flow diagram is a hybrid form, overlaying elements of a Context Diagram, a Use Case Diagram, and an ERD to demonstrate the movement and exchange of data through a process. It incorporates **Actors** and Systems, showing how the actors submit, use, and receive data from the Systems based upon the action-object aspect of the Use Case Diagram. The simplest approach is to start with the Use Case Diagram, and then map the Data to be exchanged on each of the lines representing the associations. Systems containing the data not typically found on a Use Case Diagram are added, along with association lines showing how the data flows to and from the systems. As you overlay the various diagram elements, the drawing may become complex. The goal is to focus on a comprehensive identification of the data required or being touched by the solution. Again, remember CRUD ... where will the data be created and stored, and who will read, update or modify it?

- **State Table or State Diagram**

State Tables and State Diagrams map the potential states or status of data or data sets. A completed map location, including latitude, longitude, hemisphere, depth, and other notations might be considered a completed data set. Until all of the information is captured, verified, and stored, the data set is considered incomplete. You do not wait for the entire set, however. You would likely capture and record each data element as your process suggests. You might use the labels from CRUD as the status of the data, although this is a technical reference and will not help the stakeholders, developers, or customer to understand the relationships between the data and the process, which is one of the goals of a State Table or Diagram.

You will likely use existing standards for similar datasets, or define them in a data dictionary for the current solution. Remember that examples may be available within **Organization Process Assets**.

Using the Data Dictionary for a navigational map, the various aspects of the data might be Desired, Explored, Recorded, Confirmed, Secured, Out of Date, Deleted, etc. The following is an example of a State Table for map locations.

	Target State							
		Desired	Explored	Recorded	Confirmed	Secured	Out of Date	Deleted
	Desired	X	Captain explores	x				
	Explored	x	x	Navigator charts				
	Recorded	x	x	x	Captain verifies			
	Confirmed	x	x	x	x	Lock in chest		
	Secured	x	x	x	x	x	Schedule Confirmation	
	Out of Date	x	x	x	x	x	Return to desired	
	Deleted	x	x	x	x	x	x	Burn map

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Try Drawing the above State Table as a Diagram. You don't truly need an example. Draw each of the States (found on the top row or the left column) as an oval. Start drawing each of the ovals from left to right. Once you have each of the ovals drawn, draw a line or curve with an arrow pointing from the initial state to the desired state for the data element or set. You can write the actions on the lines/curves to identify how the data state is changed. Voila, a State Diagram.

Interface Models

Most simply put, given a particular solution, with whom or what does it interface and what are the details behind each interface or interaction. Interface model templates may be created early within a project lifecycle, regardless of the lifecycle type, though they will not contain detailed information until much later in the planning process and potentially not until the implementation of the effort. Interface Models are VERY detailed and require extensive planning and verification before they are complete. They are more typically used for complex (and therefore predictive) projects, though may be used to plan and manage the entire product or backlog process for an Adaptive project.

From a project management perspective a Stakeholder Register is a form of Interface Model. A Communication Plan documenting the relative interest and influence or power of a stakeholder and the related communication requirements would be another common form Interface Model. Given that the Stakeholder Register and the Communication Management Plan are owned by the Project Manager, a Business Analyst may create or contribute to these documents, though only at the request of or in partnership with the PM.

These serve as great examples of Interface Models, since the template and early data capture is created very near project initiation, although the content continues to grow and evolve throughout the project even through closure.

A Business Analyst is more likely to create one or more of the following Interface Models: Report Table, System Interface Table, User Interface Flow, Wireframe, or Display-Action-Response.

- **Report Table**

A report table identifies the characteristics of a report in tabular format. A **mockup report** might be used to demonstrate the layout and typical report content. Mockups do not identify the underlying characteristics of the report. Reports are created to satisfy a stakeholder need or requirement. A report table identifies the characteristics of those requirements.

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Business Analysis for Practitioners *provides a detailed example (pp. 112-113), and recreation here does not necessarily benefit understanding. A shortened, modified list of the possible report elements is reproduced here. Consider what description or requirements you might place in the second column based upon reports that you have generated in the past.*

Element	Description
Unique Report ID	
Title	
Description	
Use/Decisions based on report	
Objective	(be SMART)
Priority	Quant scale (1-10 or) Qual Scale (H/M/L or ?): _____
Functional Area creators	
Report Owner	
Report Users	
Trigger	When, how created:
Frequency	
Security	Who can modify, read, etc.:
Format	Reference a layout or template:
Data Elements	Reference a Data Dictionary or list them in detail?
Report Count	
Distribution	
Retention	

- **System Interface Table**

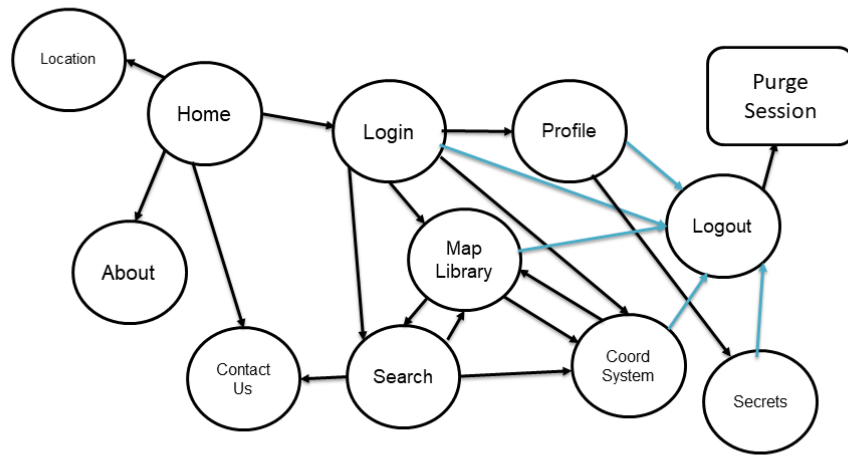
The system interface table takes all the detailed elements from a single system interface. This is different than a data model, since it focuses on all the components of a **system**, including the data repositories, the data, access to and use of the data, security, administration, retention, error processing, etc. Either the business analyst or a system architect would create a unique system interface table for each system being incorporated into the solution.

System Interface tables are often incorporated into middleware solutions that assist with database design, table integration, system interface design and related automation tools. They provide the full set of specifications and reference or incorporate data dictionaries. They are effectively requirements in and of themselves.

- **User Interface Flow**

A User Interface Flow is typically used to identify the flow of pages or interfaces for a software, web or mobile application. In Project Management the User Interface Flow would be labeled a form of **Interrelationship Diagram**, one of the seven basic quality management tools. User Interface Flows are used during the early design or definition phase of a project, since they require significantly more detail before implementation can begin. They do, however, assist both stakeholders and developers to understand and discuss the potential complexity of a solution that is not a sequential process.

User Interface Flow



- **Wireframes**

Wireframes typically require greater experience with human factors or user experience experts than a business analyst possesses or maintains. A Business Analyst may be asked or tasked with this effort, though should request assistance since the human and technical factors underlying a usable wireframe may be significant. Both **functional** and **non-functional** requirements arise from wireframe development. The primary role of the BA in this effort is typically the developed understanding of **personas** or other user characteristics essential to developing a human-machine interface. Elements that must be considered include:

- Compatibility – cross platform, write once- ready many solutions.
- Consistency – common user access (CUA).
- Memory – reference tables and drop downs (state abbrev, zip codes, etc.).
- Structure – navigation, element placement, shapes, page count, etc.
- Feedback – error correction, reporting, support.
- Workload – the user’s mental workload limits or preferences.
- Individualization – interface customization, special needs, etc.

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The BA works with the people aspect of the interface, while the user interface analyst works with the technical aspects. Wireframes are a component of a modern technology solution. You are an experienced navigator, who now needs to learn about geosynchronous satellite based location services. Rely on the satellite signaling technician to identify what might be possible, and let them work through how many and which satellites are required to determine latitude, longitude, altitude or depth, and direction based on radio based triangulation solutions. Stick to navigating the ship!

- **Display-Action-Response**

Display-Action-Response is actually a subset of wireframe development that focuses more heavily on the action elements of the technology interface. Wireframes incorporate the placement of buttons, the 'red X', and other elements. Display-action-response incorporates the function behind the buttons, and other features that are behind or within the interface rather than what the user sees. Display-action-response may be the next step after a technology based User Interface Flow, defining how and what actually happens as users transition from one page to the next. Display-action-response models are typically tables or textual descriptions of the trigger, action(s), and alternative outcomes.

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We have completed our review of the Five modeling categories. Think back. You probably want to start with several of the Scope models to develop a high level understanding, and to help stakeholders and developers build consensus for the solution. Organizational charts, SWOT analysis, and decomposition are common across all projects. The selection of other diagrams and models will be based on the problem (fishbone?), system (ecosystem, feature, interrelationship), or opportunity (context, Use Case, User Stories) being pursued. As you ask more questions, the information will be stored in Data Dictionaries and other data models, while interactions will be controlled by rules, decisions, and allowed data states. The models were used to organize the information that you captured during analysis. Remember that BA work is always iterative, with logical sequences occurring per iterations and driving the iterative pattern forward.

Other Analysis

During Needs Assessment you conducted high-level analysis of the problem, the business, the need, the environment and the capability of the business to address the issue. You are deeper into the use of analytical tools, and have a clearer picture of the requirements. You may wish to revisit your early determinations with greater emphasis.

The following subsections are not included within ***Business Analysis for Practitioners***, though are essential to successful Business Analysis and may be referenced during certification efforts.

- **Capability Analysis** was performed during Needs Analysis to determine the organizations ability to solve a problem or address a need. You may wish to revisit Capability Analysis due to:
 - A more comprehensive model incorporating the need, Enterprise Architecture, and current process or performance than initially existed.
 - Capabilities suggested by the development team MIGHT be allowed to support future capability/flexibility that might not otherwise have been considered. You don't just add requirements based on technology suggestions, but a technology suggestion that supports business value should be evaluated.
 - When finding missing capabilities, you need to perform additional GAP analysis in order to determine how large a gap exists in order to fulfill needs. If too large a gap is identified, you might suggest cancellation of the project or shift emphasis to fill the need. (That 'little' boat you were planning to use might not be what you need to cross that huge ocean AND carry back all that gold.)

Now you need to create documentation based on your organization and the models that you applied.

Document the Solution Requirements

Alright, Navigator, time to draw those maps! Highlight the knowns and the unknowns. Provide one large map, and lots of smaller detailed maps. Highlight with arrows, circles, and elaborate details the lost city and the pots of gold beyond the rainbow. Trace the known paths and show dotted lines for the possibilities. Then prepare for your presentation to the sponsor and key stakeholders. Here is where you draw them all in with your story. You sell the journey to the goal. You gain commitment and consensus. If you draw it and right it all down, everyone can look at it the morning after that massive celebration that you inspired and continue to believe in the dream. Without documentation, it really is still just a dream.

If you want to reach a goal, write it down!

If you want the support of others, show and tell them!

Although documentation itself can serve multiple purposes, all that work is useless unless it helps the team to move forward to the goal. Consensus, commitment, collaboration.

Documentation organizes and categorizes the requirements so that they are:

- Understood by the sponsor and key stakeholders and from this may be validated.
- Usable by the development team to implement the effort.
- Applied as a baseline for the planning and management of project work.
- Convertible to internal or printed user manuals or training content.
- Established as sound foundation for product evolution and become a valuable component of Organizational Process Assets.
- Integrated with quality, audit, and risk plans due to clear objectives (SMART) and valid metrics.

The primary documentation effort is requirements capture and clarification. The evolution of the requirements should also be documented, including business purpose, situation statement, elements carried forward from the business case, assumptions, constraints, and reference sources that may be useful to the development team, eventual customer, and business analysts who pursue future product enhancements.

Writing Rules

When available, use templates or follow established documentation outlines. Start with resources within your organization, seeking outward through your industry, recognized business sources, and then global searches as you seek established documentation standards. The goal is generating documentation that is more efficient to create, easier to maintain, and most importantly clearly understood by the readers or review audience.

In addition to maintaining the appropriate requirements format (review the section earlier in this module), Business Analysis documentation should adhere to the following criteria:

- **Unambiguous** – Clear. Not subject to misinterpretation or variant meaning. Requirements should be reviewed and verified. If they do not pass inspection regarding ambiguity, rewrite the documentation or try a different model or format.
- **Precise** – State only that which is necessary, neither more nor less. The content should not be terse so as to be ignored, though does not need to be repeated if properly constructed following a recognizable pattern. Outline formats and statements are recommended over missives if they cover the material completely.
- **Consistent** – Each requirement is included only once, and then referenced or cross-referenced as needed. Prose suggests the use of synonyms, and colorful turn of phrase. You are not creating interpretive imagery. Re-use the same terms and vocabulary to demonstrate connectivity between need, requirements, and solution. When using adjectives or adverbs to describe elements (nouns) or work (verbs), use specific terms and define

them in the data dictionary as necessary. Avoid the use of pronouns. A need turns into a solution turns into a product or service. Each term has a correct meaning that you do not want to interchange. Repetition when necessary may annoy the audience, though is less damaging than misunderstanding.

- **Singular** – emphasis on singular statement for each requirement. Duplication of requirements may result in one being updated and the other being missed during the edit/update process. Maintain only one copy of each relevant element.
- **Correct** – Each requirement describes a single feature or function. Only the appropriate product owner (Agile), key-stakeholder (requester, sponsor), or submitter can **verify** if the requirement is correct.



No requirement should be committed to documentation or implementation until verified by at least two sources.

- **Complete** – When focusing on precision, essential detail may be omitted. Review for inclusion of all relevant information.
- **Set rules** – every requirement must match a business or solution need. Every business or solution need must be addressed by at least one requirement. All requirements needed for the solution are included. All necessary inputs are identified and defined. All necessary outputs are defined and generated by at least one requirement. All terms are defined, and all models, figures, tables and support documents referenced and incorporated.
- **Measureable** – each requirement may be independently measured or confirmed as complete.
- **Feasible** – feasibility of the entire solution was identified in Needs Assessment and documented in the Business Case. In this instance, each requirement is reviewed for its feasibility and contribution to the solution. **Requirements Feasibility** consists of four elements:

- **Operational feasibility** - the product will be used or the implementation supported by the customer once received.
- **Technology/system feasibility** – each requirement can be accomplished given the technology selected, and contributes to the solution through the use of the chosen technology.
- **Cost effectiveness** – the cost of the requirement fits within the Value proposed by the solution. If a single requirements violates the Value proposition, it must be replaced with a requirement that maintains Value.
- **Time feasibility** – The requirement can be completed and delivered within the allotted or committed time (including acceptable variance).
- **Traceable** – Each requirement can be mapped back to the need, the source of its introduction, its relationship and interdependence with other requirements, and ultimately rolled upward into deliverables, objectives and the project goal.

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Traceability, the subject of the entire following module, suggests that each requirement needs to be small enough to be independently tracked; yet comprehensive enough that it can stand alone, meet all the other requirements attributes, and be reported independently. Ownership and accountability are requirements features that aid traceability, hence one way to confirm traceable requirements is association with one skillset, individual, or work package necessary to produce the work.

- **Testable** – Measureable suggests that the requirement can be confirmed, typically suggesting verification by the team and validation by the customer. Testing criteria include the ability for a test engineer or quality assurance specialist (often working with the BA) to create a specific test to be used for verification, as well as elements of transition testing (defined in the Evaluation Module) required for the project lifecycle methodology. Test plans should be identifiable within or easily derived from the requirement as stated.

Acceptance Criteria

Acceptance criteria may be some of the more difficult requirements to establish before an effort is initiated. Acceptance criteria define the **proofs** that a solution, product or service meets the desired needs and provides value.

High level functional requirements may be defined, although non-functional requirements tend to evolve, and technical requirements are revealed through progressive elaboration as the project is being executed.

The PMI Guide to Business Analysis offers three possible early alternatives to developing **product** acceptance. It should be noted that product acceptance criteria may be used to determine requirements prioritization, verification/confirmation, and validation. In all three techniques, the approach is to consider various elements of the end state as a basis for developing acceptance criteria.

- **Behavior-driven Development (BDD).** The team is tasked with identifying the behavior of the product or how the customer will actually use it. Tests to confirm the behavior are then designed. The solution features are then developed to affect successful completion of the designed tests. This is a natural extension of **Test Based Development**.
- **Definition of Done.** Definition of Done is an Agile team approach wherein the entire team agrees to complete a series of conditions before a feature, item, or component is sufficiently developed to be offered to the customer. DoD criteria typically must be developed at the user story, iteration, release and product level to be viable. As such, they often require a broader picture than most Agile teams generate before work is performed.

- **Story Elaboration.** Story Elaboration is a hybrid approach to Agile development that violates the Agile Manifesto. User stories are expanded with additional information, documentation, and conversations with users and other stakeholders until they are sufficiently defined to begin work. This approach effectively takes the Agile methodology back into the realm of predictive, incremental, or iterative planning.

Regardless of the approach or technique selected the goal of the Business Analyst is to simplify the confirmation of **value** and that **need** is met by the final result.

Prioritization

The ideal solution incorporates every requirement, delighting as well as satisfying the customer. Resource constraints, risk responses, and change prevent equal allocation or completion of efforts. Recall the potential for multiple Elicitation-Analysis Cycles, each with its own documentation and prioritization effort preceding validation, verification and approval. The Business Analyst should have determined how requirements would be prioritized within the Business Analysis Plan.

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Module Four, Business Analysis Planning, contains a section on Requirements Prioritization from the perspective of the business need, the Business Case, and common project constraints (Scope, Schedule, Cost). Review this material for clarification before selecting an appropriate prioritization scheme. Business Analysis Planning identifies the business priorities, and the priorities relative to the problem, opportunity, need or solution. This information may be used to develop criteria specific to related requirements. As with all elements of the Business Analysis Plan, you need to coordinate your work with the Project Manager and adhere to the Project Management Plan. The prioritization scheme that is applied to requirements should match the most important constraints applied to the project.

Prioritization Schemes

Remember that the Business Analyst focuses on achieving commitment and consensus. As such, the methods used by a BA are group or team based. The project manager may identify a method such as **autocracy/dictatorship** or **plurality**, though a BA would prefer majority or unanimity to affect the desired commitment to the effort and solution. The same approach may be used for **conflict resolution**, when two or more individuals or groups disagree regarding either the validity or the priority of selected requirements.

- **MoSCoW** – Must Haves, Should Haves, Could Haves, Won't Haves. In other words, critical to product success, important though not foundational, little impact if missed, not delivered during this effort.
- **Multivoting** – Allow participants to vote on requirements, giving each participant multiple votes and allowing them to allocate more than one vote per item. The items receiving the most votes from the group are determined to hold higher priority. Votes may be a single point each, or provided with scale (high, medium, low) such that some votes have more weight than others.
- **Buy a Feature** – This collaborative game provides each participant with a predetermined and fixed amount of play money. Participants are then allowed to spend their money on any single feature or choice of features. The features receiving the most money are considered the most valuable or important. Buy a Feature is effectively a game based version of multi-voting.
- **Time Boxing** – Common in adaptive or agile projects. A set period of time is identified (based on work hours or calendar dates), and referred to as the 'time-box'. The scope of work, and the selection of which requirements meet the scope, is based upon the amount of work the team can commit to achieving only within the 'time-boxed' period. A typical Agile Sprint is defined as two weeks (10

business days), inferring a two week time-box. Although 'time-boxing' implies time as the constraint, a similar approach can be used for money or any other element that may be associated with requirements and numerically managed.

- **Weighted Ranking** – In project management this approach is referred to as **Multi-criteria Decision Analysis**. The BA facilitates a discussion identifying factors or criteria upon which requirements might be selected as more or less important. Examples include cost, effort, efficiency, ease-of-use, urgency, attractiveness or other product characteristics. Weights are placed on the various attributes, prioritizing them in terms of their importance. Requirements are then filtered according to the weighted rankings to determine their relative importance to the solution.
- **Delphi** – Consensus building through input from anonymous SMEs, consolidated and evaluated by an internal facilitator. Usually requires multiple cycles or iterations until an unanimous prioritization list is generated.
- **Minimum Viable Product** - an Agile Methodology that identifies the fewest number of features within the initial release from which the customer would receive value. This does not assure value to the business or return on investment, it merely enables a first to market mentality as providing value for the effort.

- **Weighted Shortest Job First (WSJF)** – an Agile methodology that adds three factors (business value, time criticality, threat reduction/opportunity enablement) and divides them by the aggregate effort to affect the user story.



The formula for Weighted Shortest Job First is:

$WSJF = [business\ value + time\ criticality + (threat\ reduction/opportunity\ enablement)] / effort$

{It must be noted that The PMI Guide to Business Analysis incorrectly labels threat reduction as "risk reduction", although risk is either positive (opportunity and strength) or negative (threat or weakness), so the formula must be the ratio of the value of loss relative to the value of gain.}

- **Purpose Alignment Model** - This method was discussed within the model on Needs Assessment. It uses a four quadrant analysis of the relative placement of business options based on their purpose. The x and y axis are respectively mission criticality and competitive advantage.



Although neither statistically nor legally required, according the business analysis best practices weighted rankings should always total 1.0 or 100%.

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Take a look at the PMBOK® Guide regarding the Delphi Technique. Project Managers take a different approach to the Delphi Technique. External experts are kept anonymous and must remain anonymous from one another. They would therefore never meet as a group or team. Their input is collected and sorted using a weighted ranking method. Results are then shared with anonymous identifiers back to the experts for review, feedback and a second round of input. The new inputs are rescored and a new weighting calculated. The process continues until a consistent and Unanimous result is achieved. The business analysis approach focuses solely on subject matter experts (who may be internal or external) and unanimity.

Validating Requirements

You have organized, documented, and prioritized all of the requirements. You now need to convince the sponsor to fund the project so that it can be implemented. As the Navigator, you are not in this alone. The captain wants the funding as well. Your partnership will help with this next step. You will together demonstrate that the **Plan meets the Needs and Provides Value**. The sponsor and key-stakeholders (king, queen, and court) will determine which requirements actually meet their needs. You want an armada, yet only three vessels may be placed at your disposal. (Yahoo! One navigator and three captains to assure you return safely.) As the Sponsor approves each requirement, they are being validated.

Remember the riverboat navigation scenario? You are using the same validation approach, only this time at each port of call. Same Elicitation-Analysis Cycle, just different tools leading up to a more compressed documentation, prioritization, validation, verification and approval. You won't sell or trade your goods or be able to depart for the next location until the cycle is completed. At least not with added value in the ship's hold or the captain's safe.

Continual Confirmation

You may only have a single audience with the sponsor for validation, although the best approach will have been gaining validation for each requirement as you progressed through elicitation and analysis. You will also be acquiring progressive validation for **solutions** that are delivered iteratively, incrementally, or adaptively. The risk of too granular a validation effort may be that the requirements or partial solutions do not combine well toward a cohesive, completed solution. Meet the needs of the Project, based on its lifecycle, current product owner, and other planned components. Follow the plan. Partner with the PM.

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Module One provides an 'anchored' passage that describes the different uses of the terms validation and verification. Review the section again. The use of these terms can be among the most confusing on the PMI-PBA exam, as well as being poorly differentiated in most of the business analysis literature. Unfortunately, the terms tend to be used as though they were synonyms. Avoid that error.

Validation is always about Value, meeting the stated need. Verification is always about truth, confirming that what is stated is accurate. You can state a lot of truths (write many well phrased requirements) that do not meet a need and are therefore invalid. It is useless to be right and true, at least in a business sense, if you are not meeting someone's need – you won't get paid. Also, it is not a good idea to state a mistruth when requesting actual payment. You need to verify, confirm the truth of your efforts, before handing over the bill. Payment is validation that you met the need.

Requirements Walkthrough

Business Analysts love team efforts. Using an approach similar to Elicitation (interviews, facilitation, etc.) prepare appropriate stakeholders for a review of the documented requirements. The goal in this instance is not requirements gathering but requirements review. The approach is typically dictated, as with Elicitation, by the project lifecycle, availability of the stakeholders, and in this instance the nature of the information to be shared. There are a few different preparation elements:

- Consider possible feedback. Prepare for the worst, but hope for and manage toward the best outcome.
- Avoid emotional reactions. Operate from the truths you have documented. (You did verify before presenting, didn't you?)
- Share subsets of the requirements with contributing or relevant groups in advance so that the participants best represent the entire group. (You documented their statements accurately, share them in advance.)

Let the attendees dictate the flow of the meeting more than with typical Elicitation. When you have the Validation, you may close the meeting.

Verify Requirements

You understand which of the requirements meet the sponsor and/or customer need once the requirements are validated. You have had them validate the voyage. Before you set off, you might want to verify the information on that map one more time? Triple check the resources manifest, assure sufficient crew, paper/pens/ink. See if there might be room in the budget for a new sextant? You don't want to recheck everything, only the elements that are to be funded. Make those last minute adjustments and refinements.

Might it be a good idea to get a second opinion for the more relevant and higher priority requirements? You have two common ways to achieve this.

- **Peer Review**

Provide copies of all the written documents and models to other business analysts (other navigators) and have them review the documents for completeness and accuracy.

You might also go through a peer review with the development team. They probably were not present at the Validation meeting with the king and court. By reviewing the documents as a group, they may help to clarify any last minute details before work gets underway.

- **Inspection**

This is a far more detailed analysis of the requirements, conducted according to a formal process or checklist. This form of review is more common for a predictive lifecycle, where all of the details need to be correct before implementation is underway.



Peer review relies on the knowledge of the reviewers and may be subject to error, lack of knowledge, or lack of attention to detail. Inspections use checklists and detailed sequences to identify gaps or omissions and are less prone to error.

Approval Sessions

You are about to withdraw funds from the treasury. (Ohh, I love gold dubloons!) A couple of signatures (and a shiny wax seal) are required before you receive the funds. The signatures may be for the entire project for a Predictive lifecycle, per stage or phase for an incremental lifecycle, or per release for an Adaptive lifecycle. Regardless of how many times you require 'withdrawals', each new cycle requires the signatures.

The three most common signatures are:

- The sponsor, business owner or executive in charge of the effort for the current cycle.
- A solution team recipient who accepts accountability for building the product based on the documents provided. Typically the project manager (or Scrum master, etc.).
- The business analyst who prepared the documentation and confirms it is complete and accurate. (That's you!)

You wouldn't expect the king to provide you all that gold without holding the captain and you accountable, would you?



Other Considerations

Although we discuss the techniques, tools and concepts of Elicitation as part of a Business Analysis and Project Planning process or sequence, they may be applied to other scenarios useful to business analysis. Some of these considerations might be useful in the real world or as you prepare for certification.

- Although you would prefer to discover an existing model or diagram when assessing Needs, you may choose to create one in order to understand the Root Cause or contributions to a problem. Root Cause analysis is a critical, required skill set for a Business Analyst. **Process Flowcharts** are a great tool for identifying existing or missing steps that contribute to a problem.
- Business Priority is identified first and more directly related to Needs Assessment. Business priority is typically given top billing. Technical priority may override Business priority to affect a working solution. For instance, the customer may desire that a particular feature or function is developed first, but the developers may identify an underlying technical component that must be completed before the desired feature can be developed or delivered.
- Recall that some Models are better suited to providing requirements for general review, including stakeholders who lack technical knowledge or the ability to define their own specifications. Stakeholder availability may also impact the business analysis approach. Pay attention to the alternatives as you select techniques (or prepare for certification). As an example:
 - Prototyping Involves stakeholders.
 - Interface Analysis does not require stakeholders.
- When learning the various models and their application, it may be useful to develop more comprehensive titles that do not alter someone else's understanding if you use the term. Then associate tags or key words as you study. Here are two examples:
 - State Diagram: **Data** State Diagram – the state of the data object from its inception to deletion, within the business.
 - Context Diagram: **Work** Context Diagram – the context of the work through which data or information **Flows** including internal and

external interactions. (This is a form of Scope Model and Scope is about Work.)

- When considering Business Rules, recognize that not all business rules need to be identified or documented for a given solution or effort. You may choose to document them for completeness and to demonstrate their consideration. Business Rules may be a confusing concept. Dig a little deeper so that related questions do not slow you down – on the exam or in the real world. Understanding business rules can become logic puzzles if you are not careful.
 - Not every Use Case references a business rule
 - Some are user generated.
 - There are business rules not used by Use Cases
 - That still affect the solution or effort.
 - Some business rules are manually enforced.
 - Therefore do not lend themselves to automation.

Elicitation and Analysis are the day-to-day work of an operational business analyst. The tools of 'drawing forth' information, capturing it in useable form, and sharing it in an understandable manner can directly affect the success or failure of any business. The organization of information, modeling, documentation and presentation offered through Elicitation and Analysis can define operations, be used for training and orientation to existing processes, and assist a business to meet strategic Key Performance Indicators.

Elicitation and Analysis are the Business Analyst's major role during Project Planning.

Traceability, covered in the next module, is as important for day-to-day work, since it tracks the current state and potential for change relative data, process, and requirements. Traceability can also be used to organize and track business

analysis work. As you will discover in the next module, Traceability is ***critical*** for the success of projects, and the most important Business Analysis deliverable in a project centric or change focused organization. Traceability can be used to integrate and guide the work of the project even as the PM leads the effort.

Remember that Business Analysis and Project Management are a partnership.

Product Risk Analysis

The PMI Guide to Business Analysis introduces a more detailed approach to **Product** risk analysis that is seldom within the realm of business analysis accountability. A review of the content within the Guide suggests that the material came directly from the *PMBOK® Guide 6th Edition*, then incorporated the use of business analysis tools and techniques identified in other processes within the Guide.

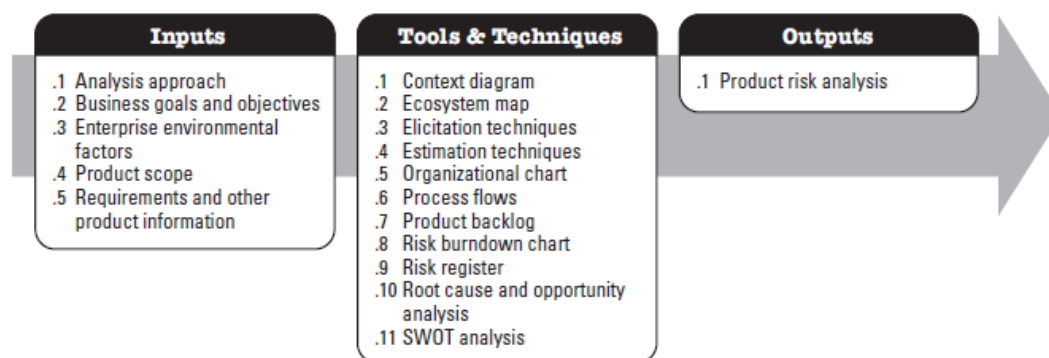


Figure 7-43. Identify and Analyze Product Risks: Inputs, Tools and Techniques, and Outputs

In order to best grasp the concept, a Business Analyst requires an overview of the approach to risk analysis conducted by project managers. The *PMBOK® Guide 6th Edition* effectively breaks the effort down into six processes (after first developing a risk plan to select the most appropriate tools for the situation at hand). Not all six processes may be selected or necessary.

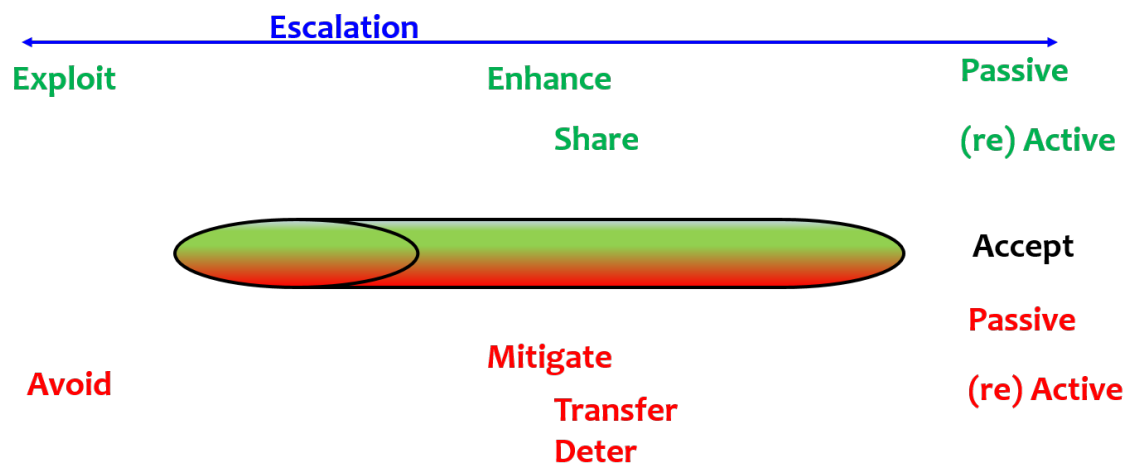
- Identify Risks
- Perform Qualitative Risk Analysis
- Perform Quantitative Risk Analysis
- Plan Risk Responses
- Monitor Risk (triggers)
- Implement Risk Responses

The goal is to identify and develop appropriate Risk Responses. If this goal can be achieved without the need for more detailed risk identification, qualitative or

quantitative risk analysis, and the result achieved affects desired outcomes, then extra overhead of risk analysis only reduces product value.

The concept of risk response is to take advantage of the best opportunities by applying the greatest strengths of the organization, while also avoiding the worst threats and minimizing the common weaknesses. As the scale or size of the risk diminishes, responses shift in magnitude and focus. The lowest scale of response is passive acceptance, wherein not action is taken before, during, or after a risk event. This is effectively the role of the business analyst when performing Needs Assessment.

If a risk event occurs that was not planned, or at the least not well and appropriately planned, then an alternate risk response is **escalation** (to organization officers with higher authority to address the situation).



Product and project risk analysis merely add more tools and formalize the analysis process.

A project risk is formally composed of three elements: the event causing the risk (risk event), the probability (P) of the risk event occurring within the time frame of the project, and the impact (I) of the risk event on the project outcome(s). The

result of multiplying the probability (P) times the impact (I) yields the **Expected Monetary Value (EMV)** of the risk event. EMV offers a balanced look at risk since it helps to level risk responses, enabling emphasis on events with both higher impacts AND higher probabilities of occurrence.

Note that risk is either positive or negative depending on the impact. It is inappropriate and incorrect to consider risk to be only negative. The purpose for being in business is to provide for customer need and to gain a positive revenue in return. Risk Analysis is merely a more formal approach to predict and attempt to control returns.

The role of the business analyst is to calculate the *impacts*, typically in monetary values. The probability aspect requires statisticians to calculate probability distributions. Professional project managers are familiar with statistical probability methodologies, and often contribute this skill set on projects as needed to prioritize risk responses.

A business analyst may be accountable for both the probabilities and the impacts across a *product's* lifetime. This is a component of the **Product Roadmap**.

Risk Events are identified through needs assessment (SWOT, context diagram, ecosystem maps, organization charts, process flows, etc.) and elicitation (all tools and methods).

Qualitative Risk Analysis identifies either probability, impact, or both on relative or prioritized scales. Business analysis tools include prioritization and viability techniques.

Quantitative Risk Analysis provide numerical probabilities on a scale of zero to one, and impacts in monetary terms. Again, the business analyst more typically

provides the monetary impacts, while a statistician provides the numerical probabilities.

Another important contribution delivered by business analysts is their understanding of stakeholder perception and motivation. This allows the business analyst to provide additional risk inputs like **tolerance**, **threshold**, and **appetite**.

- Risk tolerance is a stakeholder's tendency toward both positive and negative risk. Alternative approaches include **risk seeking/taking**, **risk neutral/balanced**, and **risk averse/avoidance**. Risk seekers or takers will face or attempt a risk event even if the threat outweighs the opportunity. Risk neutral or balanced stakeholder react to each risk in a situational manner (for instance by assess benefit versus cost). A risk averse stakeholder will not pursue a risk event if they perceive there is a change for loss. The most significant form of risk aversion is a phobia, such that even facts and a logical analysis will not induce participation. It should be clear that risk tolerance is based on perception, and therefore fits nicely into the role of the business analysis relative to stakeholder analysis and communication skillsets.
- Risk thresholds identify a stakeholder's shift in perspective across the spectrum of response. In other words, when desired responses shift from avoidance through mitigation toward acceptance and **perceived** EMV declines. Thresholds also measure the shift in desired response from exploitation through enhancement toward acceptance. Note that thresholds for opportunistic risks may lie on a different point along the continuum that perspective shifts along the threat continuum. (This factor explains why many stakeholders focus on risk as being negative versus opportunistic or threat based.)
- Risk appetite identifies how many simultaneous or nearly sequential risk events a stakeholder may be able to consider or process before totally ignoring or turning away from perceived risk situations.

The list of Tools and Techniques associated with business analysis risk efforts align most closely with risk event identification, thresholds (prioritization and perspective), and product life cycle impacts.

Assess Product Design Options

Assessing the product design options is a new process in ***The PMI Guide to Business Analysis*** based on incorporating business goals and objectives into the selection of implementation alternatives. The effort essentially revisits several elicitation techniques to confirm that documented requirements offer viable implementation costs, feasibility, and manageable risk toward approval of singular design options or selection amongst varied options.

For candidates preparing to take the PMI-PBA exam, it must be noted that technical design decisions are within the accountability of the project manager and the team. It would be inappropriate within a project setting for a business analyst to mandate or assume accountability for related efforts without prior negotiation. A professional business analyst will always review, revisit, and consider the impacts, relationships, and value of recorded requirements. This should most often be done informally, however, since additional formal reviews will increase project and product costs, delay delivery timelines, and may introduce additional stress and conflict within constrained environments.

For most of the following tools, if generated correctly during the original Needs Assessment and/or Elicitation & Analysis efforts, review and presentation should be the only necessary business analysis effort.

- **Affinity diagrams** – the grouping of user stories, features or requirements to aid in comparison and selection.

- **Brainstorming** – a method to generate varied design options and relative risk elements.
- **Competitive Analysis** – gathering and analyzing an organization's external environment. This is an ongoing effort for business analysts engaged in portfolio and product based planning and analysis. As a component of Needs Assessment, related information should always be available during requirements elicitation, analysis and validation.
- **Focus Groups** – within the realm of Assessing Product Design Options, this tool *revisits* the use of Subject Matter Experts to obtain their input regarding expectations and attitudes toward a finished or proposed solution. Such efforts should only be considered if the risk or implementation costs are sufficiently high to justify the repeated expense of related efforts.
- **Product Backlog** – the role of the business analyst increases in scaled agile (where integration efforts and product goals are taken into account). Additional tasks and user stories are added to the backlog to evaluate complex design options. These user stories or tasks are given a special term – **spikes**.
- **Real Options** – causing teams to delay decision making until the last possible moment in order to review and consider every option in greater detail. This approach is only reasonable when there are significant uncertainties related to design or implementation efforts that might lead to project or product failure if not addressed. The implementation of **Real Options** must ALWAYS cause the project cost and schedule to increase, adds additional scope management efforts on the project

manager, introduces its own negative risk events, and may by itself cause a project to fail to meet its goals or objectives.

- **Vendor Assessment** – As project managers step back from their role relative to **Procurement Management**, vendor assessment places a portion of this responsibility into the hands of business analysts. Procurement management is an extremely complex skill set that must take into account legal statutes; fully predictive, premeditated, and carefully documented procedures; trained and precise personnel; detailed controls and documentation; accounting for internal and external review or audits; pre-designed approval and transition mechanisms; and a mixture of soft skills and public relations training to affect valuable vendor relationships. Effectively, vendor assessment is similar to project selection and approval, and vendor management is similar to program or predictive project management.

Module 5 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

SKILLS:



KNOT

- 1) You want to use active listening and open questions to keep a dialog going. Which of the following is an open question?
 - a) Should we move forward with this project?
 - b) How much will this project cost?
 - c) What do you think we need to accomplish?
 - d) How many weeks will the effort take?
- 2) What is the definition of a closed question?
 - a) Any question where the answer is yes or no?
 - b) A question whose phrasing allows a single answer that terminates dialog.
 - c) A question with a numerical answer.
 - d) A question asked before closing a project.
- 3) You need to explain elicitation and analysis to your stakeholders. Which definition might you offer?
 - a) Elicitation asks questions. Analysis answers them.
 - b) Elicitation gathers requirements, and analysis organizes them.
 - c) Elicitation is gathering information from a group. Analysis is studying the results.
 - d) Elicitation and analysis are the same as the project life cycle.

- 4) A business analyst may be tasked with defining problems and identifying opportunities, but there are other areas where business analysis skills might be applied. Which of the following is not a business analysis category?
- a) Resolving conflict.
 - b) Hiring personnel.
 - c) Supporting executive decisions.
 - d) Applying influence.
- 5) What is the most reliable way to gather facts rather than opinions?
- a) Search the Internet and other modern or current sources.
 - b) Review published information.
 - c) Seek at least two independent sources or perform a review.
 - d) Ask a group what they think and rank their responses.
- 6) As you plan for elicitation, what is the most important factor influencing sequencing?
- a) Ask about the highest priority requirements first.
 - b) Always start with documentation.
 - c) The type of elicitation you choose.
 - d) The availability of key stakeholders.
- 7) What do you call the tool generated to affect elicitation sequencing?
- a) A source list
 - b) An elicitation plan.
 - c) A sequence table.
 - d) A Traceability Matrix.

- 8) You are in an elicitation session and participants continue returning to the same point. What should you do?
- a) Note the importance of the point made because of its repetition, and ask if the group is ready to move to the next question.
 - b) Move to close the session. You will document your results and distribute them for feedback.
 - c) Ask someone to clarify the importance of the point, then ask someone else to confirm what they heard.
 - d) Remind everyone regarding the purpose, agenda, and rules for the meeting, then resume.
- 9) When determining the questions for elicitation, which of the following is a general guideline?
- a) Start with a challenging question to get people into a creative mindset.
 - b) Present detailed information to set the stage, then ask people what they think.
 - c) Start and end with simple questions to increase participation and provide people a sense of accomplishment.
 - d) The questions should always be asked in sets of five, getting more complex as you ask them.
- 10) When is a follow-up conducted?
- a) When the information is too complex for a single session.
 - b) As quickly as possible after every session. A follow-up is the high level documentation and analysis of session results.
 - c) Before the close of the session, so that everyone can participate in documentation review.
 - d) If a participant asks for another session after they consider the results.

- 11) You are preparing for an interview. Given your preference, which form of interview would you conduct?
- a) Synchronous.
 - b) Asynchronous.
 - c) Structured.
 - d) Unstructured.
- 12) You are conducting a business analysis brainstorming session. What must you incorporate?
- a) Make certain that everyone speaks by calling on people by name.
 - b) Stop dominant people from talking to assure that everyone has a chance to contribute.
 - c) A review of all the answers at the end to get a sense of prioritization.
 - d) Since brainstorming is about creativity, make certain that people elaborate their ideas fully.
- 13) Another business analyst is facilitating a requirements workshop. You have been asked to take notes so that they can focus on facilitation. You notice that several people are having side conversations or checking text messages. What needs to be corrected?
- a) Stop the meeting and ask the facilitator to repeat the agenda.
 - b) Request a break. Suggest individually to the facilitator that they might want to repeat the ground rules when everyone returns.
 - c) Nothing. This is normal human behavior when people generate ideas.
 - d) Quietly get the attention of the distracted participants and use nonverbal signals to suggest they focus on the meeting.

- 14) When preparing to facilitate a focus group, what is the most important element?
- a) A clear agenda.
 - b) All participants must be experts.
 - c) Prequalification.
 - d) A fixed group size.
- 15) What makes the Delphi technique so important to requirements facilitation?
- a) Unanimity.
 - b) Expertise.
 - c) Anonymity.
 - d) Prioritization.
- 16) The current project will need to recommend process changes associated with the implementation of a new system. The current workflow is complicated and requires precision. End users have a difficult time explaining the sequence and documentation is weak. Which elicitation technique would you use to gather requirements?
- a) Active observation
 - b) Participatory Observation
 - c) Passive Observation
 - d) Simulation
- 17) Which of the following techniques is not an example of elicitation?
- a) Storyboarding
 - b) Throwaway
 - c) Wireframes
 - d) Evolutionary Development

- 18) You need to gather requirements quickly, your stakeholder audience is large and broadly distributed, and the initial requirements do not need to be complex. A survey or questionnaire appears to be an ideal elicitation technique. Why might you choose an alternate method?
- a) You won't be able to tell if the responses are correct.
 - b) Surveys never work as effectively as face-to-face elicitation.
 - c) Given an average 5% response, you may not receive sufficient information to progress to analysis.
 - d) The cost of surveys is higher than other alternatives.
- 19) You are working with a Scrum Master who prefers the Kanban method. He suggests that you do not need to conduct elicitation. What perspective is he professing?
- a) Agile techniques do not need to elicit and analyze requirements, because they are provided as User Stories and analyzed by developers.
 - b) Elicitation and analysis are a continuous cycle within Agile, and due to informality are often overlooked.
 - c) The Scrum Master doesn't like business analysts.
 - d) Access to stakeholders is limited using the Kanban method, so elicitation is not viable given time boxing.
- 20) You are talking to a project manager who is less experienced with requirements terminology. How would you help them understand the difference between categories, types, characteristics, and attributes?
- a) Simply, because the words are only synonyms.
 - b) Categories enable determination of correctness, priority and value based on classification by type.
 - c) Characteristics are defined by attributes.
 - d) Categories, types, characteristics and attributes are just different formats.

- 21) You receive the following requirement from a user: The marketing department must have a new website. Which formal elements are missing?
- a) Subject
 - b) Action verb and conditions.
 - c) Object
 - d) Imperative
- 22) Solution requirements derive from business or stakeholder requirements. Which type of requirement is not part of the solution?
- a) Project requirements
 - b) Functional Requirements
 - c) Non-Functional Requirements
 - d) Quality Requirements
- 23) Which of the following is a non-functional requirement?
- a) Help desk analysts must be able find an open tickets with five seconds following a search input.
 - b) The user must be able to enter a password between 8 and 15 characters in length.
 - c) The user must be able to access the webpage from either Android or iPhone devices using devices standard browsers.
 - d) The depth sounder must provide measurements in 1 foot increments to enable shore landings.
- 24) The project manager requests that you generate the requirements as fast as possible so that the team can start planning project work. As you assign attributes to the requirements, which one could you defer until you have more time?
- a) Source
 - b) Identifier
 - c) Ownership
 - d) Status

- 25) A user submits a change request and it is passing through the correct process toward the possibility of becoming a new product requirement. What status would you place on this requirement?
- a) Open
 - b) Active
 - c) New
 - d) Change
- 26) What is the 100% rule?
- a) Requirements must be 100% defined before incorporation in the project plan.
 - b) 100% of the requirements must be verified.
 - c) Six sigma suggests that product must fall with a 99.9% quality threshold.
 - d) The 100% rule is related to the WBS.
- 27) Which of the following statement is not representative of a requirements package?
- a) Requirements packages are optional.
 - b) Requirements packages are created solely by the business analyst.
 - c) Requirements packages require verification.
 - d) Requirements packages are created at the discretion of the project manager.
- 28) Which requirements processing sequence is correct?
- a) Confirm, approve, implement, validate
 - b) Confirm, approve, validate, implement
 - c) Approve, implement, verify, validate
 - d) Verify, approve, implement, validate

- 29) Which of the following is not a form of scope model?
- a) SWOT diagram
 - b) Fishbone diagram
 - c) Organization chart
 - d) Use Case
- 30) When selecting an analysis model, level of abstraction is an important criteria. What does level of abstraction mean?
- a) Providing every single detail.
 - b) The opposite of distraction.
 - c) The opposite of level of detail.
 - d) Using symbols and icons for clarity.
- 31) Which of the following is not a standard modeling language?
- a) UML
 - b) RML
 - c) BPMN
 - d) ERD
- 32) Which modeling language is associated with swimlanes?
- a) ERD
 - b) BPMN
 - c) SysML
 - d) Workflow

- 33) How would you characterize the difference between RML, UML and SysML?
- a) RML does not include system information.
 - b) Of the three, SysML works best to design human/computer interfaces
 - c) RML is about goals and objectives, the others are about interaction
 - d) UML is only structural
- 34) RML is the most used modeling language across business analysis, except perhaps within engineering and information systems teams that use SysML or UML to define systems, data, and their relationships. Which type of RML application uses CRUD?
- a) Objective models
 - b) System Models
 - c) People Models
 - d) Data Models
- 35) The project manager recently learned about Ecosystems Maps, and believes that they will overcome some of the problems previous projects have had designing program interfaces. What recommendation or response would you offer?
- a) Ecosystems maps are an RML solution that allow you to see all of the systems pieces.
 - b) Ecosystems maps will not solve the scenario you describe since they do not include interactions, data flows, or programming elements.
 - c) RML, SysML and UML all provide the same level of detail, so we should consider other alternatives.
 - d) Do whatever the project manager suggests, since they direct the project work.

- 36) Which of the following statements is correct?
- a) Component Diagrams and Class Diagrams are both forms of UML Behavioral diagrams.
 - b) Activity Diagrams and Use Case Diagrams can use UML Behavioral Diagraming techniques.
 - c) Component Diagrams and Sequence Diagrams both apply UML structural tools.
 - d) Class Diagrams built with UML are a common business analysis deliverable.
- 37) One of the team members hears you use the term cardinality while describing relationships in a diagram, and asks “what is a cardinality?” You answer:
- a) A cardinal number, like an integer, 1, 2, 3, etc.
 - b) A cardinality is the numerical relationship between two entities, like one-to-one or one-to-many.
 - c) A cardinality is an important relationship, like cardinals in a church.
 - d) A cardinality is just another term for a data relationship.
- 38) Modeling is a way to organize requirements information. What are the five categories?
- a) Need, Objective, Requirement, Solution, and Process
 - b) Scope, Process, Rule, Data, and Interface
 - c) Business, Functional, Project, Quality, Classification
 - d) Text, Tables, Diagrams, Use Cases, User Stories
- 39) You have completed elicitation for a new product and need to start analysis. You determine that a high level diagram may be useful. Which type of model are you considering as a starting point?
- a) A context diagram or feature model.
 - b) Use cases
 - c) User Stories
 - d) State Tables

- 40) You are asked to describe the difference between a use case and use case diagram to a brand new business analyst. How would you help them to understand the difference?
- a) Not a problem, a use case diagram is another term for use cases.
 - b) A use case is an activity described as verb-noun, the diagram puts many of them together to show how they all relate to the solution.
 - c) Use case is to user story as use case diagram is to storyboard.
 - d) Let me draw one of each for you so you can see the difference.
- 41) Which of the following examples is not another name for a Process Diagram?
- a) SIPOC
 - b) Flow chart
 - c) Value Stream map
 - d) User Interface Flow
- 42) What are the essential elements of a user story?
- a) Subject, verb, object
 - b) Object, action, result
 - c) Actor, function, need
 - d) Subject, action verb, result
- 43) What do you call the process of selecting User Stories prior to implementation?
- a) Purging
 - b) Kanban
 - c) Grooming
 - d) Retrospective

- 44) You have been told you need to create one model from each of the five categories. Rule Models are not as often necessary as the other categories. How would you explain why you might not need a rule model?
- a) Rule models explain how the work needs to be done, and are not necessary for defined processes or Agile.
 - b) Rule models help to set boundaries, and are not as necessary if the requirements and scope are already clear.
 - c) Business rules describe goals and objectives that have already been described in a scope model.
 - d) Rule models include decision trees and are therefore only used if risk needs to be calculated.
- 45) When creating a data model, what should you build first?
- a) The data flow diagram should be developed from a scope or process model.
 - b) The data dictionary describing the objects, descriptions, types and values.
 - c) How the data will be created, read, updated, and deleted.
 - d) The input state and expected output state for the data.
- 46) Why might a project manager consider an interface model the most common and important model associated with requirements analysis?
- a) Interface models are required before work can begin, and should be the first requirements package.
 - b) Wireframes are common baselines for technology development and are necessary to establish work estimates.
 - c) The stakeholder register and communication management plan are forms of interface models commonly used by project managers.
 - d) Interface models are only mockups and easily prepared.

- 47) Which factor is the most important consideration when documenting requirements?
- a) Completeness
 - b) Clarity
 - c) Context
 - d) Categorization
- 48) Requirements are supposed to be feasible. Which of the following elements is not a feasibility consideration?
- a) Scope
 - b) Time
 - c) Cost
 - d) Technology
- 49) What does the W in MoSCoW stand for?
- a) Would
 - b) Will
 - c) Won't
 - d) Какие
- 50) Who approves and signs the requirements?
- a) The sponsor, the customer/user, and the PM
 - b) A business owner, a solution team recipient, and the business analyst.
 - c) The project manager, the team, and the BA.
 - d) The sponsor.

Module 6 - Traceability

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

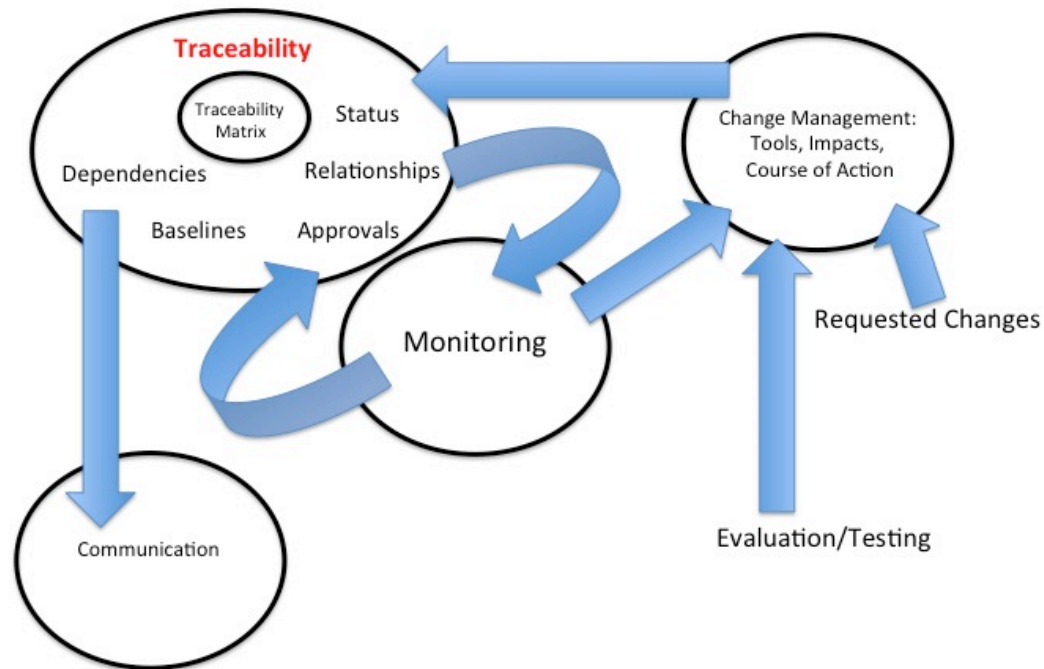
Traceability and Monitoring

- Traceability Matrix
- Dependencies, Relationships
- Status
- Approval
- Baseline
- Monitoring
- Change Management
- Communication

The **Traceability Matrix** is to the Business Analyst what the **Triple Constraint** is to a project manager. You cannot successfully implement a project without having established a Traceability Matrix, and populated it with the objectives and highest priority requirements for the project. You will continue to add content to the Traceability Matrix through additional Elicitation, Analysis, and general Progressive Elaboration. You will also update requirements attributes (such as status) as Business Analysis and Project Management work is conducted.

Traceability and Monitoring, according to ***Business Analysis For Practitioners*** and the ***PMBOK® Guide***, includes all the activities necessary to insure that requirements are approved, managed, and completed with value.

The following ***Process Diagram*** (you know what a process diagram is from Module 5) describes the workflow associated with Traceability and Monitoring.



Traceability occurs regardless of the Project lifecycle. The effort may be formal or informal, though it must always be pre-meditated and focused to cover the correct elements. Traceability, particularly formal monitoring and traceability, require a substantial time and resource commitment on the part of the business analyst, as well as understanding and commitment from the sponsor, the project manager and the team.

Imagine all those hours hovering over a map marking and documenting the details about where you have been. That might seem useless to many people, even if you inform them that it might be nice to be able to return – either to your starting point or to other interesting points along the way. You then spend even more time gathering information for that simple little ‘mark’ that shows where you are, using strange instruments and techniques with which no one else is familiar to take measurements.

Finally you stare at the map details for hours determining how to best get to where you are going from where you are. Compared to all the team members performing work (climbing the mast, swabbing the decks, catching the fish, sweating in the sun), you don't appear to be working very hard at all.

SKILLS:



COMPASS

Since Traceability takes so much skill, time, and effort, improper focus can negatively impact the Value of the product. (Too much time equates to too much cost that could be spent making other contributions.) The BA needs to balance time between Communicating with people versus Tracking working and Tracing the completion of requirements. There are a few key points to consider when selecting what should be monitored and tracked:

- ***Stick to Value by assuring that tracking includes Goals and Objectives. You might be able to drop a few requirements off the radar, but only if you are maintaining a course toward the goal.***
- ***If pressed for time or constrained by other factors, projects typically only trace critical requirements, regulatory compliance, and targeted standards.***
- ***Requirements may be traced formally and informally on any given project. Identify which require rigor and which may be managed via a simple checklist before spending time on the wrong priorities.***
- ***Since you have skills tracing and tracking requirements, you will typically track more than just your work, or the work that you can identify. Make certain that you work with the PM to identify all of the critical elements that must be traced.***

As the navigator, you have a sense of the resources necessary to conduct the voyage you have just plotted. You will need barrels to store fresh water, of varying sizes so that some may be taken ashore to refill. You will need chests with locks for the treasure you discover at the destination, and to control trade goods (and rum) you take with you. You want to make sure there is sufficient sailcloth and rope, and fuel, and oars, etc. You will not be using these tools, though your understanding of the requirements suggests that you track these essential resources and assure they are maintained throughout the voyage with regular inventories. You know the cook brought aboard many barrels of salted pork, citrus, flour, sugar, lard and other ingredients for meals. You don't need to maintain the same level of control for the cooking ingredients; that tracking would be delegated to the cook.

Since you are aware of the needs and the related requirements, you are responsible for **Communications** to assure that they are completed. You may assist the sponsor by writing the charter, the purchasing officer with assuring the list of goods is complete, and the project manager with communicating status (or at least composing the message) as desired by the key-stakeholders.

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SKILLS: **ANCHOR**
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The information about the Requirements Traceability Matrix from Module Two bears repeating. Here it is again, in part, word for word. The Traceability Matrix is the business analyst's chart. No less than a Navigator's charts and maps, you need this tool to perform your duties as a business analyst. The level of detail tracked, the timing of updates, and the frequency of reporting may vary, but this tool is essential. Although the effort associated with maintaining an accurate and up-to-date Traceability Matrix potentially generates the most work and cost associated with BA deliverables, you will create and manage one, even if unofficially. There is no better tool to help Validate (Value) the Solution as you proceed. Help the Sponsor and the BA to understand this value early during Business Analysis Planning. Many questions on the exam will inquire as to which tool will best assure the Value of the Solution. The answer is the Traceability Matrix.

As you monitor the work, you will record status against approved **Baselines**. The **Traceability Matrix** records relationships amongst requirements, between requirements and objectives, and identifies stakeholder roles (RACI) relative to the work. New requirements may be revealed, stakeholders will request new objectives and deliverables, risks (both threats and opportunities) will be uncovered, and testing will reveal acceptance or the need for rework. All variance from the plan will require an **Impact** analysis before reaction, and compliance with the Project Change Management plan if preventative or correction actions are indicated.

You do not need to recreate the models and documentation that you generated through Elicitation and Analysis. You should create unique identifiers for each requirement, and for the document(s) in which it is referenced. Recall that duplication creates confusion. One purpose of traceability is the cross-referencing of information so that it does not need to be re-created or unnecessarily checked.

Remember all those barrels? Some contain fresh water, or other perishables that you do not want exposed to salt water, fuel oil, or other contaminants. Opening them to check the contents and attempting to properly reseal them at sea poses a risk. You ought to label them each uniquely so that the correct barrel is opened only when and as needed. The cook may not care, but you should direct the labeling to assure proper resource use to maintain value and diminish waste.

SKILLS:



COMPASS

The three primary reasons for Traceability are:

- ***Ensure that each requirement adds business value. Even if the value is not immediately obvious, your role is to demonstrate the relationships.***
- ***Help to meet customer expectations. In the midst of the work, particularly on longer projects, the team may place immediate threats or opportunities secondary to the primary objective. Traceability helps to keep the work on track, or when diversion is necessary to get the work back on course.***
- ***Help to manage scope. Scope creep is dangerous to projects. Providing the baseline against which changes can be measured is critical to assuring that any change request or risk response maintains project value.***

Remember the BA is responsible for Product Scope while the PM is responsible for Project Scope.

Traceability Matrix

The **Traceability Matrix** (also called the **Coverage** or **Coverage Matrix**) is a ***hierarchical, prioritized***, logical list of the requirements for the Product. The list has no implied relationship to work sequence. Importance should be placed on linking the requirements, and related (work) processes, to solution components and to one another in order to demonstrate interdependencies.

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SKILLS:
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ANCHOR
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Quality Assurance and Testers often use a document called a Requirements Traceability Verification Matrix. Note the addition of the word Verification. The Requirements Traceability Verification Matrix ties a test case (or test cases) back to each requirement in order to identify purpose, relevance and aid in test design. The Traceability/Coverage matrix identifies status indicating that a requirement will be, is being, or has been tested but does not contain the testing details found in a Requirements Traceability Verification Matrix. Other derivatives of a Traceability/Coverage Matrix may be created, though only as they serve to simplify, clarify or control subsidiary work. Creating and matrix is time consuming. Only needed elements create value.

SKILLS:



STEERING WHEEL

As you create your Traceability Matrix, review the Requirements Attributes that you discovered to be relevant during Elicitation and Analysis in Module 5. The list is potentially extensive. From a Traceability perspective, you do not need all of the information in your Matrix. The unique identifier allows you to reference the document(s) useful to requirement creation. The Matrix is for monitoring and control purposes, and to answer the most immediate questions you may be asked by the project manager, sponsor, key-stakeholders, team members or others according to the Communication Plan. Three elements were identified as critical to Tracing.

- **Identifier**
- **Ownership**
- **Status**

Other elements typically necessary for Traceability include (the three essentials are repeated for completeness):

- **Identifier**
- Short textual description (people like words rather than numbers).
- Objective – need, goal, objective, project objective to which the requirement relates. You may include the items in this list within the Traceability Matrix or as a key, using efficiency and clarity as your guides.
- Product development stage – this is for project sequence tracking prior to delivery and validation.
 - Design
 - Build
 - Test
 - Implement
 - Verify
- WBS – link to work packages as they are defined.

- **Status** – commonly **Active, Approved, Deferred, Canceled, and Added**. This list represents the work of the Business Analyst. For instance **Added** means in the queue for Elicitation, Impact Analysis, etc. though not added to the formal requirements. The work of the PM/Project may use additional status references associated with **Active: Proposed, Open, In Process, Test, Verified, Complete**.
- Rationale – cross-reference to goal or reason for inclusion.
- Priority – quantitative or qualitative ranking.
- **Owner.**
- Source – of the requirement.
- Version.
- Date Completed – note this would be tied to Status.
- Stakeholder Satisfaction – used post verification, particularly for incremental, iterative, or adaptive projects and potential for post-delivery Evaluation.
- Stability.
- Complexity.
- Acceptance Criteria.

The information will typically be stored in a Matrix (a table with rows and columns) and exceed a single page or screen. You may create the attribute (columnar) structure of the Traceability Matrix as needed per project. Keep the most important information on the first page (from left to right), or group attributes used together in adjacent columns. For instance, Date Completed, Stakeholder Satisfaction, and Acceptance Criteria would be related to a Project **Complete** status and would not be as relevant for regular review until a component, phase, or project nears completion. Likewise, Date Completed, Stability, Complexity, would likely be associated with testing and a **Test** or **Verified** project status.

Start recording requirements as soon as you have them verified. Each unique identifier should be related to a major goal, objective, or deliverable. As you identify related requirements, they become associated IDs. You add requirements in a related, prioritized manner to reduce duplication and identify potential conflicts.

A Traceability Matrix starting template is available to you in the course Appendix and associated online materials. A partial extract of the Traceability template follows:

	A	B	C	D	E	F	G	H	I	J	K
1	Requirements Traceability Matrix										
2	Project (or Effort):					Values		Values	Values		
3	Cost Center:										
4	Project Description:					Design, Build,Test, Implement, Verify		Active, Approved, Defer, Cancel, Added	1 = Critical 2= Mandate 3= Function 4= Optional 5=Desire		
5	Identifier	Associate IDs	Requirement Description	Need, Goal, Objective, etc.	Project Objective	Product Stage	WBS Code of Acct	Status	Priority	Owner	Source
6	001	1.0									
7		1.1									
8		1.2									
9		1.2.1									
10	002	2.0									
11		2.1									
12		2.1.1									
13		2.2									
14	003	3.0									
15		3.1									
16		3.2									
17		3.2.1									
18		3.2.2									
19	004	4.0									
20		4.1									
21	005	5.0									
22											
23											
24											

Dependencies and Relationships

One of the more important aspects of Matrix design is capturing dependencies and relationships. You cannot create a map without latitude and longitude, or identify the characteristics of a safe harbor without identifying depth, reefs, rocks, sandbars and wrecks. If one of the objectives were a map that may be re-used, then all of these elements would be related as associate IDs to the Create Map requirement. If you discover sources of fresh water, fruit, and other edible resources and want to mark them on the map, then this requirement would become an associate ID. If instead, you want to create a log file that merely highlights the coordinates and the possibility of food sources, you would create a new high level identifier, and note the dependency of future food location on accurate map coordinates (which would be entered in the log).

Business Analysis for Practitioners highlights two important dependencies that should regularly be noted.

- Implementation Dependency – a requirement for present or future product delivery that is necessary. Like the map coordinates both for potential return voyage (even though an alternate route may be taken), and potential return trips. If the product is great, remember we want to make it an operational solution.
- Value Dependency – Requirements without which present or future value will not be attained. (Don't return without gold or something that can readily be exchanged for gold ...)

Requirements Approval

Requirements and the difference between Approval, Verification and Validation were covered in both Module Two and Module Five. You keep track of the approval, verification, and validation in the Traceability Matrix. The process is either formal or informal, depending on the Project Lifecycle and the Project Management Plan.

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SKILLS:
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ANCHOR
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A Work Authorization System is part of a formal Traceability process associated with approval of the work associated with a requirement before funds are released. You do not recreate the Work Authorization System in the Traceability Matrix, but you may note the requirement status. There is a requirements approval process even for Adaptive/Agile work. In a Predictive/Incremental/Iterative project the sponsor or business owners approve the work and release of related funds. In an Agile project the Product Owner approves work before it is placed into the Backlog, even if the work is an outcome of lessons learned during development. Control of backlog prioritization by a Product Owner is a form of work approval.

Approval terms, much like Verification and Validation may be confusing. The following relationships should be defined in the Business Analysis Plan or the Project Management Plan, the latter taking precedence if these definitions are included:

Approval versus Signoff. Signoff is almost always formal, and may be the responsibility of a single individual (sponsor or product owner) or all the members of a set (sponsor, PM, business stakeholder). Approval may be synonymous with signoff, or may be an informal process that precedes signoff. For instance, the close and follow-up for a facilitation session may **approve** the requirements as appropriate and correct to create value, from whence they are provided to someone with signing authority before addition or implementation within a project.

Review versus Approve. Review suggests looking at the requirements for verification or validity, though an inability to approve. Reviewers may be granted denial or veto power if a requirement does not meet desired criteria, although seldom the ability to do more than recommend approval.

Approval versus Accountability. Accountability always has a higher level of authority than responsibility. Approval is seldom handed to someone who is responsible, if there is someone identified as accountable for the completion of the work (typically the PM) or the Product itself (typically the sponsor, key business stakeholder, or product owner). Individuals with higher-level accountability are typically given higher levels of approval for the requirements and the work.

Requirement Rejection. Although Business Analysis work includes creating and verifying requirements, new information will be discovered as the requirements are elicited, analyzed and implemented. This is **Progressive Elaboration**. The plans should make it clear when and how a requirement may be rejected or vetoed, particularly by someone outside of typical accountability or authority roles. When nearing shore, the team member near the bow may be granted permission to drop anchor before the captain's signal rather than having the ship run aground on a sandbar that wasn't on the chart, or to avoid collision with another vessel.

Expert judgment and Approval. Subject matter experts may be relied upon to recommend initial requirements, or to review requirements for viability or other attributes. SME's are seldom granted approval or rejection authority, instead they should submit suggestions and changes for impact analysis and incorporation through the standard change process.

Change Control Board and approval. A **Change Control Board (CCB)** is responsible for ***reviewing, evaluating, delaying, rejecting or approving*** **Changes** to the project or the product in order to assure or protect its value, or the value of the organization. More about formal Change Control will be discussed later in this module.

Baseline

A baseline is a ***boundary*** that defines all of the approved work of the project. Boundaries are always associated with Scope, Time, and Cost and therefore the requirements that affect them. Once all of the requirements for one cycle of a project (based upon its identified lifecycle) are identified, organized and approved, the full set is identified as the Baseline.

A project is baselined by creating boundaries for the work performed to complete the product service or results.

A product is baselined based upon the features, functions, and characteristics necessary to create value.

Requirements define product scope, and therefore in segments matching the lifecycle also define the project scope.

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Remember the terminology for Agile projects. The Product Owner approves User Stories that may be added to the Backlog. The Backlog is prioritized, representing the User Stories that provide the greatest value to the Product. Given the nature of Agile projects, the priority of a User Story may change at any time, increasing or decreasing, as additional User Stories are added to the Backlog, the development team learns of additional dependencies, or the business and consumer environment generates changing product demands.

The Traceability Matrix can be used to identify the requirements baseline for any Project Lifecycle.

Requirements Lifecycle

Requirements go through a lifecycle from beginning to end. The beginning is not always the same process or source. The end is not always a completed outcome. The various states and terminology will vary amongst industries, organizations, and even implementations of lifecycle methodologies. Set a clear definition of the Requirements Lifecycle **states** for use in your Traceability Matrix. Examples include:

- Submit
- Approve
- Postpone (to later iteration, cycle, phase)
- Defer (to future project)
- Cancel - was approved, no longer approved
- Reject – never approved
- Combinations of the above or alternate labels

Change Control

Tracking Change Control is always an element of Traceability. The related status may be a standard reporting column in the Traceability Matrix or reported uniquely. An important element of Change Control is always **Communication**. Either the CCB or the Business Analyst is responsible for reporting on the actions, particularly Closing actions of a Change Control Board's decisions.

Open states include Proposed, Approved, In Progress, and Completed. In Progress includes the steps to incorporate the requirement into the Product and Project plan. Completed means completed requirement addition, not completed work.

Close states include Rejected, Cancelled, Deferred, and Implemented. Note that Postponed is NOT a closed state. A postponed requirement would be added to the requirements traceability and associated with a particular cycle, phase, or date.

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Some key elements for certification candidates:

- *Integrated Change Control (ICC) includes Configuration Change Management regarding the product (including version control during development), and Change Control (including processes, work, and documentation). From a BA perspective, Integrated Change Control (ICC) always includes a CCB.*
- *Version control systems, typically associated with Configuration Change Management, may be used to track BA artifact history. In other words, the documents and snapshots of the Traceability Matrix associated with the analysis, submission, review, and decisions regarding change.*
- *Whenever working to integrate change, communicating the disposition is mandatory.*

Two common change control systems are **Configuration Management Systems (CMS)** and **Version Control Systems (VMS)**. A CMS focuses on the product or service being tracked, and the requirements necessary to track successful development and implementation. A CMS includes documents, a tracking process, approval definitions, and covers the product across projects and interdependencies with other products and projects. A CMS is a comprehensive solution. By comparison, a VMS is only a subset of a CMS. A VMS is designed to track changes against a baseline, and is therefore more applicable to a single project or to a product's lifecycle through a development process. Either a CMS or a VMS may be used to record and track BA work artifacts. Use the same system to track all efforts when possible.

Problem Tracking and Risk Analysis

Changes are often submitted or suggested as the result of compliance or conformance with regulations, standards, the plan, verification or customer validation. (Specific testing types and outcomes are discussed in Module 7.)

When a problem is identified the most important step is to identify the **Root Cause** of the problem. Resolving a symptom will not result in a verifiable or valid product. The problem is often failure to capture clear requirements, or to achieve commitment and consensus during the elicitation, analysis and design. This results in requirements changes.

In order to properly record or evaluate a problem, a standardized reporting form and process should be implemented. Much like a good requirement has a format, a good problem report has a best-case format.

Anyone may submit a problem or change request. Make sure that key stakeholders, users, customers and team members understand the value of using a common template (minimally to expedite processing, find the cause and suggest a solution).

Situation Statement: Problem (A) has effect (B) with Impact (C).

In other words Problem > Effect > Impact

Risk Analysis suggests the identification of the **Impact** of any Risk or Problem Event upon the project or product. Business Analysis uses the same terminology, although impact is typically a qualitative analysis from a Business Analysis perspective.

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Risk Analysis is either a Project Management or a Business Analysis accountability (or a separately assigned safety manager assigned by the PM). The roles and responsibilities should be identified in a RACI diagram. All members of the team, the BA, and the PM are responsible for the identification, analysis, and resolution/implementation of defects and other problems. The Accountable party needs to focus on determining the Impact of an identified problem.

Once a problem is identified, the **Impact Analysis** will determine if the Root Cause will disrupt the value of the product or work of the project. If the Impact is low priority (and only low priority), then workarounds or mitigation pending later resolution may be suggested rather than a significant change. For this reason is it ***always*** important to assess the impact ***before*** recommending a change. Make certain that you understand this relationship for the exam.

The stepwise process is:

- 1) Problem reported or identified.
- 2) Root cause identified.
- 3) Impact Analysis performed.
- 4) Priority/action recommended.
- 5) Change Control process followed.
- 6) Resolution implemented per approved change.

Business Analysis work is always impacted, since requirements need to be reviewed to identify the impact on the **Requirements Baseline**, the impact on requirements in process or previously completed, and the impact on Business Analysis work (hours spent) to identify and recommend a solution. Models and other documentation may need to be modified, but only if they were intended as **Organizational Process Assets** following project completion. (Like that final map you provide to the national archives.) Otherwise, efforts to update elicitation, analysis, and other interim documents should be kept to a minimum in order to minimize change impacts.

Any or all of the components of a Project Management Plan (all of the knowledge areas and their associated information and documentation) may be Impacted by any change. This is outside the scope of work for the Business Analyst. It belongs to the Project Manager. Nevertheless, as a part of the leadership team, and one with a comprehensive understanding of the requirements, the Business Analyst may be asked to support efforts to identify Project impacts.

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The PMBOK® Guide suggests that a CCB has one additional response to submitted changes beyond Approved, Deferred, or Rejected. That response is More Information Required. Despite the best efforts of the Business Analyst and the team to identify the problem, root cause, impact and to make a recommendation, the CCB may have additional information or insight that suggests additional detail be assembled. Remember that anyone may submit a problem or change request. The More Information Required option is more likely to occur when the stakeholders, including the team, were not properly instructed or trained in the use of the Change Control Process. That process should incorporate a requirements/product impact analysis as well as a project impact analysis. This in turn suggests that the Business Analyst and use of the Traceability Matrix should be a standard part of the Change process. Communication and training are the skillset of the business analyst, so a regular More Information Required response would suggest the BA was not performing as professionalism would dictate.

Module 6 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) What is the best explanation for the purpose of a Traceability Matrix?
 - a) To track the work of business analysis.
 - b) To track the relationships, characteristics, status, and validation of requirements.
 - c) To trace the process of eliciting and analyzing documents.
 - d) To assure that requirements are approved and managed.

- 2) How does the project life cycle affect traceability?
 - a) The project manager determines how traceability should be managed according to the requirement management plan for predictive projects.
 - b) Agile projects are only traced informally, if at all.
 - c) All projects are traced, regardless of life cycle, although the form and focus may change.
 - d) Traceability is the business analyst's job, and is always determined as the BA deems appropriate.

- 3) Which requirements suggest mandatory tracing for value on a project?
- a) Any requirements prioritized as 'mandatory' by the sponsor.
 - b) Requirements documented in the requirements management plan.
 - c) Regulatory, targeted standards, and critical requirements.
 - d) Requirements with the highest cost or time commitments.
- 4) A new requirement has been submitted to the CCB. You have been tasked with identifying the impact and possible response. Where would you find information to provide related answers?
- a) The risk register.
 - b) The Traceability Matrix.
 - c) The change management plan.
 - d) The requirement management plan.
- 5) In addition to tracing requirements, what business analysis effort does the Traceability Matrix most support?
- a) Commitment and consensus
 - b) Communication
 - c) The value of the product
 - d) A reminder of BA deliverables
- 6) What is the purpose of a unique identifier in the Traceability Matrix?
- a) To avoid duplication and support cross-referencing.
 - b) No two requirements are alike, so the labels are unique.
 - c) Projects are defined by uniqueness.
 - d) To differentiate the business analysis work.

- 7) Why does the BA create a Traceability Matrix even when the PM indicates that they do not need it for requirements management or project work?
- a) The BA is responsible for product scope, and uses the Traceability Matrix to track product value.
 - b) The BA has to assure that the project scope is not affected by Scope Creep.
 - c) The Traceability Matrix is the primary organizational process asset created by the BA.
 - d) The BA uses the Traceability Matrix to track his/her work.
- 8) What is another name for the Traceability Matrix?
- a) Requirement Traceability Verification Matrix
 - b) Coverage Matrix
 - c) Communication Traceability Matrix
 - d) Organization Matrix
- 9) What labels does a business analyst use for requirements status in a Traceability Matrix?
- a) Proposed, Open, In Process, Test, Verified, Complete
 - b) Active, Approved, Deferred, Cancelled, Added
 - c) Confirmed, Approved, Validated, Implemented
 - d) Verified, Validated, Delivered, Closed
- 10) What is a Work Authorization System?
- a) A component of the Traceability Matrix.
 - b) A formal funds release process associated with work.
 - c) A tool used by the payroll system.
 - d) The process used by the sponsor and PM to approval business analysis work.

- 11) Which of the following statements is correct?
- a) Reviewers have no ability to affect the outcome of a requirement.
 - b) Accountability is required for approval, so they are the same.
 - c) Approval and signoff usually mean the same thing, but signoff if usually more formal.
 - d) Subject matter experts are commonly offered requirements approval status.
- 12) Which terms are not specifically associated with Agile projects?
- a) Epic, Storyboard
 - b) Backlog, Product Owner
 - c) Use Case, Iteration
 - d) Retrospective, Sprint
- 13) You need to understand the difference between postpone, defer, cancel, and reject relative to the requirements life cycle. Which of the following statement is correct?
- a) Postpone means to put the requirement off until a later project.
 - b) Reject means the requirement was never approved.
 - c) Cancel means not approved.
 - d) Defer means delay within the project.
- 14) Which of the following is not an element of integrated change control.
- a) Configuration Change Management
 - b) Change Management
 - c) Traceability Matrix
 - d) Change Control Board

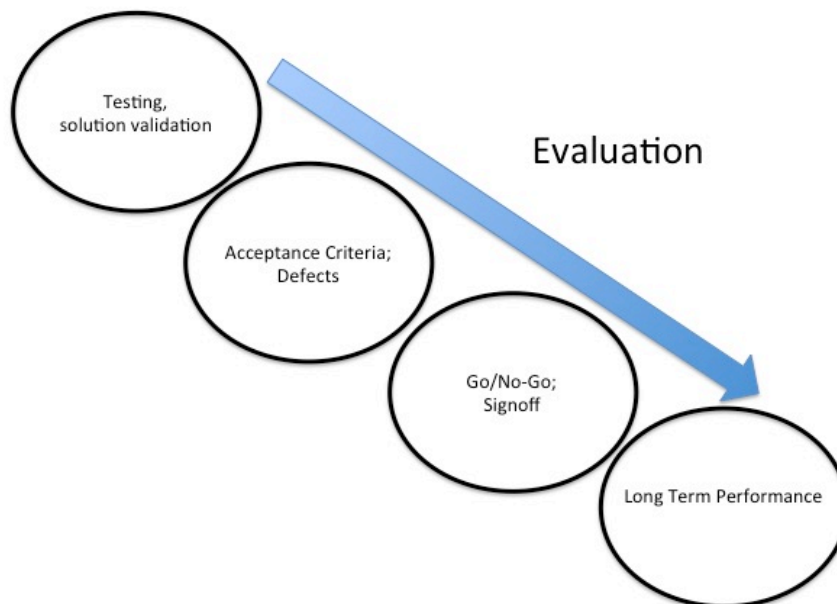
- 15) What is the best format for submission of a change request?
- a) The same as a situation statement.
 - b) Risk, Probability, Impact
 - c) Problem, Impact, Response
 - d) Proposal, Reason, Value
- 16) When a problem is identified and handed to the business analyst, what should be done?
- a) Notify the project manager, then submit a change request.
 - b) Identify the root cause before proceeding.
 - c) The first step is impact analysis, since this affects the value.
 - d) Check the Traceability Matrix to see where the problem fits.

Module 7 Solution Evaluation

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

- Evaluation mindset
- Planning
- Evaluation techniques
- Acceptance and Defects
- Go/No-Go
- Sign Off
- Long Term Performance

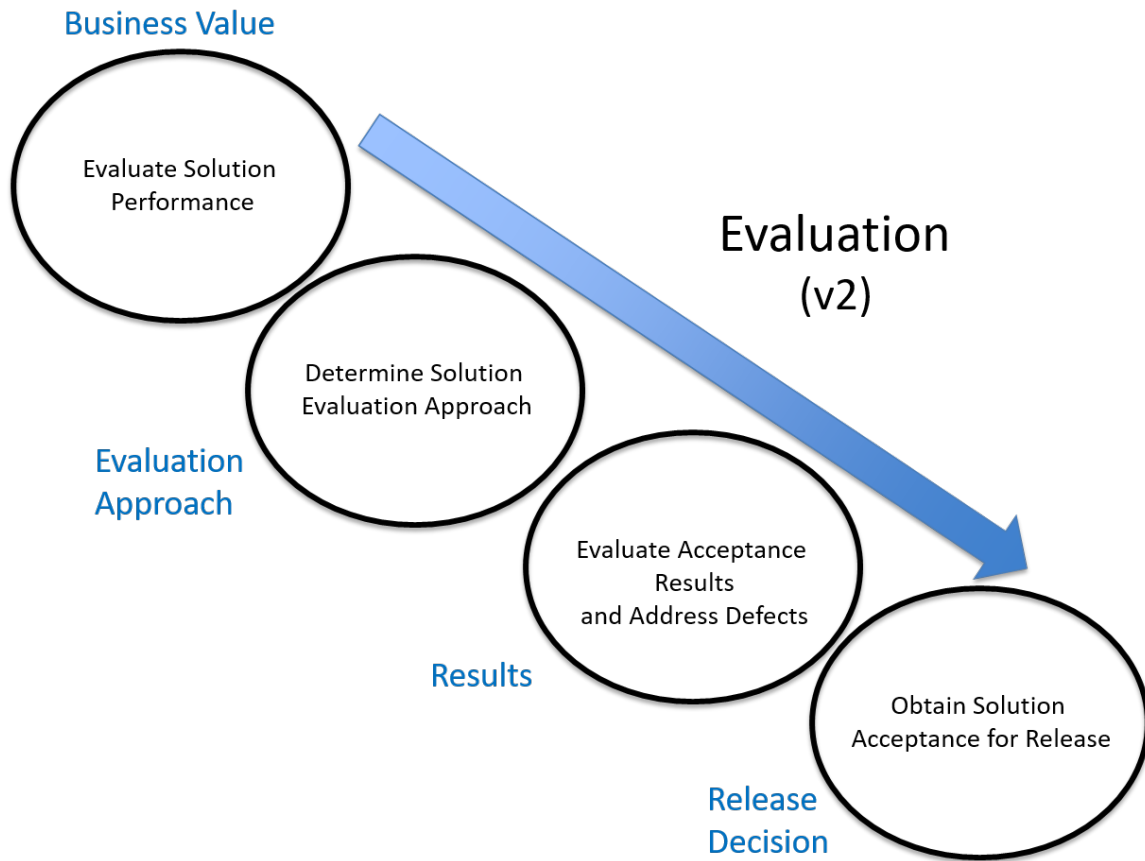


Evaluation, as introduced in Module 2, determines the **Value** solution. Evaluation is critical as each component or phase of a solution nears or reaches completion. Since a product's lifecycle extends beyond the life of the project, evaluation may also be used to determine the value of the product post-delivery or following operational implementation. Evaluation is not the same as validation, and may either precede validation in order to confirm that value was achieved prior to acquiring customer validation and signoff, or post-delivery to assure that the customer's expectations were met or exceeded. Evaluation also occurs once a product has passed through transition and into production. Evaluation tools will become a component of Needs Assessment when the business analyst is considering the Product Roadmap.

As a project is monitored and controlled, the results of each cycle are verified by the project team and the results communicated to the Project Manager per the Project Management plan. The Business Analyst may then be called upon to evaluate the solution (or element) prior to delivery to the customer. Remember that the cost of business analysis efforts may reduce the value. BA efforts to evaluate a product prior to delivery will therefore likely only occur when the solution is large, complex, or involves a large customer audience.

As I originally prepared for the PMI-PBA credential, I was regularly confused by the tendency to associate Evaluation solely with confirmation of product value prior to delivery or through transition. This is the typical mindset of a hybrid PM/BA. Ready to move onto the next project!

Sadly, the initial release of ***The PMI Guide to Business Analysis*** propagates this misconception.



This course emphasizes the broader concept of Evaluation, beyond the project centric view. This module remains essentially identical to the first edition of the course, adding only lists of tools and techniques from ***The PMI Guide to Business Analysis*** for each of the four processes as a reminder that business analysts **tailor** their efforts from across all available tools to fit the situation.

Business Analysis for Practitioners suggests that evaluations incorporating an assessment of customer value are typically qualitative, though may be ‘coarsely quantitative’. I interpret the latter to be a qualitative approach that may be placed on a quantitative scale. Two examples might be surveys or focus groups.

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Note here that the Business Analyst is using techniques commonly associated with Needs Assessment. Business analysis efforts are situational. Always select and apply the tool that fits the need, and is the most effective alternative given the criteria and constraints.

When evaluating the product or solution, for instance against functional and non-functional requirements, the evaluation is typically quantitative. Remember that one element of good requirements is the identification of metrics. Metrics may be either qualitative or quantitative. Measurement systems (with thresholds, numbers and/or statistics) are used to perform quantitative analysis. Comparison against a baseline, a target, or expectations offer greater verification precision and a more rapid **Transition** to validation. Testing is a common form of quantitative evaluation, of which there are many varieties. **Solution Validation** and **Testing** are the first formal elements of Evaluation.

Within the Elicitation and Analysis Module, particularly with reference to Analysis, several modeling languages were highlighted. Modeling languages are usually associated with software development. Most testing is generic relative to its application, although a few testing and evaluation techniques are specific to software. Evaluation is one of the few areas where PMI and IIBA identify industry specific tools within situational examples. (Watch for decidedly software oriented situations on the certification exam as a clue.) Software testing is specifically addressed later in this module.

The completion of testing may lead toward verification, **acceptance** and validation of the solution. Alternately, **defects** may be identified and require rework before acceptance can be achieved. If the problem indicates that the current solution may not be ready for delivery, then a Change Request may result, and the tools of Traceability apply. Recall that monitoring leads into Traceability (per Module 6), and may therefore result in revised planning, rework, or verification moving toward validation. Follow the Business Analysis Plan, determine the Impact, update the Traceability Matrix, and follow the Project Management Plan to address, mitigate, or defer the problem.

Recalling that Business Analysis is cyclic, many of the Evaluation outcomes, particularly testing, may identify additional problems or opportunities that may require a new solution. Deferral is one route to this outcome. Lessons Learned and Retrospectives lead to new understanding. The outcome of Evaluation may therefore lead directly into Needs Assessment for the next problem or opportunity. Business Analysis is cyclic rather than linear.

The Value proposition is often necessary for a **Go/No-Go Decision**. The Traceability Matrix contains the conditions for customer acceptance, and the Business Analyst maintains this understanding. Go/No-Go is not just about the **transition** to delivery; it may often occur well before the objective is reached. Evaluation also considers the condition of **Diminishing Returns**. Diminishing returns suggest that the investment of any additional resource, in terms of cost, time, or personnel may at some point exceed the value being returned by the product. The cost of constantly changing requirements may at some point exceed the benefit of continuing the work. Or new information may suggest a retreat and revision of the entire plan. Such decisions are difficult to make, and require justification in both qualitative and quantitative terms. Evaluation provides the information to assist with related decisions.

Don't wait for the Go/No-Go threshold to loom so closely that few alternatives are available. The goal is to evaluate as soon as viable, and as often as possible. Preparing qualitative and quantitative baselines and measurements systems in advance enables lower cost, reusable evaluation that will help keep the voyage on track. Keep measuring your course and marking the progress in small increments such that getting lost is a less likely outcome. (Some risks, like storms at sea, are inevitable. If you know your last recorded position, general time and course, you have a better chance of recovery than running blindly onward. Traceability also plays a role in this process.)

If the product or solution meets the evaluation criteria and is ready for delivery, then all of the criteria used for the decisions need to be documented in a format for potential presentation to the customer. The documentation also needs to be readied for storage in the **Project Archives** and become a component of **Organizational Process Assets** usable by future related efforts.

Predictive project lifecycles tend to conduct formal evaluation at the end of a phase or stage, or prior to project delivery. Incremental and iterative projects also conduct evaluations per cycle, suggesting that they may be more similar to predictive than adaptive projects relative to evaluation efforts (or at least how they are labeled). In all three cases, measurement should be conducted regularly, per the Business Analysis Plan, and reported formally per the Business Analysis or Project Communication Plan. For an Adaptive/Agile lifecycle, measurements are conducted at the end of a Sprint or iteration, when a User Story is delivered or completed, prior to a release, and again prior to full project completion. In Kanban, which uses an ongoing approach, measurements are done as User Stories are moved into development, and again as they transition into completion. Lighter weight testing is usually done earlier in the project, while more detailed and formal examination is conducted prior to delivery or production transition. Pre-defining both the metrics and the tests facilitates a more cost effective evaluation scenario.

When the decision resulting from Evaluation is a **Go**, the next step is to prepare for component, phase, release or solution **signoff**. **Signoff** occurs relative to the project lifecycle or the Project Management plan.

Once the metrics, tests and evaluations are defined, they may be used well past implementation on some projects as a means to determine if the product retains value and continues to produce the desired business return. It is always a good idea to determine if measurement tools or systems may be used post implementation even before the project starts (in other words during Business Planning or Elicitation). This will justify the development of metrics and tools used during the project, and should incorporate training for measurements into the transition process. One component of BA Elicitation should attempt to determine stakeholder requirements relative to post transition evaluation. Some solutions address an immediate need and a simple cost/benefit comparison. Other solutions are justified based on their **long term value**. (Remember Needs Assessment justifications using NPC, IRR, and other time based value analysis.) The most common reason for key-stakeholders or product owners discontinuing post-delivery evaluation is a lack of planning and commitment to the cost associated with the Business Analysis work following product delivery. The outcome might easily be a product that does not maintain its intended value unless efforts are conducted to communicate the impacts and to develop a commitment toward the ongoing evaluation.

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Evaluation does not just arise as the project or process nears completion. The original value of the solution was identified in the situation statement. Use Cases and User Stories identify the value and/or the basis for acceptance. Requirements Analysis, Traceability, and Evaluation (including testing) were planned during Business Analysis Planning. Each domain associated with business analysis reminds us to incorporate key stakeholders in order to obtain consensus and commitment. As the efforts associated specifically with Evaluation are reached, we are merely completing a cycle with which all of the participants should be familiar. All the relevant stakeholders should be aware and prepared for the steps associated with verification, acceptance, validation, approval, and signoff.

Always evaluate with a focus on solution value and usability.

Functional requirements are measurable against a standard or a baseline. Non-functional requirements (-ability) are based on usage. Both can be verified by testing.

Automated solutions, including software, can be verified by confirming against expected values, test patterns, or sample data. All aspects of data manipulation should be tested. Remember CRUD? Test the creation, readability, update, and deletion functions as well as data integrity, availability, and confidentiality. Software testing more commonly occurs in increments from the smallest elements upward toward completed deliverables. One example is the testing of each web page on a site, then operational sets, and finally the entire site. Object codes is inspected and tested before integration into a module, and the module is tested before integration into a system. The same approach is used for the delivery of services or single products. (Consider the cost/ impact of comprehensive or layered testing relative to the value of the solution.)

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Focus on priority components. Keep each test as simple and concise as practicable. Verify results with at least two pairs of eyes or minor test duplication. Reproducing a defect or a successful feature helps identify the next appropriate step. Once you have a verified answer, trust that the plan was correct, the implementation executed according to the plan, and the skills of the PM, BA, and team members were properly applied.

Planning for Evaluation

The business analyst performed general Evaluation planning during the creation of the Business Analysis Plan. The needs and solution acceptance criteria have existed since the requirements were recorded. The following six questions should have been asked before implementation was initiated. It does not hurt to ask them one more time before formalized Evaluation efforts are conducted. These six questions serve as a foundation for evaluation efficiency and optimal results.

- What goal, objective, deliverable, problem or impact does the specific evaluation activity identify or confirm?

Every evaluation needs to be tied to a valuable product or project element. The Captain needs to determine wind direction to set the sails, determine fuel consumption, and to monitor for ideal weather conditions. This is a project consideration, not information that will be recorded in the Traceability Matrix or marked on the map. The wind and weather are ever changing and therefore not a part of product evaluation.

- Who will cover the costs for the evaluation? Project related testing should have been planned and incorporated into the Project Plan. Follow the plan. This question becomes highly relevant to the Business Analyst when considering subsequent or ongoing evaluation following product delivery. Depending on a project or program cycle, related activities may be budgeted. They may be part of a quality assurance or operational budget. You need to check, since ongoing testing can be expensive and may not return sufficient value. The project pays for your navigational efforts, map creation and updates during the voyage, and the Captain or other team members verify that the work is correct. Once you return to port, who pays for continued confirmation of map content and updates as other ships from the fleet continue to use what your team created? Do you just hand over the map and move onward?

- Does the solution or existing infrastructure contain built-in measurement or testing capabilities? This is commonly true of hardware, software, and infrastructure projects, though may exist outside the automation arena. For example existing reports may already capture information that can be used to compare before and after values related to the solution. Always check for existing systems or tools before expending funds to create new techniques or tools. If existing charts and maps exist, your effort may merely be to compare changes. During the river expedition, each voyage may be asked to mark shifting sandbars and be provided historic charts for the purpose. Do not recreate what already exists.
- Are there already means to extract measurement data? Secondary to an existing measurement solution or report, the data may exist though may not currently be captured, formatted or immediately extractable. It may be worth inquiring whether data extraction and format would be more effective and efficient than creating totally new information. There may be old dusty maps in the archive, or charts taken from captured ships that are recorded in a different language. They provide useful information if you can interpret it.
- Is the chosen method effective and efficient (in terms of time and cost)? Constantly return to the cost versus value proposition for each evaluation alternative. Thank goodness for the creation of the pencil and eraser; all that water-soluble ink makes map creation and maintenance a challenge in a permanently humid environment.
- Does a method to organize, format, present and report results already exist? This leads back to the consideration that understanding is often more valuable than detail. Whenever possible utilize or clarify existing presentation methods. Google maps and a Geosynchronous Positioning System? By all means

It should be noted that Project Lifecycle may affect the frequency, formality or sequence of Evaluation, but does NOT play a role in Evaluation Planning.

Evaluation is about solution or product value which must occur independent of Project Lifecycle or project methodology.

Determine What to Evaluate

For the most part, you are relying on the measurements identified when S.M.A.R.T. objectives were captured. Use the metrics, values, and acceptance criteria already built into the plan and captured in the Traceability Matrix.

- **KPI**

For larger projects or solutions, particularly those that are components of **Programs** or **Portfolios**, evaluation may require comparison to organizational goals and objectives. The most common set of organizational metrics are called **Key Performance Indicators (KPI)**. There are many categories of KPIs used by business executives, based upon the focus of each business division/department or corporate strategy. Examples include finance (ROI), customers (billions served, satisfaction or Net Promoter scores), sales and marketing (market share, percentage increases, trends), operational processes (outages, safety reports, inventory controls), employees (retention, satisfaction, efficiency), environmental or corporate compliance (regulations, global impact), and social responsibility or sustainable (intangible costs and benefits), and information technology (MTBF, MTTR, help desk calls).

When KPIs exist, one or more may be readily used to determine solution value and success.

- **Project Metrics**

Project metrics may also be used to determine solution value. Examples include Earned Value Management, variance to time and cost baselines, and number/average cost per change. While project metrics are reflected within the project scope, time and cost plans and baselines, some project metrics may be determinants of product success. If you help to navigate the ship on a new trade route, returning with unique goods and new trading partners before the competition can duplicate the feat, then the value of the effort is not merely the goods, but the ability of the plan to be duplicated toward future returns.

- **Customer Metrics**

Many of the nonfunctional requirements are associated with customer satisfaction and exceeding expectations. Although typically qualitative, these must be considered if the organization desires repeat business, enhanced market perception, and promotion of business capability.

Functionality and Testing

What the product or solution provides, and the manner in which the value is provided are related to functional and non-functional requirements. More specifically, value is the true and correct delivery of the functional and non-functional specifications. Functionality can be determined by testing.

Types of Testing

Business Analysis for Practitioners identifies a partial list of testing options. You will need to differentiate and determine common sequences of test efforts in order to achieve certification. The key to any testing is to start simply with smaller elements, guiding the effort toward increasingly larger or more prominent elements until a successful conclusion is inevitable. Confirm or correct the small internal elements before integrating them into the larger solution. As the PMBOK® Guide instructs, the cost of a singular change (and therefore also the aggregate) increases over time. The sooner you catch and correct non-conformance, the lower the cost and the greater the probability of success all other factors being equal. (Yes, other threats and weaknesses may jeopardize the outcome, but that is the role of Project Risk Management.)

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Despite the focus on testing starting with smaller components or increments, the Business Analyst should not interpret this as a BA requirement to review the results of each test or test set. Trust the skills and commitment of the team to complete the work of testing and to notify both the PM and the BA of any inconsistencies or defects. The BA helps to establish the test process, and reviews the results relative to metrics and the desired value.

SKILLS:



STEERING
WHEEL

Surveys and Focus Groups

As mentioned previously in this chapter, surveys and focus groups are an excellent means to elicit information about conformance to non-functional requirements. Alternative methods and justification are discussed in more detail within Module Five – Elicitation and Analysis. Take a look back through the material so you understand the application of surveys, questionnaires and focus groups. These are great tools for Evaluation as well, since they allow feedback from a large number of respondents in a short period of time and cost less than interviews or facilitation.

- **Software Testing**

Software testing is the process of evaluating a software item to detect differences between given input and expected output. This is verification. Software testing also confirms the completeness of a product's features. Testing assesses the quality of the product based on pre-determined metrics. Software testing should be performed during development and is therefore a project management concern. The business analyst should regularly review software testing reports to confirm value throughout the project. Final software testing reports are essential prior to customer validation.

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Merely as reminders:

- *Verification is the process to make sure the product satisfies the conditions imposed at the start of the development phase. In other words, to make sure the product behaves the way we want it to.*
- *Validation is the process to make sure the product satisfies the specified requirements at the end of the development phase. In other words, to make sure the product is built per customer requirements.*

Basic software testing may be done using **black box** or **white box** approaches.

- **Black box Testing**

Black box testing is commonly misunderstood and incorrectly defined. A Black box test suggests that the tester lacks information about the specifications, design, internal mechanisms, and potentially even the purpose of the component or product being tested. The purpose of Black box testing is to determine if the system can be used in an alternate or undesirable manner. If alternate outcomes are identified, this suggests that additional design and refinement are necessary before the software can be placed into production. (Incorrect definitions imply that internal mechanisms are ignored, that non-standard approaches are taken to testing, or that the focus is on the output or the result rather than the process.) Effectively Black Box testing attempts to discover as much as possible from a minimalist starting point. **Exploratory Testing**, conducted by testers with little to no knowledge or information about the system is a common Black Box approach. Exploratory testing is designed to see if the solution can be caused to perform in unintended ways.

Toy manufacturers often test children's toys using a test audience and observation to learn how else a child might appropriately or inappropriately play with the toy.

- **White box Testing**

White box testing takes into account knowledge or information about a system, or provides the testers instructions for conducting tests. The requirements and acceptance criteria are known, and shared with test designers and/or testers. Both scripted and unscripted test efforts could be white box tests. White box testing may also be called **structural** (because the internal mechanisms and design are understood) and **glass box** (because tester can see into the process for purpose or attributes).

White box testing is used for verification. Black box testing would only be attempted as a component of validation or post-delivery evaluation. Black box testing is commonly more expensive to design and conduct, and often fails to discover the irregularities that are their purpose.

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A Test case is a scenario or script describing how to confirm functionality, in large part by looking for defects. Defects require action. A lack of defects merely means that development continues.

Types of testing

All of the following are forms of white box testing:

- Unit Testing
- System Testing
- Integration Testing
- Functional Testing
- Stress Testing
- Performance Testing
- Usability Testing
- Acceptance Testing (UAT)
- Regression Testing
- Beta Testing
- DITL (Day in the Life): Least structured kind of testing

- **Unit Testing**

Unit testing verifies an individual unit (object code, component) or group of related units. The developers typically test implementations, rely on automated tools, or utilized peer reviews to verify code correctness. **Extreme Programming** is a form of Agile project lifecycle placing emphasis on pairs of developers conducting rigorous unit testing. One member of the pair programs while the other simultaneously reviews the results. Unit testing may be done by peer review, simulation, step-by-step modeling, debuggers, and other automated review solutions.

- **System Testing**

System testing places software into one or more Operating System environments to confirm operability per specification or design. System testing is done using the equivalent of full system implementation and environment. It does not incorporate multiple systems or integrated architectures. System testing is effectively a live test of the solution prior to transition.

- **Integration Testing**

Integration testing reviews a group of components that are combined and tested for functionality. The interaction between software and hardware is tested during integration testing as well. Integration within a system is considered **Verification**. Integration testing may also be considered a component of **Validation** since it regularly incorporates the new product or component with existing business systems in order to increase value. The differentiation between integration verification and validation testing is often derived from the testing environment. If the tests can be run in an isolated or pre-production test environment, then the testing is likely verification. If the testing is conducted with a direct cutover into production, the integration testing is considered validation.

- **Functional Testing**

Functional testing seeks to identify whether required features work as designed (verification) or meet the requirements as stated by the customer (validation). In either case, the testers are reviewing the features and their operation relative to the requirements and acceptance criteria. One way to determine whether functional testing is verification or validation is identification of the audience represented by or providing the test results for subsequent action. Functional testing is often the crossover between testing performed to support development and implementation, versus confirming value prior to customer approval.

- **Stress Testing**

Stress testing is conducted to evaluate how the system behaves under unfavorable conditions. Testing is conducted beyond limits of the specifications. Results may be destructive, and therefore cost prohibitive. Stress testing is most often conducted when the risk associated with solution failure has a high probability or a high impact.

- **Performance Testing**

Performance testing assesses the speed and effectiveness of the solution. Results assure that non-functional requirements associated with the product specification or service level agreements can be met.

- **Usability Testing**

Usability testing is performed from the client perspective, though not necessarily by the user. This is another form of both functional and non-functional requirement validation. Examples include functional review of the GUI from a user rather than functional perspective. Test scripts revolve around characteristics like user-friendliness, navigability, ease of use, ease of understanding, pleasing, repeatability, forgiving, etc.



Usage or usability tests are preparations for delivery to and validation by the customer. As such, they should include tests that confirm both functional and non-functional requirements.

- **Acceptance Testing**

Acceptance testing, also called **User Acceptance Testing (UAT)**, is performed by the customer or testers representing the customer. The goal of UAT is confirmation that the features meet the customer expectations. This step always immediately precedes approval and signoff if successful, or returns the product for defect handling if a failure.

- **Regression Testing**

Regression testing occurs if changes are made to a previously approved unit, component, system, or integration. The test cycle returns back to a level preceding the scope of the change. Regression testing may be premeditated as iterations add units toward a release, or in response to rework required due to defect or customer dissatisfaction.

- **Beta Testing**

Beta testing is a special case of functional, stress, performance, usability and/or acceptance testing conducted by a focus group designed to represent the eventual customer of the solution. The Beta test team is typically outside of the development team, and may be either an internal or external group representing the characteristics of the intended target audience. Depending upon the nature of the information provided to the Beta testers, Beta testing may be considered a form of black box testing.

- **Day-in-the-Life Testing**

Day-in-the-life testing may be closely compared to Exploratory Testing, although it is either informally or semi-formally scripted, removing it from a true black box form of test. Day-in-the-life provides a scenario, sequence of activities, set of data or other information comparable to the elements that would be used to interact with the solution in a production environment. Day-in-the-life testing is not the same as Beta testing, since it is at least semi-scripted, shorter in duration, and focused on confirming specific requirements or results. Day-in-the-life testing is commonly used for smaller, single product transitions, although may also be used for a range of testing from subcomponents to heavily integrated systems. Day-in-the-life testing derives its name from the practice of isolating the test to the functions or features that would be associated with the daily activities of a single persona or actor.

- **Long Term Testing**

Long Term performance is looked at as plateaus or trends. The cost of repeating unit, system, integration, functional, stress, performance or usability testing is prohibitive. A variety of scripts or Day-in-the-Life testing may be conducted at fixed points in time or given specific criteria to re-validate the solution. More commonly, automated systems and report metrics are compared against a baseline to confirm continued function and returns over longer periods of time.

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If long term testing will be conducted, this is the role of the Business Analyst. The project management and development team have been released to perform other work. Long-term evaluation may result in the identification of additional problems or opportunities that result in a new Needs Assessment. That would start a new cycle of planning, and analysis. The more common approach to long term testing begins with the identification of the metrics necessary to appropriately measure long-term value. Value may be based on the proposition offered in the Business Case, though the metrics applied during development are usually more rigorous than might be afforded post transition.

The same approach to Pre-delivery Evaluation is then conducted. The BA needs to identify or elicit appropriate requirements for evaluation including the metrics, target measurements, and acceptable variance or tolerances. As tests are conducted in the production environment, comparable analysis is conducted and similar reports are generated. The business analysis plan post transition should include triggers or indicators that may be used to identify when evaluation will end. It is seldom cost effective to continue evaluation, particularly when a BA's skills can be applied to greater opportunity elsewhere in the organization. One of the transition elements may alternately be to create an automated measurement and reporting system, or to train a customer representative to conduct evaluations.

As testing is completed, test results should be reported using standard templates or formats. The business analyst bears the accountability for creating formats that simplify review of the results in order to confirm solution value against requirements.

A sample layout, explaining the field contents and a sample test/result are provided in the following table.

Precondition	Event	Expected Result	Actual Results
<The condition to be met within the requirement boundary for the result to be 'true'>	<The test action to be taken or observed in order to verify/validate the feature/function; and any data necessary to perform the action>	<The expected response or responses, messages, output results, or post-conditions due to the action taken.>	[This space is reserved for input by testers.]
When the map is unrolled on the table, a location should be confirmed based on nearby landmarks	1. Use a straight edge rule to draw lines representing the latitude and longitude for the current location. 2. Review the landmarks closest to the location indicated on the map. 3. Via a porthole or on deck, observe the local landmarks.	<i>The Landmarks should represent those drawn or labeled on the map in at least two cardinal directions.</i>	Yep, we are in port and tied up next to the <i>Old Sailors Pub!</i>

Acceptance and Defects

Compare actual to expected results. When there is compliance you are ready to move toward acceptance. When there is non-compliance, you shift to Traceability, problem reporting, impact analysis and change management.

Depending on the Business Case, the Business Analysis Plan, and the Project Management plan, results may need to match exact criteria. Alternately, there may be a range of acceptable values within tolerance thresholds.

(Personally, I am fine with any bounty ranging from 100,000 to 1,000,000 doubloons as a share of the voyage proceeds.)

A combination of fixed or exact values for functional requirements and tolerance ranges for non-functional requirements is more common.

- **Log and Address Defects**

If defects are identified, an impact analysis must be conducted. At this stage, any major defects should have been identified and resolved. Minor defects can usually be identified and resolved according to the Project Risk Management Plan. Mitigation may include temporary solutions or deferral until a subsequent phase or project effort. The smallest defects may merely be passively or actively accepted.

Major defects or lack of acceptance by the customer also demands an impact analysis. **Diminishing returns** may suggest cancellation or closure of the project without a successful solution. Alternately, defects may be addressed by establishing a new project effort. Hopefully, the ongoing efforts of the BA/PM partnership will avoid an end result with this type of surprise.

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Look at sections 6.10.3 through 6.10.5 of Business Analysis for Practitioners regarding analysis and resolution of long-term performance reviews. The guide provides examples for the ongoing use of an insurance claims improvement project. There is no correct or absolute answer regarding the approach to take due to changes that affect the life of the product. Causes may be the product's current state, the environment, business changes, organizational limitations, and a host of other factors. The difference between the identification of a new problem or need and ongoing evaluation is the history and information to which the business analyst has access. Since the process and the product are better understood, the Business Analyst may make a series of minor operational recommendations, or conduct a full Needs Assessment. Organizational guidelines, cost, and workload will more likely dictate the proper approach.

- **Go/No-Go and Signoff**

This is where the Business Analysts communication skills once again come to the foreground. Check the RACI diagram for the project or the business analysis plan. Identify the stakeholders marked as accountable for final validation and signoff. This is a face-to-face meeting. All of the previous steps associated with Evaluation may have been conducted and reported remotely using verbal, digital, or paper media. Meet and obtain approval with all the key stakeholders, business leaders, or product owners to obtain their approval before going to the final customer for formal signoff.

The number and type of formal signoffs are dependent on the:

- Type of project
- Type of product
- Project lifecycle
- Corporate constraints
- Regulations

Formal signoffs become mandatory when one or more of the following elements are present:

- Line of business or enterprise wide solution.
- Products where failure to meet criteria or tolerances produces high risk that could result in loss of life, property or financial solvency (business failure).
- Organizations following strict predictive lifecycles (for the sake of certification assume that all predictive lifecycles follow strict controls).
- Heavily regulated industries (banking, finance, insurance, medical, clinical research, pharmacology, environmental, etc.).



The accountability, authorization, and signoff requirements were discussed and should have been documented during Business Analysis Planning. You may want to review Business Analysis Planning again, making notes now that you better understand all of the Business Analysis Work and related deliverables.

Other than long-term evaluation, the last task that may fall upon the business analyst following signoff is transition to production. Efforts for transition should have been captured in the Business Analysis Plan, based on the nature of the product, solution, and organizational standards. Alternately, the Project Plan may have incorporated transition requirements. Regardless of the guidance, the requirements should have been identified and analyzed by the BA, incorporated in the Traceability Matrix, and the approach and next steps validated before signoff.

The Business Analyst has the skill set to maintain communication, consensus, and commitment of stakeholders. Hence the BA is the logical choice to oversee transition efforts.

Transition

Business Analysis for Practitioners refers to transition as Solution Replacement/Phase-out although this label does not accurately cover the decisions required or the effort that needs to occur.

- **Training**

First and foremost, the BA must prepare far more than the individual(s) accountable for signoff. All end users should have been made aware of the pending transition and guided to accept and support the solution based on the value that it provides. Acceptance requires understanding, and understanding requires training. The training and communication may be broadly promotional and informational, or specific to the skills and process changes that will occur due to product introduction. The most likely approach incorporates a variety of training requirements based on the various personas and starting skill levels of the end users.

Required training and communication elements include:

- Communication to/with all stakeholders who will be directly or indirectly impacted.
- Completion of training materials and delivery of training.
- Completion of or updates to **Standard Operating Procedures (SOP)**.
- Purchase, licensing, and installation of associated hardware or 3rd party services associated with production or operations of the new product.
- Schedule coordination for implementation, related outages, and relevant support.
- Any business interruption is identified, communicated and accepted by relevant stakeholders.

- **Data Conversion and Transmission**

Many technology systems require the conversion of data or the transmission of information as they are placed into production. The business analyst may be responsible for identifying and overseeing the **Extraction, Transformation, and Load (ETL)** of data between existing and new systems. The design work should have been an objective or deliverable of the project, and likely included a systems architect or database engineer. These subject matter experts may be accountable or responsible for conducting the conversion and/or transmission. At this point, the project manager has often stepped away to perform other duties and the BA leads or oversees the conversion effort, affirming product value.

Back in port the Captain has gone ashore to notify the sponsor, leaving his able Navigator to arrange the cargo manifest and offloading process.

- **Implementation Strategies**

Most notably for hardware, software or technology solutions, although possibly for process and procedure changes, there are several implementation strategies that must be considered. Typically only one is selected, although hybrid approaches are possible.

- **Cutover** (one-time cutover, massive one-time cutover). The new solution, system, or product is put into service immediately replacing its predecessor.
- **Segmented** (or **Rollout**, or **Phased** cutover). Segments or phases are installed (in rolling waves) rather than an organization or system wide replacement. Segments might be product releases, or based upon organization region, location, line of business, department, user role, or business opportunity (best immediate return).
- **Pilot**. A specific version of segment implementation, that identifies a designated group of users, representing the target audience to serve as the first solution recipients. This is not Beta testing. It usually conducted to identify and refine operational issues rather than to perform product tests.

- **Parallel (Time boxed).** Both the old and the new system coexist for a pre-determined period of time or performance criteria. Both the old and new systems operate independently as data, customers, and/or users are migrated from one system to the other. This approach is usually associated with massive infrastructure or data migrations.
- **Permanent Coexistence.** Both the old and the new systems continue to operate. Existing customers and solution applications continue to use the current solution. New customers and solution application access the new solution or product.

Solution size, complexity and risk are the factors primarily influencing the selection of transition strategy.

For each of the transition activities there are probably organizational entities, teams, or individuals accountable for related work on a day-to-day basis. In such cases the role of the business analyst is that of a SME, familiar with the product, and willing to facilitate their acceptance and ownership of the product.

The PMI Guide to Business Analysis – Evaluation Tools

The four processes associated with Evaluation introduce no new terms or tools. Beyond the four list 'outputs': Business Value, Evaluation Approach, Results, and Release Decision, all other concepts are introduced earlier in this module. Each of the tools listed amongst the following sets are covered previously throughout the course and merely remind the business analyst that tool selection is situational – the delivery of value remains the goal.

Evaluate Solution Performance

- Cost-Benefit Analysis
- Elicitation Techniques
- Product Portfolio Matrix
- Prioritization schemes
- Root cause and Opportunity Analysis

Solution Evaluation Approach

- Elicitation Techniques
- Group Decision Making
- Prioritization Schemes
- Retrospectives and Lessons Learned

Evaluate Results and Address Defects

- Prioritization Schemes
- Root Cause Analysis
- Traceability Matrix
- Variance Analysis

Obtain Solution Acceptance

- Facilitated Workshops
- Group Decision Making



Congratulations! You have just completed a comprehensive course introducing you to the focus, skills, techniques and approach of Business Analysis. Mastering and expertise come first through assimilating the knowledge into your repertoire. Next, you need to associate new lessons with tools and topics with which you are familiar. As you practice application, the associations become stronger. Strong mental and neural associations lead to creative analysis, and the ability to generate flexible, situational approaches.

Best of luck in your endeavors. Continue to chart new courses, and to help others to recognize value in business and in life.

Module 7 – Skills Practice

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA

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- 1) What is evaluation?
 - a) The same as validation.
 - b) Determining the value of the solution, before, during or after a project.
 - c) A combination of verification and validation.
 - d) A review conducted by experts.
- 2) Evaluations are considered to be?
 - a) Based on metrics and therefore quantitative.
 - b) Primarily qualitative, or coarsely quantitative.
 - c) Detailed analysis of the product or solution value.
 - d) A comparison against the baselines established during project and business analysis planning.
- 3) You are asked to determine the threshold for diminishing returns. What does diminishing returns mean to a business analyst?
 - a) Reducing the number of product returns from customers.
 - b) A method to determine the ROI for the product.
 - c) The investment of additional resources will exceed the intended value of the product.
 - d) A diminishing return is the same as a sunk cost. You cannot recover the money you have already spent.

- 4) The product, a software package, has been placed into production following project completion. You are now tasked with evaluation. What is the most efficient way to conduct evaluation?
- a) Ask the customer if they like the product.
 - b) Use metric solutions built into the software.
 - c) Wait to see if you receive any feedback in a few weeks.
 - d) Review the validation reports created just prior to customer signoff.
- 5) The project was planned and funded. Why is one of the critical evaluation planning questions “who will cover the costs of evaluation”?
- a) No component of evaluation is covered by the project.
 - b) Evaluation is fully planned during project analysis and business analysis planning, so this question is asked early in the planning process.
 - c) Evaluation both precedes project funding and follows delivery into the product life cycle.
 - d) The business analyst wants to be paid for their work.
- 6) Another evaluation planning question might be, ‘how do we extract measurement data?’ Why might this be relevant?
- a) Many solutions, systems, and products contain data that might be useful for evaluation if it could be extracted.
 - b) The business analyst is unfamiliar with evaluation and is seeking subject matter expertise.
 - c) The business analyst is just trying to make the customer aware of the possibility that evaluation will be conducted.
 - d) The business analyst arrived late in the project and is trying to get up to speed.
- 7) Which of the following is not a common example of a KPI?
- a) ROI
 - b) MTBF
 - c) Retention
 - d) UCL

- 8) As the project proceeds the test team waits for completed deliverables before conducting any testing. Is that a good or bad idea?
- a) It is a good idea. The test team is aware that testing is expensive and does not return direct value to the product if overdone.
 - b) Bad idea. The sooner you catch a problem, the less expensive the recovery. Testing should always start with the simplest elements possible.
 - c) Acceptable. The test team is just following the project plan.
 - d) Good idea. Testing should not be performed until handed to the User Acceptance Team who can best determine value.
- 9) Which of the following tools might best be used for evaluation?
- a) Interviews
 - b) Brainstorming
 - c) Focus groups
 - d) Retrospectives
- 10) What is Exploratory Testing?
- a) Any test that explores the features of a product.
 - b) A method to identify which tests capture the metric correctly.
 - c) A form of black box testing.
 - d) Looking at a problem when you do not know what is wrong.
- 11) What is another name for white box testing?
- a) Formal testing
 - b) Penetration testing
 - c) Structural Testing
 - d) Informed Testing

- 12) What is the definition of a test case?
- a) Each instance of a test is called a test case.
 - b) Instructions for using a product are used as a test case.
 - c) A script designed to find defects in a product.
 - d) A documented test result.
- 13) Unit Testing and System Testing verified that the software solution worked as designed. During integration testing a problem was documented, passed change control and was implemented. What is your next step?
- a) Repeat Integration Testing.
 - b) Regression Testing
 - c) Stress Testing
 - d) Functional Testing
- 14) During testing you discover that the product does not meet the requirements. What should you do?
- a) Repeat the tests
 - b) Meet with the developers to discover why the requirements were missed or not followed.
 - c) Notify the PM that the product is defective.
 - d) Record the problem in the Traceability Matrix.
- 15) What elements can be used to develop test cases?
- a) Scope models, Situation statement, the Backlog
 - b) User Stories, Use Cases, non-functional requirements
 - c) DiTL, Exploratory Testing, Change requests
 - d) Product documentation, Traceability Matrix, the Business case.

- 16) Which type of testing is more likely to be used with a Predictive life cycle project?
- a) User Acceptance Testing
 - b) Integration Testing
 - c) Stress Testing
 - d) Beta Testing
- 17) Which form of testing is the last to occur prior to transition?
- a) Day in the Life Testing
 - b) Long Term Testing
 - c) User Acceptance Testing
 - d) Usability Testing
- 18) Which form of transition maintains two versions of the product for the foreseeable future?
- a) Timeboxed
 - b) Parallel
 - c) Phased
 - d) Coexistent
- 19) One aspect of transition for which a business analyst may be held accountable is referred to as ETL. What does ETL mean?
- a) Extended Testing Limits
 - b) Extraction Transformation Load
 - c) ETL is a component of Earned Value Management focusing on transition value
 - d) Executive Team Leader

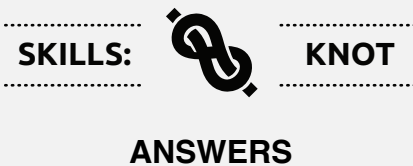
20) When does solution Evaluation end?

- a) When the value is proven.
- b) When the customer indicates time to stop.
- c) When a replacement solution is identified.
- d) When the business analyst moves to another project.

Module 1 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



1) How would you differentiate between a goal and an objective?

- a) A goal is measurable.
- b) An objective is specific, measureable and shorter term than a goal.**
- c) Goals and objectives are different words with the same meaning.
- d) Only goals address strategic needs.

Goals tend to be longer term. Objectives may also address strategic needs. Both are measurable.

2) SMART stands for:

- a) Specific, Manageable, Attainable, Relevant and Timely.
- b) Specific, Measureable, Achievable, Realistic, and Timely.
- c) Specific, Measureable, Achievable, Relevant, and Time-bounded.**
- d) Significant, Measurable, Achievable, Realistic, and Time-bounded.

You got this one!

- 3) Which of the following is an example of a SMART Objective?
- a) Create a map that will allow us to return to ports of call.
 - b) Decrease voyage transit times by 10% in order to diminish the spoilage of perishable goods.**
 - c) Identify possible trading partners during a two year voyage.
 - d) Accurately mark harbor entry and anchorage depths at each stop.

Measurable and metrics are the most important element of SMART. Two years suggest longer term goals rather than clear objectives.

- 4) A business analyst measures success by assuring that:
- a) Customer expectations are exceeded.
 - b) All of the requirements are met.
 - c) The solution provides value.**
 - d) All customer suggestions are considered.

Value is a primary focus for Business Analysts.

- 5) Why is the term COTS important?
- a) Business analysts often work long hours.
 - b) Business analysts may recommend a solution that can be purchased without the need for a formal project.**
 - c) COTS is component of the ROI analysis process.
 - d) The product life cycle extends beyond the project life cycle.

COTS stands for common-off-the-shelf. Some solutions may be provided via a commercially or retail purchased product.

- 6) Which is not an output of Needs Analysis?
- a) A business case
 - b) A COTS recommendation.
 - c) Models or diagrams that identify the need.**
 - d) A project.

Needs analysis may result in a COTS recommendation, a business case, or a project. Models and diagrams may help to identify the need, but are an input not an output during Needs Assessment.

- 7) Who is accountable for overseeing the work of the project?
- a) The project manager and the business analyst partner to oversee the work.
 - b) The PM is accountable for the work of the project.**
 - c) The BA is accountable for the work of the project.
 - d) The PM, the BA, and the team oversee the work of the project.

The PM and the BA should partner, though ultimately the PM is ACCOUNTABLE for the Project.

- 8) Which concept most accurately reflects a completed Scope?
- a) All of the work is defined.
 - b) The boundaries of the work are defined.**
 - c) The work is linked to time and cost.
 - d) Work has been identified for all of the objectives.

The key word associated with scope is boundaries, often including specific assumptions and constraints. Scope can be defined without clear or complete time and cost. Progressive elaboration will help to refine the work definitions and the decomposition of the objectives. Only Predictive project life cycles tend to complete all four answers before initiating work.

9) Which of the following statements is most correct?

- a) The Business Analysis Plan is subsidiary to the Project Management Plan.
- b) The Business Analyst follows the Business Analysis Plan, unless the Project Management Plan provides higher guidance.**
- c) The Business Analyst owns the Communication Management Plan.
- d) The Business Analyst always creates the Communication Management Plan for the PM.

The BA Plan is separate from the Project Management plan, but may be influenced by it. The PM owns the Communication Management plan, although the BA *may* develop or contribute to it.

10) Which statement is most relevant to a business analyst?

- a) The work of the project must be completed as planned.
- b) The quality of the work requires proper metrics.
- c) The value of the product overshadows the work effort.**
- d) The project life cycle affects the nature of the Business Analysis deliverables.

While answer **d** may be true, the concept of product value is fundamental to business analysis. Work is the domain of the PM.

11) Another term for a business problem or opportunity is:

- a) Threat
- b) Need**
- c) Value
- d) Objective

A threat is a form of problem, but the word that best represents both problem and opportunity is NEED. The solution to the need provides value, through the delivery of measurable objectives.

12) The solution scope defines:

- a) The work of the project.
- b) The requirement boundaries.**
- c) The ROI.
- d) The decomposed goals and objectives.

The solution scope is not the same as the project scope. The solution is identified by objective requirements, not all of which will be used to define the product or solution. The word scope always suggests boundaries.

13) Business Analysts conduct their work

- a) On projects.
- b) Before, during, and after projects.**
- c) To identify projects and oversee the goals.
- d) At the discretion of the Project Manager.

Business Analysis helps to identify problems and needs, that may lead to a project, and then evaluate the value of the product (life cycle) after the project is closed.

14) Who is more likely to select the Project Life cycle?

- a) The project manager
- b) The business analyst
- c) The PMO establishes the guidelines
- d) Business preference, standards, or environmental factors.**

The selection of the project life cycle should be the choice of the PM, given the nature of the solution and the work necessary to deliver the product. Nevertheless, business preference, organizational standards and external factors, like industry norms and competitive pressures, are more likely to influence project life cycle selection.

15) Predictive Project Life Cycles are most likely due to:

- a) Complexity
- b) Risk**
- c) Total duration
- d) Policy

The larger the risk, the more likely a predictive lifecycle will be selected to identify and minimize the risk. Complexity is the second highest reason.

16) For a simple process change or solution to solve a singular problem the most likely project life cycle is:

- a) Adaptive
- b) Incremental
- c) Just-in-Time**
- d) Predictive

Just-in-time solutions are usually quick, simple and may include COTS.

17) Which of the following is not a characteristic of Adaptive projects?

- a) Objectives are less well defined.
- b) Work is time or resource bounded.
- c) The requirements are formally traced.**
- d) There is a need to start as soon as possible.

Requirements will be formally approved, though are less likely to be formally traced or tracked. Informality is a common theme for Agile projects.

18) What is the guidance for Lean processes?

- a) Any Agile methodology
- b) Minimize waste**
- c) Continuous improvement
- d) Limit resources

Lean methodologies may be used as continuous process improvement for operations. Not all Agile methodologies focus on Lean elements. Resource limits may help, but the theme is to minimize waste.

19) Although business analysis tools may be applied in any order suggested by the need, which most closely represents the business analysis cycle:

- a) Planning – Assessment – Analysis – Build – Evaluation
- b) Assessment – Planning – Elicitation – Analysis – Tracking**
- c) Assessment – Elicitation – Analysis – Evaluate – Build
- d) Elicitation – Analysis – Tracking – Deployment – Evaluation

You may use the techniques in any order, though you would not plan detailed work unless a need is identified, evaluation happens during or following the build process (and build is a PM accountability rather than a BA accountability), deployment is a PM accountability often in partnership with a BA.

20) Which of the following is not a clear indicator of Agile project life cycles?

- a) Product Owner
- b) Sprint
- c) Iteration**
- d) Backlog

While it is true that Agile projects use the term ‘iteration’, there are other iterative project life cycles. The other three terms are directly associated with Agile methodologies.

21) What does the Acronym INVEST stand for?

- a) Iterative, Needed, Valued, Evaluated, Simple, True
- b) Independent, Negotiable, Valuable, Estimable, Small, Testable**
- c) Independent, Negotiable, Valid, Estimable, Specific, Testable
- d) Iterative, Negotiable, Valuable, Estimable, Small, True

Know this for the PMI-PBA certification exam. Look for terms you are certain to be correct (or compare/contrast the answers to eliminate any that have one or more incorrect terms).

22) A collection of Agile User Stories is called:

- a) A backlog
- b) An epic**
- c) A standup
- d) A retrospective

A collection of User Stories is an Epic, all Epics and independent User Stories that are not completed are placed in the backlog. A standup reviews the daily work of a sprint. A retrospective is a review of the lessons associated with a set of Agile sprints, or releases.

23) Which is the least important characteristic used to prioritize a solution in a Business Case?

- a) Feasibility
- b) Time/cost/scope
- c) Quality**
- d) Need

Although Quality metrics and acceptance criteria are important, they may not be definable in a business case. The need, the feasibility of delivering the solution, and an estimate of scope, time and cost are key elements of a business case.

24) Which of the following is the least important Business Analysis work product?

- a) The Business Case
- b) The Traceability Matrix
- c) The Project Charter**
- d) The Business Analysis Plan

Although a BA may provide the Project Charter for sponsor signature, the other three work products are key business analysis deliverables

25) Which statement is correct regarding verification and validation?

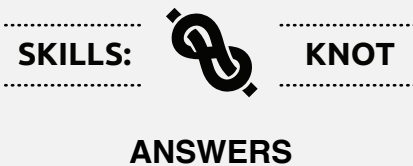
- a) Verification is only about the product.
- b) Verification means true, and Validation means provides value.**
- c) Verification always precedes validation.
- d) The BA verifies and the PM validates.

Verification may be used to identify the correctness of the requirements, the project work, and/or the product. Both the PM and the BA oversee verification and validation. The BA verifies and validates the requirements. The PM verifies and validates the work. Together the PM and the BA partner to verify and validate the product prior to customer delivery and acceptance.

Module 2 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



1) Which of the following is NOT a Needs Assessment Tool?

- a) SWOT
- b) PEST
- c) Force Field
- d) COTS**

SWOT and PEST are forms of Force Field analysis. SWOT stands for Strength, Weakness, Opportunity and Threat. PEST stands for Political, Economic, Social and Technical. COTS, common off the shelf, is a possible Needs Assessment recommendation.

2) What are the six business analysis knowledge areas?

- a) Initiating, Planning, Executing, Monitoring, Controlling, Closing
- b) Assessment, Stakeholder engagement, Elicitation, Analysis, Tracing, Solution Evaluation**
- c) Initiating, Planning, Analysis, Monitoring, Transition
- d) Predictive, Incremental, Iterative, Just-in-Time, Adaptive

Don't worry about exact labels, understand the knowledge areas common to business analysis work.

3) Elicitation means 'to _____' :

- a) Teach
- b) Draw forth**
- c) Facilitate
- d) Question

Teaching, facilitation and questioning are all forms of elicitation, though the meaning is 'draw forth'.

4) Elicitation does not include:

- a) Note taking
- b) Active Listening
- c) Documentation**
- d) Tracing

You can take notes during elicitation, and active listening is critical to success. Tracing means mapping requirements to one another, to cause, to source, and to prioritize – you perform tracing during elicitation. Documentation ***follows*** elicitation, when the BA has time to analyze and clarify the results.

5) Which of the following statements is most correct?

- a) Decomposition is applied identically by the business analyst and the project manager.
- b) Decomposition means breaking objectives into work packages.
- c) Decomposition may be used to generate more detail for goals, problems, opportunities, requirements, or work.**
- d) The project manager decides when decomposition is complete.

Business analysts and project managers apply decomposition differently. For PM's decomposition is a formal scope planning tool to identify work packages, and a schedule planning tool to identify activities. The PM may decide when work decomposition is sufficient to integrate and manage work, but the BA will continue to generate additional details before, during, and after the project.

6) Which statement best identifies Needs Assessment?

a) Needs Assessment precedes project management.

b) The work of Needs Assessment is cyclic and ongoing.

c) Needs Assessment ends when the Business Case is created.

d) Needs Assessment is only about problem, opportunity, and need identification.

While it is true that Needs Assessment precedes project management, this is only one aspect of Needs Assessment efforts. Needs Assessment is an ongoing effort to identify business processes, architecture, rules, interrelationships, and human interactions to increase business value.

7) The most challenging and complex component of a project is:

a) The cost and budget

b) Controlling the schedule since projects are often late.

c) Managing the scope, changes, and scope creep.

d) Communicating with people.

Complexity is based upon and contributed by people. All of the other elements can be planned, monitored and managed within thresholds.

- 8) When a problem is identified, what is the most important business analyst output?
- a) A situation statement and solution.
 - b) Clear and concise documentation.
 - c) The root cause.**
 - d) The impact of the problem.

Although Impact analysis is important to determine the value of any effort, without a root cause all other efforts are identifying the cost of resolving a symptom. The BA may not be able to identify the impact without support from a SME, though Business Analysis tools and skills can point to a root cause.

- 9) Which of the following is not a description of business rules?
- a) They always resolve to true or false.
 - b) They may be written, unwritten, or informally assumed.
 - c) They are like regulations and must be followed.**
 - d) Documentation always clarifies business rules.

Business rules may be informal and situational rather than mandatory like regulations. All of the other statements are true of business rules.

- 10) Which of the following is not included in a Business Case?
- a) The solution scope.
 - b) The project scope.
 - c) A justification for the need and approach.
 - d) Recommendation of a project manager.**

Although knowledge of people within the organization and their skills, or recognized partnership with a PM may result in a related recommendation, this is optional and at the discretion of the sponsor. A high-level project scope (the work to be conducted) is contained in the Business Case and is used in

partnership with the assigned PM to develop a more detailed project scope – Progressive Elaboration.

- 11) Which of the following is most important to planning Business Analysis work?
- a) The project life cycle.
 - b) The goal, objectives and requirements management.
 - c) Stakeholder analysis**
 - d) The solution context.

All four elements are important inputs, though without a complete list of key-stakeholders and an understanding of their needs, the requirements will be inaccurate or incomplete.

- 12) Business Analysis work is always:
- a) Formal
 - b) Informal
 - c) Proactive**
 - d) Reactive

Business analysis work may be formal or informal, and may sometimes be reactive, but the primary goal and focus is to identify a problem or opportunity and to address it before the need arises.

- 13) Progressive Elaboration is:
- a) Only conducted on projects.
 - b) Handled differently by business analysts.
 - c) Infrequent within business analysis due to detailed analysis.
 - d) An essential refinement of the requirements details.**

Progressive Elaboration is adding details, whether business analysis or project management work, and is essential to both.

- 14) You are at a local restaurant having lunch when a co-worker approaches and starts a casual conversation about a problem with product specifications. What should you do?
- a) Stop the conversation, business problems should not be discussed outside the workplace.
 - b) Actively listen and ask for clarification.**
 - c) Ask the co-worker to write down their problem for clarity and submit it to you, promising you will review the issue.
 - d) Make a quick note about the issue and let the co-worker know you will call them later in the day.

Each of these responses may be appropriate in some cases, but a business analyst is always performing elicitation and needs assessment. Ideal relationship management suggests you actively listen and ask for clarification. This is an informal interview.

- 15) Which of the following statements most accurately reflects interviews?
- a) Interviews always precede other forms of elicitation.
 - b) Interviews are always better than observation.
 - c) Interviews provide a better context when identifying a need.**
 - d) A business analyst needs to prepare carefully for interviews to be effective.

The opportunity to prepare for an interview is the ideal scenario, although they may occur informally and the skills of a business analyst are applied without preparation. It's what a business analyst does. Location and availability may prevent interviews, so other forms of elicitation may occur first, like surveys or questionnaires. The word 'always' relative to interviews is a caution. Sometimes observing a process or work provides better insight than interrupting someone to ask for clarity.

- 16) As you gather requirements, how should you share them with approved stakeholders?
- a) In detail to demonstrate that you have captured all of the information.
 - b) In diagrams, text, or tabular form for simple review.
 - c) According to the communication management plan.**
 - d) Only verified and validated requirements should be shared.

Too much detail is confusing. The requirements should be organized to assist stakeholder understanding, and presented clearly. Diagrams, text or tabular form is a means to achieve clarity, but presentation and facilitation may better serve the need. Requirements need to be reviewed by the stakeholders in order to achieve verification, after which the BA determines which provide value to address the need. The best answer is according to the communication management plan since it addresses all of these scenarios.

- 17) Which of the following statements best represents modeling?
- a) They are always graphical in order to provide rapid, clear understanding.
 - b) The project life cycle dictates the model to be used.
 - c) The audience determines the model to be used.**
 - d) The business analyst should use a model from each category for completeness.

The best answer is to meet the needs of the people. Whichever approach aids understanding is most appropriate. While graphics may be easy to present and understand, text, tables, or prototypes may provide better clarity given the audience. Project life cycles are a strong influence, and may provide direction but they are not the most significant influence. Considering a model from each category as analysis progresses is reasonable, but use of every category is not required if it doesn't provide clarity.

18) Requirements should be:

- a) **Confirmed or verified before they are approved.**
- b) Provide value before they are approved.
- c) Implemented once they are approved.
- d) Validated before they are verified.

Always confirm/verify the requirement as correct and complete, then approve, then validate (identify which have value and should be included) before implementing.

19) Which tool most influences a business analyst's day-to-day work?

- a) The business case.
- b) The business analysis plan.
- c) **The Traceability Matrix.**
- d) The project management plan.

The question asks about day-to-day work. While the others identify and direct need, value, requirements and work processes, the day-to-day tool is the Traceability Matrix.

20) The relationship between a risk event and a risk trigger is:

- a) The risk trigger prompts the response to a risk event.
- b) **Since the business analyst focuses on impact and response, a risk event and a risk trigger mean the same.**
- c) A risk event can always be identified, but risk triggers cannot always be identified.
- d) Risk triggers result in the analysis of a risk event.

Answer 'A' is correct for a project manager, who conducts qualitative and quantitative analysis to identify response thresholds based on triggers. The business analyst focuses on impacts, and helps to identify the high level response

suggested by stakeholders based on their characteristics. A business analyst relies on others to perform more detailed risk identification, analysis, and response plans. The BA supports such efforts by contributing understanding about the stakeholders.

- 21) If a problem is identified through risk monitoring, the proper course of action is:
- a) Document the problem and submit it to the Change Control Board.
 - b) Seek the source and document the impact, you may not have to submit a change request.**
 - c) Respond only according to the Risk Management plan.
 - d) Notify the project manager since they own the Risk Management plan.

Not all problems require a response or reaction. Application of the risk management plan suggests that the identified risk may have an impact on the project. The business analyst's role is to find root cause, and to identify if an impact sufficient to affect value is present. After performing these efforts, the BA may notify the PM, submit a change request, or follow the Risk Management plan.

- 22) The best description of Product evaluation is:
- a) Validate the product before delivery to the customer.
 - b) Ask the customer if they are satisfied.
 - c) Determine that the Value of the product matches the requirements.**
 - d) Long term monitoring of the ROI.

Each of the answers may be components of product evaluation. The best answer always involves Value matching the requirements.

23) What does Go/No-Go mean?

- a) The project should not be initiated if a No-Go decision is made.
- b) Determine if the value of the product matches the need before customer signoff.**
- c) The 'Go' decision authorizes project work.
- d) Go/No-Go is a reset for each project life cycle.

Go/No-Go is a component of product evaluation to determine if the value matches the requirements before customer delivery. Go/No-Go might result in a return to project work, but is not a project control tool.

24) When a customer reveals dissatisfaction after delivery, what is the most likely cause?

- a) The requirements were captured incorrectly.**
- b) The customer is complaining about a new problem.
- c) The training and communication were insufficient.
- d) The project manager did not complete the validation process.

If a business analyst properly elicits, analyzes, and traces requirements, the customer should be satisfied with the value. Always assume that work preceding the situation stated has been done correctly to plan. If the customer does not accept the value, then the BA work cannot have been done correctly.

25) What is true of formal signoff?

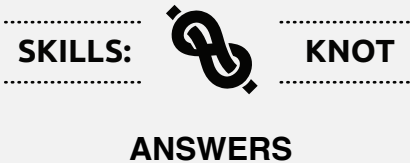
- a) Formal signoff is only required on predictive projects.
- b) Formal signoff occurs after the customer receives the product.
- c) Agile projects only occasionally require formal signoff.
- d) Formal signoff is always required to assure and achieve solution value.**

Formal signoff may occur at different steps within business analysis and project cycles, but they are always needed to assure correct, complete and value based requirements are met. For instance, formal signoff may occur before or after work begins, depending on the nature of the project life cycle.

Module 3 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



1) Situation statements always apply the following format:

- a) Cause – effect – solution
- b) Problem or opportunity – effect – impact**
- c) The format is situational.
- d) Need – benefit – cost

For clarity, whenever possible a single sentence that identifies the problem or the opportunity, followed by the effect or symptoms it produces and the impact that this has on the business, customer, etc. A business case or other recommendation may incorporate multiple situation statements.

2) The purpose of a Gap analysis is:

- a) Identify the current need and alternative approaches.
- b) Identify the current environment and ability to address the need.**
- c) Determine the differences regarding stakeholder perception.
- d) Resolve the stakeholder interest versus power grid.

A Gap analysis always includes a review of the current environment and capability of the organization. Project managers perform a gap analysis within Stakeholder

Relationship Management to identify the difference between desired and current stakeholder support for the project. This latter use of the term gap is not typically a Business Analysis application.

- 3) When determining which problem or opportunity to address first the best approach is:
- a) Address current problems before looking to the future.
 - b) Focus more on opportunities that improve the sustainability of the company; solely addressing problems is not growth oriented.
 - c) Remove the problems that are barriers to exploiting opportunities.
 - d) Perform an analysis to determine which strength, opportunity, weakness or threat provides the greatest value.**

All of these answers are reasons to analyze a situation and recommend a solution. The creation of value is always the primary goal.

- 4) A successful business analyst most requires:
- a) Certification or a degree
 - b) Strong communication skills.**
 - c) The ability to organize and analyze
 - d) An understanding of the business.

Strong communication skills are essential even for a starting business analyst. All of the other skills can be learned or enhanced while on the job.

- 5) A business analyst is supposed to use a Pareto Diagram to identify the root cause or greatest need. How do you define a Pareto Diagram?
- a) A bar chart or histogram
 - b) A force field analysis of the problem.
 - c) Application of the 80-20 rule.**
 - d) A tool developed by Joseph Juran.

A Pareto Diagram attempts to identify the most significant cause of a problem, representing 80% of the symptoms. The method was formally developed by Joseph Juran, and may be represented by a bar chart or histogram, but these answers do not best define the approach.

- 6) Which of the following would not initiate needs assessment?
- a) An external regulator mandates a change.
 - b) A sponsor or customer requests a product.
 - c) An executive reorganizes the leadership of their division.**
 - d) The business analyst recognizes an external opportunity matched by an internal strength.

Strategic and tactical operational decisions do not require a needs assessment. They may be part of a succession or business continuity plan, skills development policy, or other internal best practice. All of the other answers are common initiators for business analysis activity.

- 7) What is the best source for obtaining 'as-is' information?
- a) Organizational Process Assets.**
 - b) Models generated by the business analyst.
 - c) Benchmarking
 - d) Other business analysts

Always review existing documentation, the lessons learned, and the information generated during previous projects first. Benchmarking looks outside, and generating a new model is not the best use of an analyst's time except to resolve an identified and approved need. Other business analysts may provide insight or direction to find Organizational Process Assets.

8) What is the best definition of Business Principles and Practices?

- a) Lessons Learned from other projects
- b) Internal policy documents
- c) Regulations, standards, or assumed knowledge within an industry.**
- d) The knowledge provided by subject matter experts.

You may glean information about Business Principles and Practices from the other sources listed, but they tend to be large order, common knowledge or published standards.

9) How should a business analyst interact with a stakeholder with low power or influence and high interest?

- a) Keep them satisfied.
- b) Keep them informed.**
- c) Manage them closely.
- d) Monitor them.

Keep them informed according to the Communication Management plan. Know the power interest grid for certification exams.

10) Which of the following statements is true of RACI charts?

- a) Only one RACI chart, owned by the PM, can exist on the project.
- b) The business analyst may maintain a RACI diagram identifying the accountability for business analysis work.**
- c) If needed, both responsibility and accountability may identify more than one individual.
- d) Inform means stakeholders who inform you of their needs.

The definition of a RACI diagram includes only one accountable individual per task or activity. The accountable individual may be directing a team to achieve subcomponents of the task, and delegate accountability for subtask to other

individuals. It is common for a BA to use a RACI diagram for business analysis work independent of the project RACI diagram. The PM owns the project RACI diagram, and the BA has no authority to unilaterally change it, hence the secondary charts. The term “inform” identifies the people who are informed about status and outcomes.

11) Which of the following is not a means to display the results of stakeholder analysis?

- a) RACI chart
- b) Onion diagram
- c) Salience model

d) Goat matrix

The RACI chart, Onion Diagram, and Salience model are all methods for recording stakeholder relationships to a problem, solution or project. Goat matrix is a play on the term RAM, for Responsibility Assignment Matrix, the more general project management form of a RACI diagram that identifies team members and their roles.

12) In order to understand stakeholder attributes that may later be applied to modeling, the business analyst may perform any of the following except:

a) Personal interviews

- b) Job Analysis
- c) Actor Identification
- d) Persona Analysis

Although interviews are the ideal way to develop an understanding of key stakeholder attributes, modeling uses a characterization of the attributes for a group or type of stakeholder. Job Analysis, Actor Identification, and Persona analysis help to identify shared attributes.

13) Which of the following stakeholder attributes is individual rather than shared by a group?

- a) Culture
- b) Attitude**
- c) Experience
- d) Availability

While any of the listed attributes may be associated with an individual, attitude is solely an individual attribute relative to the effort, while the other choices may be characterized as either individual or group attributes.

14) What are the results of a cultural assessment?

- a) Determining the region or location that a stakeholder represents.
- b) Group characteristics are categorized.
- c) Identification of language and communication styles for communication planning.**
- d) Developing policies relative to cultural sensitivity and diversity.

The driving factor behind identifying cultural factors is their impacts of effective and efficient communication. The other information might be valid in resolving perception or conflict issues, but these approaches are too specific for a needs assessment.

15) What is another term for a portfolio?

- a) A strategic program.
- b) A business case hierarchy.**
- c) A stock and cash inventory.
- d) A retrospective.

A business case hierarchy is a diagram that displays current goals, their associated objectives, and the business cases that arose from them. These are the key elements of a strategic business portfolio.

16) What do the L and E stand for in pestLE?

- a) Liability and Equity
- b) Liability and Environmental
- c) Legal and Economic
- d) Legal and Environmental**

PEST stands for political, economic, social and technical; a force field analysis of the factors affecting a situation. Legal and Environment factors may be added to the four primary considerations.

17) You are asked to conduct an Opportunity Analysis. What are you being asked to perform?

- a) SWOT or PEST.
- b) Root Cause Analysis**
- c) Cost/Benefit Analysis
- d) Gap Analysis

From a business analysis perspective a need is based upon solving a problem or taking advantage of an opportunity. The approach is the same, so the terms are interchangeable.

18) As you refine your approved Situation Statement, you are preparing to perform a root cause analysis. Which tool are you least likely to select?

- a) Five Whys
- b) Ishikawa Diagram
- c) Competitive Analysis**
- d) Interrelationship Diagram

Competitive analysis looks outside the organization to determine what other companies are doing. This might help to identify opportunities or alternate solutions. The other three techniques each address root cause determination for problems.

- 19) Why isn't designing a Process Flow diagram useful for identifying opportunities?
- a) Process flow diagrams are only useful for identifying problems.
 - b) Process flow diagrams are only 'As-is', never 'to-be'.
 - c) Process flow diagrams require time and effort that may not be justified until the Business case is approved.**
 - d) Process flow diagrams are never used for root cause analysis.

The question asks about ***designing*** a Process Flow diagram. You may use an existing diagram to help identify a problem or look for a gap that provides opportunity, but would not take the time and cost intensive effort to create one unless the situation and solution are approved. Process flow diagrams are more likely to be used in response to solving a problem. If a process works, improving it may not be beneficial without external cause.

- 20) What are the primary drivers for performing benchmarking?
- a) To achieve competitive advantage.
 - b) To determine business principles and practices.
 - c) To identify missing data and financial information.**
 - d) To discover best practices in other parts of the company.

Benchmarking for a BA is always external, so 'd' does not apply. Benchmarking may help to identify competitive opportunities and industry standards. The primary justification for the benchmarking effort is always data and financial information that cannot be found within the organization.

- 21) What is the major difference between an enterprise business architecture and a capability framework?
- a) An enterprise business architecture is about systems and a capability framework is not.
 - b) An enterprise business architecture is more detailed than a capability framework.
 - c) A capability framework focuses more heavily on products and deliverables.**
 - d) The two tools are identical.

Enterprise business architectures and capability frameworks may both contain the same infrastructure, systems, hardware, software, process, people, locational, and other business elements. The difference is the focus on product or deliverables within the capability framework.

- 22) A business analyst conducted thorough situation, capability, and gap analysis. A high level approach has been presented, but the analyst failed to share discarded alternatives during the presentation. What is the most likely outcome?
- a) The priority cannot be assessed from the information gathered.
 - b) Stakeholders will not participate or commit efforts due to lack of ownership.**
 - c) The complexity of the project has been oversimplified, generating incorrect assumptions.
 - d) The business analyst will be asked to revisit the problem.

It is unlikely the business analyst will be asked to revisit the problem, though they may be asked to generate a better presentation. The information is available but was not shared. The primary reason for presenting viable alternatives that were not selected is to demonstrate that multiple perspectives were considered and to achieve consensus.

- 23) Which of the following is not a project management and business analysis collaboration?
- a) Identifying constraints
 - b) Documenting assumptions
 - c) Evaluating risk
 - d) Create a feasibility assessment.**

A PM and a BA may collaborate on constraints, assumptions and risk analysis both during needs assessment and project planning. The BA creates the feasibility assessment based on a development understanding of business operations.

- 24) Four projects are being compared based upon PBP. Which project should you recommend?
- a) Project A has a PBP of 6 months.
 - b) Project B has a PBP of 16 weeks.**
 - c) Project C has a PBP of 1 year.
 - d) Project D has a PBP of 30 weeks.

16 weeks is four months. Always select the shortest payback period, all other factors being equal.

- 25) When comparing the selection of projects using IRR, a hurdle rate of 12% is provided. What does this mean?
- a) The project can borrow funds at 12% APR.
 - b) The project must exceed a return of 12% even to be considered.**
 - c) The 12% is a target. Select the best project regardless of the calculated IRR.
 - d) The organization set an arbitrary 12% number to filter project selection.

When selecting projects using IRR, you always want the highest internal rate of return. The typical goal is to increase the value of the business, which means selecting projects whose return is higher than the average return in the current portfolio. A higher return increases the average, and the value of the business. A hurdle rate is effectively the average return for the business portfolio.

26) Four projects are being compared using NPV. Which would you select?

- a) Project A has an NPV of \$200,000 but takes 4 years to complete.**
- b) Project B has an NPV of \$50,000 but takes 1 year to complete.
- c) Project C has an NPV of \$125,000 but takes 18 months to complete.
- d) Project D has an NPV of \$95,000 and only takes 6 months to complete.

NPV already incorporates time periods, financial rates of return, project and operating costs over the stated period. Always select the higher value in current dollars.

27) For what purpose are PBP, ROI, IRR, and NPV used?

- a) Determining the value of current assets.
- b) Performing Cost/Benefit analysis.**
- c) When no other measures are available for project selection.
- d) To satisfy organizational standards.

All four methods are used to determine the potential value of the solution compared to other alternatives or other projects. Cost/Benefit is about determining the difference between the cost and the return, and decisions should be made against other needs that might be addressed.

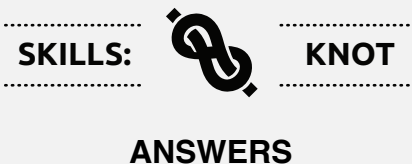
- 28) A business case is composed of several elements. Which element is not a fundamental part of a business case?
- a) The situation statement.
 - b) The recommendation.
 - c) The value of the solution.
 - d) A procurement recommendation.**

The focus of a business case may be a procurement recommendation, although this is the less typical scenario. All business cases contain a situation statement, a recommendation that includes alternatives and analysis, and justification for the value of the solution. Other common elements are assumptions, constraints, risks, and the reason for the approach taken when developing the business case.

Module 4 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) Which form of project requires formal business analysis planning and approval?
- a) Predictive projects
 - b) Incremental projects
 - c) Adaptive projects
 - d) All business analysis work**

While not all project life cycles include the same level of formality for the project work, all business analysis work must be formally approved before it is conducted.

- 2) Which element most dictates the amount of work and nature of the deliverables performed by the business analyst?
- a) The project management plan.
 - b) The project life cycle
 - c) The value of the work provided.**
 - d) The business analysis plan.

While each of the stated elements will identify some aspect of the business analysis deliverables, the value of the product, the value of the project that creates the product, and the value of the work contributed by the business analyst are the primary considerations.

- 3) Which project management plan component will receive the smallest business analyst contribution?
- a) Requirements management plan
 - b) Communication management plan.
 - c) Stakeholder management plan
 - d) Quality management plan**

Business analysis focused on requirements, and business analysts apply people and communication skills to generate value for the business. Although a business analyst may assess value through metrics and quality, this is not a primary skill set.

- 4) Which alternative best describes responsibility for creation of the business analysis plan?
- a) The business analyst creates the plan and submits it to the PM for approval.
 - b) The business analyst and the project manager build the plan together.
 - c) The business analysis plan is derived from the business case.
 - d) The business analyst, project manager and development team develop the business analysis plan together.**

The business analysis work is central to product and project success, but only if integrated with the PM, and through consensus of the team. Although a BA could (and often may be asked to) create the BA Plan alone, the best approach to partnership and collaboration is involvement in the planning process.

- 5) The business analysis plan has been generated, and reviewed by the team, the project manager, key stakeholders and the sponsor. Who formally signs the business analysis plan?
- a) The sponsor.
 - b) The project manager.
 - c) The sponsor and the project manager.
 - d) The sponsor, the project manager, and the business analyst.**

All three sign the Business Analysis Plan as a form of agreement to partnership and a commitment to deliver value.

- 6) Which of the following is not a key element of the business analysis plan.
- a) Refining stakeholder analysis
 - b) Identify the project life cycle.
 - c) Define traceability and change management
 - d) Creating a requirements Traceability Matrix.**

The work of defining traceability and change management spells out the creation and use of a Traceability Matrix, but the matrix would not be created until the plan is approved (at least not formally or officially).

- 7) Which statement best reflects the completion of formal stakeholder analysis?
- a) It is planned during business analysis planning and completed during elicitation and analysis.
 - b) Stakeholder identification starts during needs analysis and continues throughout the business analysis cycle.
 - c) You should always be asking the question, "who else might have input or requirements regarding this solution?"**
 - d) Needs assessment identifies the stakeholders while elicitation and analysis refine the attributes.

Business analysts are constantly performing informal stakeholder analysis. The formal aspects begin with Needs Assessment and continue through Business Analysis Planning to Elicitation and Analysis. Traceability and Evaluation may identify additional stakeholders, but the process is less formal. The best answer is always asking, “Who else might need to be involved?”

- 8) The project manager enters your office at 7:30 am indicating that he has a meeting with the sponsor at 8:00 am. He insists that you provide him with two copies of a well-designed stakeholder register, a copy of the business case, and your initial list of requirements. What is the realistic response?
- a) Suggest that he postpone the meeting until you can generate the requested materials.
 - b) Provide him the materials, and offer to accompany him to the meeting since you understand the sponsor.**
 - c) Be honest, telling him that the request should have been provided much earlier. This enhances the integrity of the relationship.
 - d) Say nothing, and scramble to put together as much as you can in 30 minutes.

Okay, you don’t believe this is realistic, but it should be for a business analyst. Remember your skills are based upon organization. By the time a Project Charter is signed and a project manager assigned, you already have all of the documents he has requested. You likely know the sponsor and well or better, and can help the meeting to run more smoothly. Offer to assist!

- 9) Which stakeholder attributes are most likely to impact business analysis work?
- a) Attitude, Complexity, Culture, Experience, Influence**
 - b) Interest, Knowledge, Power, Legitimacy, Urgency
 - c) Intent, Spirit, Commitment, Flexibility, Expertise
 - d) Intellect, Maturity, Leadership, Organization, Compassion

Any stakeholder characteristic might influence the problem, need, solution, product or project. Attitude, complexity, culture, legitimacy and influence are among the characteristics that most influence the work of the business analyst.

10) The project manager is developing the Resource Management Plan. Which stakeholder analysis tool might you use to best assist the PM?

- a) Persona Analysis
- b) Job Analysis**
- c) RACI diagram
- d) Stakeholder Register

The job analysis tool helps to identify the skills and interactions necessary to perform work. Job analysis helps to provide attributes that might be useful during resource selection and leadership. Besides, the RACI diagram and Stakeholder register are documents or outputs rather than 'tools'.

11) You have been asked to develop a Persona Analysis to assist with the creation of a process framework. What are the aspects of a persona analysis that make this tool appropriate for the work?

- a) Fictional, class based, interactive**
- b) Detailed, behavioral, skills based
- c) Work based, general, simple
- d) Clarity, precision, specific

Although other characteristics associated with Persona Analysis occur within answers b through d, Fictional, Class Based and Interactive are key characteristics of Personal Analysis. It is the 'interactive' elements that make Persona Analysis most appropriate for process frameworks.

12) The PM has asked you to share stakeholder information with the core team. Before distributing the stakeholder register to this project team, what might you need to do?

- a) Have every core team member sign a confidentiality agreement.
- b) Remove PII from the document and mark every page according to confidentiality policy.**
- c) Separate the stakeholder register into groupings and share only key-stakeholder information.
- d) Provide all the information you have, since this aids the full understanding of interactions critical to core team member roles.

You likely already have business confidentiality agreements from core team members. The core team needs more information than any other stakeholder to help guide the project, they are effectively the secondary leadership for project work. You need to be careful distributing personally identifiable information, so labeling the content, and removing personal information that is not essential to project work is the best answer.

13) Select the five project management process groups.

- a) Open, Plan, Implement, Manage, Close
- b) Plan, Design, Implement, Test, Transition
- c) Initiate, Plan, Execute, Monitor, Control, Close**
- d) Requirements, Scope, Cost, Schedule, Quality

The list has six, but Monitoring and Controlling is one process group. Know the essential aspects of project management to best partner with the PM.

14) Which of the following is not an example of a predictive project?

- a) Waterfall
- b) Traditional
- c) Phased**
- d) Cascade

Phased implies incremental, while waterfall, cascade, and traditional are alternate labels for predictive projects.

15) The Project Manager has selected an Agile approach. Which project characteristics most likely drove this decision?

- a) Time-boxed work schedules
- b) Constant uncertainty and change**
- c) No formal goal
- d) Team skills and experience

Even Agile projects have a formal goal, although perhaps not a full set of clear objectives or course. Team skills and time-boxed schedules are characteristics that influence Agile design and success. Constant uncertainty and change during the project or relative to product identification should be the primary reason for selecting an Agile approach.

16) You have just been hired as a business analyst. Your first assignment is to help train key-stakeholders regarding a recently approved Agile lifecycle project. Which documentation will help you effectively learn about previous Agile project execution within your new organization?

- a) Lessons Learned
- b) Business standards
- c) PMO guidelines
- d) Retrospectives**

In general, when answering an Agile topic, stick to Agile terminology.
Retrospectives are to Agile what Lessons Learned are to predictive lifecycles.
Both would become part of Organizational Process Assets, material that may be used to discover what has been tried before.

- 17) Which statement best identifies the level of detail necessary for business analysis work?
- a) Gather as much detail as possible, and take copious notes, particularly with regard to understanding stakeholders.
 - b) Make certain that business analysis work never exceeds 10% of the project's administrative budget.
 - c) More is better because it aids understanding and consensus.
 - d) Whatever might be necessary to produce product value and project success, but no more.**

All of the answers are correct, but the driving force must be providing value without excess cost or effort.

- 18) A Project Charter identifies the project manager by name, states the goals of the project, and authorizes the project manager to use the authority level of the sponsor or signer. How does a business analyst perceive the primary purpose of a Project Charter?
- a) Formally authorizes the business analysis work.
 - b) Authorizes the business case to proceed.
 - c) Creates a partnership amongst the key stakeholders.**
 - d) Generates the assumptions and constraints used by business analysis.

All of the other elements could be achieved by alternate means. The business analysis work is authorized by an approved Business Analysis Plan. Consensus, commitment, and partnership are key reasons for many of the authorization documents associated with project management and business analysis work.

19) What are the components of a Requirements Management Plan?

- a) Gather, analyze, manage, and document.
- b) Source, owner, (change) controls, acceptance
- c) Elicit, store, maintain, manage, verify/validate**
- d) Assess, Analyze, Prioritize, Implement

Remember that a Business Analysis requirements management plan is different than a project requirements management plan. The work of the BA relative to requirements is elicit, store, maintain (trace), manage, and verify/validate. The PM is concerned with gather, analyze, manage, and document relative to the work involved.

20) You are asked to perform a facilitation session for an Agile project. Why would you recommend against this option?

- a) You can't get everyone needed together in one location given the short time frames for an Agile project.
- b) Users create their own individual stories that are placed into a backlog, so group sessions do not fit the methodology.**
- c) Facilitation requires a formal process and formal outputs. Agile is always informal.
- d) Agile projects are time and cost constrained, and facilitation is always expensive.

The best answer is based on the description of an Agile methodology. Users generate their own individual User Stories that become Epics placed in a backlog for review. You may facilitate, but only to help everyone identify the goal and train regarding the approach.

21) Why should a business analyst sequence elicitation activities?

- a) Sequencing work activities is required by the Project Schedule Management Plan.
- b) Much like project management, sequencing activities after all of the work has been decomposed enables economies of scale and interrelationships not visible within single work packages.**
- c) Elicitation cannot be performed without proper sequencing.
- d) Elicitation sequencing identifies the number of hours required for business analysis work.

You may start elicitation formally or informally without a full decomposition or activity sequence, or even a formal schedule. Looking for efficiency and common factors enhances the value of business analysis work.

22) Which of the following is not a stakeholder authority relative to requirements prioritization?

- a) Verification
- b) Approval
- c) Validation
- d) Evaluation**

Evaluation is conducted by the business analyst to confirm that the value of the product matches the goal and objectives.

23) Requirements Validation uses metrics, similar to quality metrics in a project management plan. Which metrics are appropriate to Business Analysis planning?

- a) Cost, Time, Scope, Quality
- b) Cost, Value, Risk, Regulatory**
- c) Difficulty, Compatibility, Opportunity, Problem
- d) Regulatory, Risk, Cost, Quality

The primary elements against which requirements are measured to assess Value are cost, risk, and regulatory compliance. The word value is often a key.

- 24) The business analyst must gather and document all of the requirements submitted for a project. Which of the following is the least valid reason for omitting requirements from the Traceability Matrix?
- a) They do not meet the selection or prioritization criteria.
 - b) They exceed stated constraints.
 - c) The business analyst did not have time to incorporate them.**
 - d) They are outside the scope of the product.

You might be able to omit many efforts from business analysis work to affect better cost or time value, but omission of requirements is never one of them. The other answers are valid reasons to omit requirements from traceability (but not from your general documentation).

- 25) Verification of requirements includes all of the following, except?
- a) Review versus regulations and standards.
 - b) Confirming text, tables, and models are clear and complete.
 - c) Acquiring a key stakeholder or customer signature.**
 - d) Determining if the correct product will be built.

Acquiring a signature is approval or validation. All of the other answers are examples of verification. Is it true and correct?

- 26) Which of the following statements represents requirements validation?
- a) The customer approves and accepts the product.
 - b) The requirements align with business metrics.**
 - c) The project manager accepts the requirements and begins implementation.
 - d) Prototyping is complete.

The PM may start some of the work, for instance within an Agile project, before all of the requirements are validated. Prototyping and product approval are components of implementation. Requirements must align with the desired product metrics to be valid.

27) Which of the following is considered the foundation for traceability?

- a) Requirements attributes.
- b) Business metrics
- c) Change management**
- d) Prioritization

The Traceability Matrix may be used to trace attributes, metrics, and prioritization. The purpose for traceability is tracking changes to requirements, work status, and other product information.

28) Product evaluation _____.

- a) Confirms that the work is complete and is performed as components are delivered to the end user.
- b) Verifies the product satisfies the customer and can be performed at any time.
- c) Assures that the product matches the intended value.**
- d) Is only conducted during projects through final administrative closure.

Evaluation is about value rather than verification, and can be performed at any time.

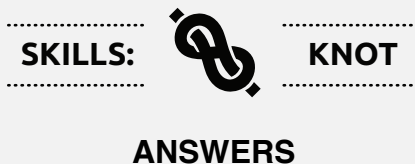
- 29) What is the primary reason for planning business analysis work?
- a) To determine the required time and cost.
 - b) PM and BA work overlap. Planning reduces duplication and confusion, assuring that all work is done by someone.**
 - c) So that the team knows what the business analyst is supposed to do.
 - d) To obtain approval from the sponsor.

Much business analysis work is critical to the project, but providing value means avoiding duplication. Partnership is a goal, and planning enables partnership and commitment.

Module 5 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) You want to use active listening and open questions to keep a dialog going. Which of the following is an open question?
- a) Should we move forward with this project?
 - b) How much will this project cost?
 - c) What do you think we need to accomplish?**
 - d) How many weeks will the effort take?

'What do you think?' is an open ended question, asking for participation in a dialog.

- 2) What is the definition of a closed question?
- a) Any question where the answer is yes or no?
 - b) A question whose phrasing allows a single answer that terminates dialog.**
 - c) A question with a numerical answer.
 - d) A question asked before closing a project.

Asking for a yes or no answer, or a numerical answer, or a singular answer are all examples of closed questions. A question that closes dialog is a definition and the best answer.

- 3) You need to explain elicitation and analysis to your stakeholders. Which definition might you offer?
- a) Elicitation asks questions. Analysis answers them.
 - b) Elicitation gathers requirements, and analysis organizes them.**
 - c) Elicitation is gathering information from a group. Analysis is studying the results.
 - d) Elicitation and analysis are the same as the project life cycle.

Elicitation might gather information from documentation, research, creativity, individuals, or groups. Analysis organized the information to assist understanding, planning, consensus, and application.

- 4) A business analyst may be tasked with defining problems and identifying opportunities, but there are other areas where business analysis skills might be applied. Which of the following is not a business analysis category?
- a) Resolving conflict.
 - b) Hiring personnel.**
 - c) Supporting executive decisions.
 - d) Applying influence.

The five categories into which business analysis falls are: support executive decision making, successfully apply influence, assist with negotiation and mediation, resolve conflict, and define problems or opportunities.

- 5) What is the most reliable way to gather facts rather than opinions?
- a) Search the Internet and other modern or current sources.
 - b) Review published information.
 - c) Seek at least two independent sources or perform a review.**
 - d) Ask a group what they think and rank their responses.

“This should be obvious!”

6) As you plan for elicitation, what is the most important factor influencing sequencing?

- a) Ask about the highest priority requirements first.
- b) Always start with documentation.
- c) The type of elicitation you choose.

d) The availability of key stakeholders.

Sequencing is about the order in which you ask questions or review documentation. Access to people can be more limiting than any other factor, so this should be used to determine the sequence in which you seek information.

7) What do you call the tool generated to affect elicitation sequencing?

- a) A source list
- b) An elicitation plan.**
- c) A sequence table.
- d) A Traceability Matrix.

An Elicitation Plan is a table that commonly contains four columns: question or information sought, source, method, sequence. You select the sequence after generating and considering the other three columns based on availability, important, relevance, and urgency. You should typically start with documentation in order to formulate better questions and to arrive prepared for interviews or facilitation sessions. Limited availability should move a source higher on the sequence list.

- 8) You are in an elicitation session and participants continue returning to the same point. What should you do?
- a) Note the importance of the point made because of its repetition, and ask if the group is ready to move to the next question.
 - b) Move to close the session. You will document your results and distribute them for feedback.**
 - c) Ask someone to clarify the importance of the point, then ask someone else to confirm what they heard.
 - d) Remind everyone regarding the purpose, agenda, and rules for the meeting, then resume.

Repetition of the same point suggests that the current topic and agenda are exhausted. The efficient use of people's time is an important consideration. Close the meeting, document the results, ask for feedback, and convene a separate session if needed after people have had a chance to review and think about the results of the first session.

- 9) When determining the questions for elicitation, which of the following is a general guideline?
- a) Start with a challenging question to get people into a creative mindset.
 - b) Present detailed information to set the stage, then ask people what they think.
 - c) Start and end with simple questions to increase participation and provide people a sense of accomplishment.**
 - d) The questions should always be asked in sets of five, getting more complex as you ask them.

In order to get participants involved you must start with content to which they can relate. Start simple and work toward more complicated issues as people start to participate and contribute. Always end with simple questions to clarify what was shared and provide people an opportunity for commitment because they understand what was shared.

10) When is a follow-up conducted?

- a) When the information is too complex for a single session.
- b) As quickly as possible after every session. A follow-up is the high level documentation and analysis of session results.**
- c) Before the close of the session, so that everyone can participate in documentation review.
- d) If a participant asks for another session after they consider the results.

Although you should ask everyone to help clarify the information, and potentially prioritize results prior to close of the session, this is not follow-up. Follow-up includes clear documentation and a high level summary or analysis. The purpose for follow-up is to verify the documentation for the results as correct.

11) You are preparing for an interview. Given your preference, which form of interview would you conduct?

- a) Synchronous.**
- b) Asynchronous.
- c) Structured.
- d) Unstructured.

The options are not all mutually exclusive, making the choice a little more complicated. Synchronous is always best, since this allows you to interact directly with the participant(s). Synchronous interviews could be either structured (formal question list) or unstructured (prepared questions but more informal or situational dialog). The latter pair is dependent on the resource and the information needed. In any case, synchronous is always preferred in order to take advantage of the nuances of communication.

- 12) You are conducting a business analysis brainstorming session. What must you incorporate?
- a) Make certain that everyone speaks by calling on people by name.
 - b) Stop dominant people from talking to assure that everyone has a chance to contribute.
 - c) A review of all the answers at the end to get a sense of prioritization.**
 - d) Since brainstorming is about creativity, make certain that people elaborate their ideas fully.

You need to set the stage by providing ground rules up front. You may call on people, but want to be neither formal nor merely sequential in your approach (going around the room calling on names would be both). Creativity is often associative and free flowing. The tone and the mode need to be set. Never cut people off. Guide them to completion and encourage others to speak. Active listening and the form of questions better guide participation. Some communication is non-verbal (like nodding heads or leaning forward). The unique aspect of brainstorming for business analysts is getting a sense of value or prioritization. The purpose of elicitation is always about requirements, which is a more targeted approach than general brainstorming.

- 13) Another business analyst is facilitating a requirements workshop. You have been asked to take notes so that they can focus on facilitation. You notice that several people are having side conversations or checking text messages. What needs to be corrected?
- a) Stop the meeting and ask the facilitator to repeat the agenda.
 - b) Request a break. Suggest individually to the facilitator that they might want to repeat the ground rules when everyone returns.**
 - c) Nothing. This is normal human behavior when people generate ideas.
 - d) Quietly get the attention of the distracted participants and use nonverbal signals to suggest they focus on the meeting.

You will experience many similar situations in reality (and on the exam). You are likely to associate with your experience in a similar situation. Stop and think about all the ramifications. Then act. In this situation, you do not want to diminish the authority or expertise of the facilitator. A few participants are lost and need to be pulled back to the topic. That is the facilitator's role, not yours. The agenda and ground rules were not made clear, or non-essential people are at the meeting. In either case, focus must be re-established by the individual guiding the meeting.

- 14) When preparing to facilitate a focus group, what is the most important element?
- a) A clear agenda.
 - b) All participants must be experts.
 - c) Prequalification.**
 - d) A fixed group size.

A clear agenda is always important, though does not differentiate a focus group. Delphi technique is a better approach to utilizing experts. Focus groups should optimally be 8-12 participants in size, but a fixed number is not required. The key to focus groups is pre-qualification of participants based on attributes that can address the purpose of the meeting and quickly arrive at more detailed responses.

- 15) What makes the Delphi technique so important to requirements facilitation?
- a) Unanimity.**
 - b) Expertise.
 - c) Anonymity.
 - d) Prioritization.

Expertise and anonymity are characteristics of the Delphi Technique, but not the value achieved. The process is iterative until the results have been prioritized, which is an outcome. The value of the Delphi Technique is achieving a unanimous result affecting consensus and direction.

16) The current project will need to recommend process changes associated with the implementation of a new system. The current workflow is complicated and requires precision. End users have difficult time explaining the sequence and documentation is weak. Which elicitation technique would you use to gather requirements?

- a) Active observation
- b) Participatory Observation
- c) Passive Observation**
- d) Simulation

You are not trying to learn the process, since it is complex, so simulation and participatory observation are not efficient options. Active observation interrupts the workflow, and would disrupt the precision being observed. You need to perform passive observation, and may need to have the process repeated several times while you observe and note the details. The follow-up documentation will be reviewed to achieve correctness.

17) Which of the following techniques is not an example of elicitation?

- a) Storyboarding
- b) Throwaway
- c) Wireframes
- d) Evolutionary Development**

Storyboarding and Wireframes are both forms of evolutionary prototyping, typically associated with Adaptive Methodologies. Throwaway is a third form of prototyping. Prototyping is considered a form of elicitation by business analysts since it clarifies requirements (when specifications do not exist). Agile efforts are referred to as Evolutionary Development, which would be implementation rather than elicitation.

- 18) You need to gather requirements quickly, your stakeholder audience is large and broadly distributed, and the initial requirements do not need to be complex. A survey or questionnaire appears to be an ideal elicitation technique. Why might you choose an alternate method?
- a) You won't be able to tell if the responses are correct.
 - b) Surveys never work as effectively as face-to-face elicitation.
 - c) Given an average 5% response, you may not receive sufficient information to progress to analysis.**
 - d) The cost of surveys is higher than other alternatives.

While it may be difficult to clarify the answers for context, you will be able to determine statistically if they are true or correct. This is only true if you receive sufficient response volume. The size of the survey population, promoting and rewarding participation, and assuring an upper level champion are all methods to improve survey participation, which is the greatest challenge associated with this methodology. The cost of surveys may be high, but the cost of preparation, travel, as well as the direct and indirect costs of people's time is usually much higher.

- 19) You are working with a Scrum Master who prefers the Kanban method. He suggests that you do not need to conduct elicitation. What perspective is he professing?
- a) Agile techniques do not need to elicit and analyze requirements, because they are provided as User Stories and analyzed by developers.
 - b) Elicitation and analysis are a continuous cycle within Agile, and due to informality are often overlooked.
 - c) The Scrum Master doesn't like business analysts.
 - d) Access to stakeholders is limited using the Kanban method, so elicitation is not viable given time boxing.**

Elicitation is about 'drawing forth' requirements, so it is always necessary. Often due to a lack of understanding business analysis skills, techniques, and alternatives, or due to a desire for informal processes, they are overlooked. The Scrum Master may not like business analysts, or you in particular, but you don't have enough information from this scenario to make that determination. Rework and replacement are common in Agile because insufficient effort has been expended encouraging stakeholders to come forward with their User Stories so that the Backlog is big enough for analysis and prioritization. Elicitation is still necessary, it just takes a different form.

- 20) You are talking to a project manager who is less experienced with requirements terminology. How would you help them understand the difference between categories, types, characteristics, and attributes?
- a) Simply, because the words are only synonyms.
 - b) Categories enable determination of correctness, priority and value based on classification by type.**
 - c) Characteristics are defined by attributes.
 - d) Categories, types, characteristics and attributes are just different formats.

Types (functional, non-functional, business, etc.) help to categorize requirements to determine how they should be analyzed and tracked. Characteristics help to define the structure of a requirement in order to determine its completeness and clarity. Attributes of a requirement enable its status to be tracked. The format is the pattern, template or structure used to capture a requirement so that its character may be determined, its category identified, and its attributes assigned.

- 21) You receive the following requirement from a user: The marketing department must have a new website. Which formal elements are missing?
- a) Subject
 - b) Action verb and conditions.**
 - c) Object
 - d) Imperative

All good requirements have a subject, an imperative, an action verb, an object and conditions. This requirement has a subject (marketing department), an object (new website), and an imperative (must have), but lacks an action verb and conditions that define how to proceed. This user seriously needs a business analyst to generate requirements so that the marketing department can develop or receive a new website in order to complete their goals!

- 22) Solution requirements derive from business or stakeholder requirements. Which type of requirement is not part of the solution?
- a) Project requirements**
 - b) Functional Requirements
 - c) Non-Functional Requirements
 - d) Quality Requirements

Project requirements derive from stakeholder requirements and affect how the project is managed, the work performed, etc. The three types or subsets of solution requirements are functional (what it does), non-functional (how it performs), and quality (how the solution will be measured or accepted).

23) Which of the following is a non-functional requirement?

- a) Help desk analysts must be able find an open tickets with five seconds following a search input.
- b) The user must be able to enter a password between 8 and 15 characters in length.
- c) The user must be able to access the webpage from either Android or iPhone devices using devices standard browsers.**
- d) The depth sounder must provide measurements in 1 foot increments to enable shore landings.

Requirements that state what the product does are functional, and SMART if they provide measureable elements. Non-functional requirements are about the performance or how the product works. Most non-functional requirements suggest a characteristic that ends in –bility. Access from multiple platforms is about ***compatibility***.

24) The project manager requests that you generate the requirements as fast as possible so that the team can start planning project work. As you assign attributes to the requirements, which one could you defer until you have more time?

- a) Source**
- b) Identifier
- c) Ownership
- d) Status

Knowing the source of a requirement helps with categorization and subsequent clarification, though can often be determined later from the nature of the requirement. You must have a unique identifier, ownership, and status attributes in order to perform the business analysis work. This includes organization, traceability, and the requirement's lifecycle.

25) A user submits a change request and it is passing through the correct process toward the possibility of becoming a new product requirement. What status would you place on this requirement?

- a) Open**
- b) Active
- c) New
- d) Change

Although many methodologies use their own terminology to track status, the common status for a new requirement is open or proposed (pending might be used though is less descriptive, since it might be pending approval/assignment/completion/etc.). Active means open and in process. You would change the status to Active if the requirement is approved. The status should help the BA, the PM, and the team easily understand the state of the requirement.

26) What is the 100% rule?

- a) Requirements must be 100% defined before incorporation in the project plan.
- b) 100% of the requirements must be verified.
- c) Six sigma suggests that product must fall with a 99.9% quality threshold.

d) The 100% rule is related to the WBS.

The 100% rule, per the PMBOK® Guide suggests that all work packages must roll up to an objective and all objectives must be decomposed to the required work. Nothing can be omitted in order to meet the need and provide value.

- 27) Which of the following statement is not representative of a requirements package?
- a) Requirements packages are optional.
 - b) Requirements packages are created solely by the business analyst.
 - c) Requirements packages require verification.**
 - d) Requirements packages are created at the discretion of the project manager.

All of the descriptions fit a requirements package except the verification. A requirements package is created to meet a communication need, often defined in the communication management plan. A requirements package includes specified requirements, all related documentation, reference keys, and descriptions that enable interpretation and application of the requirements.

- 28) Which requirements processing sequence is correct?
- a) Confirm, approve, implement, validate
 - b) Confirm, approve, validate, implement**
 - c) Approve, implement, verify, validate
 - d) Verify, approve, implement, validate

Approve, implement, verify, validate is the product or project process sequence. Confirm, approve, validate, implement is the **requirements** processing sequence.

29) Which of the following is not a form of scope model?

- a) SWOT diagram
- b) Fishbone diagram
- c) Organization chart

d) Use Case

A Use Case is a type of process model, while a Use Case diagram is a type of scope model. Scope models organize features, functions, and set boundaries. SWOT, Fishbone diagrams, and organization charts all organize the information relative to the business, need, or solution.

30) When selecting an analysis model, level of abstraction is an important criteria. What does level of abstraction mean?

- a) Providing every single detail.
- b) The opposite of distraction.
- c) The opposite of level of detail.**
- d) Using symbols and icons for clarity.

The level of abstraction is the opposite of the level of detail. You want to start at the highest level possible and add only enough detail to clearly present the material. Adding too much does create a level of distraction!

31) Which of the following is not a standard modeling language?

- a) UML
- b) RML
- c) BPMN

d) ERD

An Entity Relationship Diagram (the one with the 'crow's feet') is not a standard modeling language. Unified Modeling Language, Requirements Modeling Language, and Business Process Modeling Notation are standards based modeling languages.

32) Which modeling language is associated with swimlanes?

- a) ERD
- b) BPMN**
- c) SysML
- d) Workflow

Business Process Modeling Notation is used for workflow diagrams and specifically includes the use of swim lanes to separate participant (sets).

33) How would you characterize the difference between RML, UML and SysML?

- a) RML does not include system information.
- b) Of the three, SysML works best to design human/computer interfaces
- c) RML is about goals and objectives, the others are about interaction**
- d) UML is only structural

The statement that RML is about goals and objectives, while UML and SysML are more about interaction (and design) is the most accurate. RML does include system information, as well as objectives, people, and data. UML may be either structural or behavioral. SysML uses a block architecture of the component and is not about the interface details.

34) RML is the most used modeling language across business analysis, except perhaps within engineering and information systems teams that use SysML or UML to define systems, data, and their relationships. Which type of RML application uses CRUD?

- a) Objective models
- b) System Models
- c) People Models

d) Data Models

CRUD stands for Create, Read, Update and Delete, the common states of data. CRUD is associated with Data models, and more specifically with RML than UML or SysML.

35) The project manager recently learned about Ecosystems Maps, and believes that they will overcome some of the problems previous projects have had designing program interfaces. What recommendation or response would you offer?

- a) Ecosystems maps are an RML solution that allow you to see all of the systems pieces.

b) Ecosystems maps will not solve the scenario you describe since they do not include interactions, data flows, or programming elements.

- c) RML, SysML and UML all provide the same level of detail, so we should consider other alternatives.
- d) Do whatever the project manager suggests, since they direct the project work.

Answer A is correct, but does not clarify the issue that will be faced. SysML and UML provide better interface, data, and programming information and likely would offer better solutions. You are part of the leadership team, and should openly partner with the PM to provide your knowledge and skills. You follow the ***plans*** that you partnered to create.

36) Which of the following statements is correct?

- a) Component Diagrams and Class Diagrams are both forms of UML Behavioral diagrams.
- b) Activity Diagrams and Use Case Diagrams can use UML Behavioral Diagramming techniques.**
- c) Component Diagrams and Sequence Diagrams both apply UML structural tools.
- d) Class Diagrams built with UML are a common business analysis deliverable.

Admittedly one of the more difficult questions you might address on the exam; understanding the differences may help you to resolve the answer better than memorization. Understanding patterns and memorization works better for applied cognitive processing. UML application to structural diagrams include Component and Use Case Diagrams. UML modeling for behavioral diagrams is more extensive, including Application Diagrams, Use Case Diagrams, Sequence Diagrams, and Communication diagrams – they tend to show more general interactions. Class Diagrams built with UML are typically far too technical for business analysis composition – related design falls to experienced system analysts.

37) One of the team members hears you use the term cardinality while describing relationships in a diagram, and asks “what is a cardinality?” You answer:

- a) A cardinal number, like an integer, 1, 2, 3, etc.
- b) A cardinality is the numerical relationship between two entities, like one-to-one or one-to-many.**
- c) A cardinality is an important relationship, like cardinals in a church.
- d) A cardinality is just another term for a data relationship.

No other explanation should be necessary, answer B is the definition.

38) Modeling is a way to organize requirements information. What are the five categories?

a) Need, Objective, Requirement, Solution, and Process

b) Scope, Process, Rule, Data, and Interface

c) Business, Functional, Project, Quality, Classification

d) Text, Tables, Diagrams, Use Cases, User Stories

Models are a means of representing data or information in a clear, simplified, and organized way. The five model categories are scope, process, rule, data, and interface.

39) You have completed elicitation for a new product and need to start analysis. You determine that a high level diagram may be useful. Which type of model are you considering as a starting point?

a) A context diagram or feature model.

b) Use cases

c) User Stories

d) State Tables

Scope models are the highest level of abstraction, and the best starting point for a new product or process. Context diagrams and feature models are forms of scope models. Use cases and user stories are process models. A state table is a data model.

40) You are asked to describe the difference between a use case and use case diagram to a brand new business analyst. How would you help them to understand the difference?

- a) Not a problem, a use case diagram is another term for use cases.
- b) A use case is an activity described as verb-noun, the diagram puts many of them together to show how they all relate to the solution.**
- c) Use case is to user story as use case diagram is to storyboard.
- d) Let me draw one of each for you so you can see the difference ...

Use cases are usually recorded textually in a form or table, and contain details about an activity that can be simplified to verb-noun format. A Use Case Diagram is a high level drawing of the activities used to identify them to assure that a use case is created for all relevant parts of the solution. User stories are a more simplified approach to a use case and are used in Agile technologies (so that end users can create them). Story boards are built from User Stories, but Use Cases evolve from a Use Case Diagram so the analogy is incorrect.

41) Which of the following examples is not another name for a Process Diagram?

- a) SIPOC
- b) Flow chart
- c) Value Stream map
- d) User Interface Flow**

All of the answers are examples of work flows or process flows, except User Interface Flow, which is a form of interface model.

42) What are the essential elements of a user story?

- a) Subject, verb, object
- b) Object, action, result
- c) Actor, function, need
- d) Subject, action verb, result**

A 'good' requirement always includes subject > action verb > object, but Agile methodologies use a format described as Actor, function, and need that may also facilitate prioritization and the relationship between user stories for a story board.

43) What do you call the process of selecting User Stories prior to implementation?

- a) Purging
- b) Kanban
- c) Grooming**
- d) Retrospective

Grooming or grooming the backlog is the process of reviewing user stories for selection, prioritization, of refinement. The backlog may be represented on a Kanban board. The process may occur during a Retrospective if performed between releases.

44) You have been told you need to create one model from each of the five categories. Rule Models are not as often necessary as the other categories. How would you explain why you might not need a rule model?

- a) Rule models explain how the work needs to be done, and are not necessary for defined processes or Agile.
- b) Rule models help to set boundaries, and are not as necessary if the requirements and scope are already clear.**
- c) Business rules describe goals and objectives that have already been described in a scope model.
- d) Rule models include decision trees and are therefore only used if risk needs to be calculated.

Rule models help to define or refine the value if it is not clear from other models or the requirement themselves. Examples include Business Rules Catalogs, Decisions Trees, and Decision Tables. They do not define how the work is to be done, and are more detailed than goals and objectives. While decision trees may be applied to risk analysis, they more generally diagram how decisions are made and the possible outcome. The most important aspect of Rule models is that they help to set boundaries when what should be and should not be done are unclear.

45) When creating a data model, what should you build first?

- a) The data flow diagram should be developed from a scope or process model.
- b) The data dictionary describing the objects, descriptions, types and values.**
- c) How the data will be created, read, updated, and deleted.
- d) The input state and expected output state for the data.

Although you may start data modeling at any point in the modeling process, and may evolve toward data modeling from any of the other model types, the most common element that should be created first is the data dictionary. The data dictionary helps everyone to understand the meanings of the names, labels, or terms used to identify the data, and therefore to participate in requirement verification.

- 46) Why might a project manager consider an interface model the most common and important model associated with requirements analysis?
- a) Interface models are required before work can begin, and should be the first requirements package.
 - b) Wireframes are common baselines for technology development and are necessary to establish work estimates.
 - c) The stakeholder register and communication management plan are forms of interface models commonly used by project managers.**
 - d) Interface models are only mockups and easily prepared.

Interface models are amongst the most detailed, potentially complex, and detailed of all the model types. Consider for instance the stakeholder register. Creating a starting template for a stakeholder register may be simple, but including all the necessary fields, and populating it with all the stakeholder information is no small task. Although a requirements package aids the communication process, they are less often required and are certainly not needed before work begins. Wireframes are a common form of interface model, though they can be complex, require iterations, and often special skills to build.

47) Which factor is the most important consideration when documenting requirements?

a) Completeness

b) Clarity

c) Context

d) Categorization

While good requirements are clear, correct, value based, and well written (subject – verb – object), the most important element is that they are clear to the sponsor, user, team, project manager and key-stakeholders.

48) Requirements are supposed to be feasible. Which of the following elements is not a feasibility consideration?

a) Scope

b) Time

c) Cost

d) Technology

Scope is part of the triple constraint, along with schedule and cost, relative to the project work. Feasibility is the ability of the organization to meet the requirement and includes time, cost, technology or systems, and operations.

49) What does the W in MoSCoW stand for?

a) Would

b) Will

c) Won't

d) Какие

Must Haves, Should Haves, Could Haves, Won't Haves – so won't. Какие means 'what?' in Russian.

50) Who approves and signs the requirements?

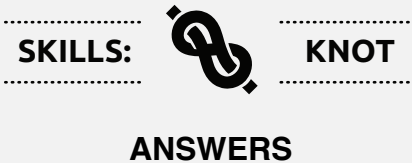
- a) The sponsor, the customer/user, and the PM.
- b) A business owner, a solution team recipient, and the business analyst.**
- c) The project manager, the team, and the BA.
- d) The sponsor.

The correct set is a business owner, executive or sponsor; a representative of the team accepting the work – usually the PM; and the business analyst who created the requirements – vouching for their correctness (veracity) and value.

Module 6 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) What is the best explanation for the purpose of a Traceability Matrix?
 - a) To track the work of business analysis.
 - b) To track the relationships, characteristics, status, and validation of requirements.**
 - c) To trace the process of eliciting and analyzing documents.
 - d) To assure that requirements are approved and managed.

Although the Traceability Matrix is managed after the requirements are elicited and analyzed, it is probably being created during the process. It does track the work of business analysis (not the hours and cost) but the results of the effort. It certainly can be used to assure that the requirements are approved and managed. But the key concepts are completeness and value.

2) How does the project life cycle affect traceability?

- a) The project manager determines how traceability should be managed according to the requirement management plan for predictive projects.
- b) Agile projects are only traced informally, if at all.
- c) All projects are traced, regardless of life cycle, although the form and focus may change.**
- d) Traceability is the business analyst's job, and is always determined as the BA deems appropriate.

Traceability tracks that the product meets that goals and values assigned to the project. Traceability is always tracked, although the level of detail and resource commitment may vary from extremely formal to informal except for key deliverables. The project requirements management plan may identify elements that need to be tracked for the project, but the business analysis deliverables extend beyond the project so some tracing is necessary in all cases.

3) Which requirements suggest mandatory tracing for value on a project?

- a) Any requirements prioritized as 'mandatory' by the sponsor.
- b) Requirements documented in the requirements management plan.
- c) Regulatory, targeted standards, and critical requirements.**
- d) Requirements with the highest cost or time commitments.

Requirements identified as mandatory by the sponsor might be well served by traceability, but they may be easy to identify and complete relative to other efforts. Traceability is about assuring value and meeting the primary goals and objectives identified in the business case. The requirements management plan does not document requirements, it identifies how requirements will be managed, and may provide criteria for traceability. The time and effort of tracking have to be offset by the value. 'Mandatory' tracking is typically assigned to regulatory, standards based, or critical requirement where failure to meet the criteria is certain loss of value.

4) A new requirement has been submitted to the CCB. You have been tasked with identifying the impact and possible response. Where would you find information to provide related answers?

a) The risk register.

b) The Traceability Matrix.

c) The change management plan.

d) The requirement management plan.

This is a new requirement, so it probably has not been assessed for risk; so the risk register will not help you. The change management and requirements management plan may provide you additional guidance regarding the process. What you most need is to identify the impact. The Traceability Matrix will help you to identify dependencies and possible impacts on other requirements for the purpose of suggesting a response.

5) In addition to tracing requirements, what business analysis effort does the Traceability Matrix most support?

a) Commitment and consensus

b) Communication

c) The value of the product

d) A reminder of BA deliverables

All of the answers are correct. The best answer always incorporates the value of the product or solution. If value were not offered, then communication would be the best answer, since this is the primary skill of the business analyst. The process used to plan business analysis work, including the Traceability Matrix, creates commitment and consensus with the PM and team. Proper use of the matrix maintains the trust by assuring support for the deliverables.

6) What is the purpose of a unique identifier in the Traceability Matrix?

a) To avoid duplication and support cross-referencing.

- b) No two requirements are alike, so the labels are unique.
- c) Projects are defined by uniqueness.
- d) To differentiate the business analysis work.

Many requirements or requirement elements are inter-related. Unique identifiers prevent the duplication of information and may be referred singly or multiply to reduce the need to restate them. Related cross referencing also reduces the overhead associated with changes since any change is made only to one item, and referenced by any others.

7) Why does the BA create a Traceability Matrix even when the PM indicates that they do not need it for requirements management or project work?

- a) The BA is responsible for product scope, and uses the Traceability Matrix to track product value.**
- b) The BA has to assure that the project scope is not affected by Scope Creep.
- c) The Traceability Matrix is the primary organizational process asset created by the BA.
- d) The BA uses the Traceability Matrix to track his/her work.

The primary purpose for the Traceability Matrix is to assure product value. Product scope is the accountability of the BA. Project Scope is the accountability of the PM. The Traceability Matrix can assist to prevent scope creep by enhancing change control, and may use the matrix to assure work deliverables are met. The Traceability Matrix may be added to project archives and become an organizational process asset. Product value is the best answer.

- 8) What is another name for the Traceability Matrix?
- a) Requirement Traceability Verification Matrix
 - b) Coverage Matrix**
 - c) Communication Traceability Matrix
 - d) Organization Matrix

Coverage Matrix or just Coverage are synonyms for the Requirements Traceability Matrix. A Requirement Traceability Verification Matrix is a special instance used by testers to identify and track test cases. An organization matrix is associated with project manager authority within resource management planning. A communication Traceability Matrix is made up, or at least not a recognized PM or BA standard practice.

- 9) What labels does a business analyst use for requirements status in a Traceability Matrix?
- a) Proposed, Open, In Process, Test, Verified, Complete
 - b) Active, Approved, Deferred, Cancelled, Added**
 - c) Confirmed, Approved, Validated, Implemented
 - d) Verified, Validated, Delivered, Closed

Active, Approved, Deferred, Cancelled, Added are requirements states or status relevant to business analysis work. A Project Manager may request that project related requirements' status is tracked using Proposed, Open, In Process, Test, Verified, and Complete. Confirmed, Approved, Validated, Implemented is the sequence associated with requirements elicitation. The last option is a hybrid status list; modified status designators can always be created to affect the most efficient process to generate value.

10) What is a Work Authorization System?

- a) A component of the Traceability Matrix.
- b) A formal funds release process associated with work.**
- c) A tool used by the payroll system.
- d) The process used by the sponsor and PM to approval business analysis work.

A work authorization system is a formal traceability process associated with funds release for work. For example, financial organizations may release funds to construction projects based on inspection completion. The status or results may be tracked in a Traceability Matrix, but have nothing else to do with business analysis work.

11) Which of the following statements is correct?

- a) Reviewers have no ability to affect the outcome of a requirement.
- b) Accountability is required for approval, so they are the same.
- c) Approval and signoff usually mean the same thing, but signoff is usually more formal.**
- d) Subject matter experts are commonly offer requirements approval status.

Reviewer can make recommendations, and may be given veto or rejection power. Accountability for some level of goal or objective is typically required for approval, but the roles are not the same. Subject matter experts seldom have approval authority, but they may be tasked with verification or determining requirement value.

12) Which terms are not specifically associated with Agile projects?

- a) Epic, Storyboard
- b) Backlog, Product Owner
- c) Use Case, Iteration**
- d) Retrospective, Sprint

Use Cases are usually associated with process oriented projects, detailing the relationship between an actor and an object. They are not specifically used for Agile. Iterations occur in iterative as well as Adaptive and Agile projects. Watch for the associations of Agile terminology on certification exams as clues to identify the best answer.

13) You need to understand the difference between postpone, defer, cancel, and reject relative to the requirements life cycle. Which of the following statement is correct?

- a) Postpone means to put the requirement off until a later project.
- b) Reject means the requirement was never approved.**
- c) Cancel means not approved.
- d) Defer means delay within the project.

Postpone to a later iteration, phase or cycle within the project. Defer to a future project. Cancel means was approved, but is no longer approved. Reject means never approved.

14) Which of the following is not an element of integrated change control.

- a) Configuration Change Management
- b) Change Management
- c) Traceability Matrix**
- d) Change Control Board

A Traceability Matrix may be used to track the status and results of integrated change control, but it is not a part of the integrated change control system. For a

business analyst, a change control board is a mandatory element of integrated change control (it is a desired but optional component for project managers).

15) What is the best format for submission of a change request?

- a) The same as a situation statement.
- b) Risk, Probability, Impact
- c) Problem, Impact, Response
- d) Proposal, Reason, Value

For a business analyst the best approach, which should be recommended or used in templates, is the same as a situation statement. Problem (A) has Effect (B) with Impact (C). Alternatives considered and a solution or recommendation would be appended.

16) When a problem is identified and handed to the business analyst, what should be done?

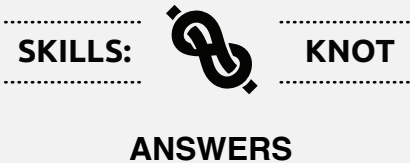
- a) Notify the project manager, then submit a change request.
- b) Identify the root cause before proceeding.**
- c) The first step is impact analysis, since this affects the value.
- d) Check the Traceability Matrix to see where the problem fits.

The value and the impact are the most important contribution, but you cannot determine the true impact until you know the root cause (remember Chicken Little?) A symptom may be large or small, but root cause identifies whether the problem is an outlier or foundational and therefore has relatively small or large impact. The Traceability Matrix may provide information to investigate root cause, but does not itself provide the answers.

Module 7 – Skills Practice Answers

PMI-PBA: Business Analysts and Project Managers

Steven M. Fullmer, MBA, PMP, PMI-PBA



- 1) What is evaluation?
- a) The same as validation.
 - b) Determining the value of the solution, before, during or after a project.**
 - c) A combination of verification and validation.
 - d) A review conducted by experts.

Evaluation is a set of techniques used to assure that the solution provides the value necessary to meet the need. To solve the problem or exploit the opportunity. Evaluation occurs as the business case is being developed, the requirements elicited, the work being conducted, and the product prepared for delivery. Evaluation also extends potentially long after delivery, to test and confirm value throughout the product life cycle.

- 2) Evaluations are considered to be?
- a) Based on metrics and therefore quantitative.
 - b) Primarily qualitative, or coarsely quantitative.**
 - c) Detailed analysis of the product or solution value.
 - d) A comparison against the baselines established during project and business analysis planning.

Metrics may be used for qualitative or quantitative analysis. Evaluation components during the project may interact with verification and validation, but focus on value. Determining value is typically qualitative since it focuses on goals and objectives rather than the details. Diving too deep extends the cost and diminishes the value. The baselines are used for verification and control more than value determination.

- 3) You are asked to determine the threshold for diminishing returns. What does diminishing returns mean to a business analyst?
- a) Reducing the number of product returns from customers.
 - b) A method to determine the ROI for the product.
 - c) The investment of additional resources will exceed the intended value of the product.**
 - d) A diminishing return is the same as a sunk cost. You cannot recover the money you have already spent.

At some point in any effort it is possible that spending additional resources to correct problems or enhance the functions and features will exceed the value received in return. The transition point between value and loss of value is called the point of diminishing return. It may even occur before break-even since efforts to stop, cancel or close the effort will have expenses.

- 4) The product, a software package, has been placed into production following project completion. You are now tasked with evaluation. What is the most efficient way to conduct evaluation?
- a) Ask the customer if they like the product.
 - b) Use metric solutions built into the software.**
 - c) Wait to see if you receive any feedback in a few weeks.
 - d) Review the validation reports created just prior to customer signoff.

Asking the customer is a good idea, but not about feelings. The questions need to be about value. Waiting does not assure value, either. Validation reports may help determine value at a point in time, but true value is matching or exceeding the original goal. Access to existing metric solutions is both cost effective and repeatable for the long term.

- 5) The project was planned and funded. Why is one of the critical evaluation planning questions “who will cover the costs of evaluation”?
- a) No component of evaluation is covered by the project.
 - b) Evaluation is fully planned during project analysis and business analysis planning, so this question is asked early in the planning process.
 - c) Evaluation both precedes project funding and follows delivery into the product life cycle.**
 - d) The business analyst wants to be paid for their work.

The project was funded, though additional business analysis work and solution evaluation may not be planned within the operational or maintenance budgets. You want to be paid, but only for providing valued services. You need to determine if a plan for evaluation exists, and recommend one if there is no plan.

- 6) Another evaluation planning question might be, 'how do we extract measurement data?' Why might this be relevant?
- a) **Many solutions, systems, and products contain data that might be useful for evaluation if it could be extracted.**
 - b) The business analyst is unfamiliar with evaluation and is seeking subject matter expertise.
 - c) The business analyst is just trying to make the customer aware of the possibility that evaluation will be conducted.
 - d) The business analyst arrived late in the project and is trying to get up to speed.

Software, databases, and other products often incorporate information that can be used for later evaluation, even if not intended for that purpose. Developers sometimes leave backdoors in software for subsequent patch, inspection or repair. Non-functional measurements may be possible based on performance metrics. The information may be available and the possibility needs to be explored.

- 7) Which of the following is not a common example of a KPI?
- a) ROI
 - b) MTBF
 - c) Retention
 - d) **UCL**

A Key Performance Indicator is an organizational, strategic goal oriented metric that can be ideal for assessing value of the organization or solutions. Return on Investment, Mean Time Between Failures, and employee or customer retention are all KPIs. UCL, upper control limit, is a boundary associated with quality control testing, and is about granularity and quality rather than higher order value.

- 8) As the project proceeds the test team waits for completed deliverables before conducting any testing. Is that is a good or bad idea?
- a) It is a good idea. The test team is aware that testing is expensive and does not return direct value to the product if overdone.
 - b) Bad idea. The sooner you catch a problem, the less expensive the recovery. Testing should always start with the simplest elements possible.**
 - c) Acceptable. The test team is just following the project plan.
 - d) Good idea. Testing should not be performed until handed to the User Acceptance Team who can best determine value.

Testing should always be conducted with the smallest possible piece, and continued as the elements are combined. The cost of each small change increases as elements are added, so problems must be found as soon as possible.

- 9) Which of the following tools might best be used for evaluation?
- a) Interviews
 - b) Brainstorming
 - c) Focus groups**
 - d) Retrospectives

Interviews, Brainstorming and Focus groups were initially identified as elicitation tools. Interview and Brainstorming are ideal for requirements generation, which identifies the acceptance criteria for value. Focus groups is the best answer, since it allows for identification of a specific group of users, key stakeholders, or customers who can offer insight into value based upon prepared questions. A retrospective is a review of Agile project efforts that can help to refine Agile projects and future product efforts. It is a tool used for a specific environmental purpose only.

10) What is Exploratory Testing?

- a) Any test that explores the features of a product.
- b) A method to identify which tests capture the metric correctly.
- c) A form of black box testing.**
- d) Looking at a problem when you do not know what is wrong.

Exploratory testing is asking someone to evaluate a product or solution with little or no knowledge of its function, features, or internal mechanisms. This is a form of black box testing, wherein no information about the product is provided, there are no test cases, and the tester attempts to determine function and value using their own criteria.

11) What is another name for white box testing?

- a) Formal testing
- b) Penetration testing
- c) Structural Testing**
- d) Informed Testing

Structural testing and Glass Box testing are other terms for white box testing. The mechanism and details are provided to testers along with test cases. Penetration testing is a form of security test. The other two test terms are fictional, at least from a business analysis perspective. (Formal is a descriptive term, but not a labeled form of testing.)

12) What is the definition of a test case?

- a) Each instance of a test is called a test case.
- b) Instructions for using a product are used as a test case.
- c) A script designed to find defects in a product.**
- d) A documented test result.

The goal of testing is to discover defects, or to attempt to see if they can be created through the test process. It does little good to merely confirm a product or solution works under controlled conditions (Houston, we have a problem!). A test case is a script or set of instructions that help testers to discover defects.

13) Unit Testing and System Testing verified that the software solution worked as designed. During integration testing a problem was documented, passed change control and was implemented. What is your next step?

- a) Repeat Integration Testing.
- b) Regression Testing**
- c) Stress Testing
- d) Functional Testing

You need to perform regression testing. Any change might affect other requirements or elements of the solution. You need to repeat each form of testing that preceded the integration test, including unit and system testing for any component that might have been touched or affected.

- 14) During testing you discover that the product does not meet the requirements. What should you do?
- a) Repeat the tests
 - b) Meet with the developers to discover why the requirements were missed or not followed.**
 - c) Notify the PM that the product is defective.
 - d) Record the problem in the Traceability Matrix.

Repeating the tests will only confirm what you already know. You need to trust that the testers did their job. You will likely need to notify the PM, document the problem, and open a change request, but FIRST you need to identify the root cause and impact. To perform root cause you need to talk with the team to discover why the requirements are omitted.

- 15) What elements can be used to develop test cases?
- a) Scope models, Situation statement, the Backlog
 - b) User Stories, Use Cases, non-functional requirements**
 - c) DiTL, Exploratory Testing, Change requests
 - d) Product documentation, Traceability Matrix, the Business case.

Test cases are based on requirements, and suggest sufficient detail to determine value. User Stories, Use Cases, and non-functional requirements identify the required value of the solution at a test case level. Scope models, situation statement, backlogs, product documentation, the Traceability Matrix, and the business case all identify the goal, objectives and ultimate value of the solution, but they are not the source of test cases since they are too high level. Other testing, like DiTL, may identify the need for additional test cases but are not the source for the test cases themselves.

16) Which type of testing is more likely to be used with a Predictive life cycle project?

- a) User Acceptance Testing
- b) Integration Testing
- c) Stress Testing**
- d) Beta Testing

Stress testing focuses on elements associated with risk. Stress testing determines or attempts to exceed probability, impact, or event thresholds. Predictive life cycles are usually selected based on large risk, so a Stress Test is most likely for predictive life cycle projects.

17) Which form of testing is the last to occur prior to transition?

- a) Day in the Life Testing
- b) Long Term Testing
- c) User Acceptance Testing**
- d) Usability Testing

Usability Testing typically precedes delivery to the customer, and User Acceptance Testing is the last test set, conducted by users or user representatives before transitioning a solution into production. Long Term Testing follows transition. Day in the Life is typically associated with adaptive projects, and limited formal transitions.

18) Which form of transition maintains two versions of the product for the foreseeable future?

- a) Timeboxed
- b) Parallel
- c) Phased

d) Coexistent

Timeboxed and Parallel testing are the same. Systems are coexistent, though only for specified periods of time and purpose. Phased or Segmented transitions target specific regions, locations, or user groups. A Permanent Coexistent or Coexistent transition means that both the existing and new system will permanently co-exist, or at least until one of them reaches end of life. Buy a new car, but hang on to the old one for the teenagers or young adults in your family? That's permanent coexistence – at least for the automotive solution.

19) One aspect of transition for which a business analyst may be held accountable is referred to as ETL. What does ETL mean?

- a) Extended Testing Limits

b) Extraction Transformation Load

- c) ETL is a component of Earned Value Management focusing on transition value
- d) Executive Team Leader

When transitioning a system or process, the business is accountable for identifying how the data will be extracted, transformed as necessary to the new format, and loaded into the new system. This includes testing and back out plans as part of the ETL process.

20) When does solution Evaluation end?

- a) When the value is proven.**
- b) When the customer indicates time to stop.
- c) When a replacement solution is identified.
- d) When the business analyst moves to another project.

All products have a life cycle, so hypothetically evaluation will continue until the end-of-life for the product or when it is replaced. From a business analysis perspective, a BA only performs evaluation until the customer indicates that the effort should be stopped. This is commonly the case when the cost of evaluation exceeds any return for the additional effort.

Glossary of Terms

PMI-PBA: Business Analysts and Project Managers

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Term	Definition
Acceptance	Confirmed receipt of a product or service by the customer.
Acceptance Criteria	A set of conditions that are met before deliverables are accepted.
Actor	In business analysis terms, the role played by a stakeholder relative to the product, solution, or project effort. Or the person who plays the role.
Affinity Diagram	A graph or table that groups common objects or elements for analysis.
Agenda	A structured plan, including timing, topics, methods, and participants preceding the conduct of a meeting or event.
Agile	An adaptive methodology that performs work in time-boxed iterations. Work is based on user stories, over seen by a project leader often titled a Scrum Master, and sponsored by a representative referred to as the Product Owner.
Analysis	The organization and review of information for the purpose of gaining clarity, detail, or practicable application.

Archive(s)/Project Archives	A location or system that allows organized storage of paper and/or digital elements considered part of Organizational Process Assets.
As-Is	The current state of an organization.
Asynchronous	Out of phase or sequence, alternating, disrupted.
Attribute	An assigned aspect of an object, person, effort, or solution. A distinguishable characteristic of a person or object that assists with unique identification of the individual, or the individual as a member of a group.
Autocracy/Dictatorship	A decision process wherein a single individual has full authority.
Backlog (Product Backlog)	A collection of Epics and/or User Stories managed within an Agile methodology.
Baseline	A planned and documented set of constraints against which work results are measured. Project elements that always have baselines include scope, time, and cost.
Behavioral Diagram	A diagram focused on the functions of a system. Examples include: Activity Diagrams, Use Case Diagrams, Sequence Diagrams and Communication Diagrams.
Benchmarking	Looking outside of an organization to find data and financial information that is not available or may not be generated within an organization. Competitive analysis may be related to Benchmarking though is not specifically equivalent.

Black Box	Term typically associated with testing wherein the tester is provided no or limited information regarding the purpose, functions, features or internal mechanisms of the product or solution.
Boundaries	Established limits or constraints that identify the control or stoppage point or line.
BPMN	Business Process Modeling Notation. A structured modeling language used to identify business process elements and interactions.
Business Analysis	The practice identifying problems and opportunities in an organizational context, and further defining needs and recommending associated solutions that deliver value to stakeholders.
Business Case	A formal document that identifies a problem or opportunity, the associated need, a solution represented in a situation statement, along with reviewed alternatives, constraints, assumptions and a justification for the analysis processed applied.
Business Case Hierarchy	A graphical representation of the goals, objectives, and resulting business plans within an
Business Principles and Practices	The common knowledge or practice across an industry or career field.
Business Rules	The documented policies, guidelines, or best practices that must be followed for a business process to be compliant with internal controls.

Capability Table	A tabular matching of problems or opportunities with their root cause/source, and the capability or feature that may serve as solution component.
Cardinality	A numeric assignment identify to the numerical association between data elements; for instance one-to-one or one-to-many.
Categories	Logical grouping, of information or requirements.
CCB/Change Control Board	A change control board. A specifically assigned group of people accountable for reviewing, approving, deferring or canceling proposed changes to a product, system, process or product.
Change Intelligence	CQ® , a predisposition toward leading change with a particular style or emphasis.
Characteristic	An observation, fixed aspect of an object, person, effort or solution.
Checklist	A list of goals, objectives, deliverables, work, or their elements that can be used to confirm their execution, completion, or quality control.
Checksheet	Similar to a checklist, except that the contents or elements follow a template or standard content layout.
Class Diagram	A structural diagram associated with UML and object oriented programming; often require a system analyst for design and development.

Closed-Ended	A question that only offers singular, limited choice or categorical answers from the respondent.
Collocation	Organization or gathering of all members of a team or effort within a single geographic location.
Communications	The formal and informal interactions between stakeholders.
Competitive Analysis	A review of market conditions, including competitor action and information, to seek or analyze opportunity.
Component Diagram	A structural diagram emphasizing the relative components of a solution.
Configuration Management	The control, documentation and management of a product or service from instantiation to end-of-life, including version management and associated archival capabilities.
Core Team	The officers, leaders, or key members of a development team. The count should never exceed 6-8 individuals including the PM and the BA.
Corporate Documents	Any documents created or stored within an organization that represent policies, standards, guidelines, procedures, or the output of previous project and operational work efforts.
COTS	Common off the Shelf. A commodity, goods, or services that may be acquired through standard retail or wholesale channels.
Coverage/Coverage Matrix	A synonym for the Traceability Matrix.

Creativity	The use of the imagination or original ideas, in the case of business management to identify and offer solutions for problems or opportunities.
CRUD	Create, Read, Update, Delete. The standard life cycle and interactive states for Data.
Data Dictionary	A list of data elements, their attributes, associations, context, and content.
Decision Framework	A structured approach to business decision-making. Examples include a decision tree and a decision table.
Decomposition Diagram	Any graphical representation of the decomposition model.
Decomposition Model	Any text, table or diagram representing the graphical decomposition of the elements of effort, structure, or organization from large to smaller increments.
Defect(s)	Any failure to meet the designed or desired features of a product or service as identified in the requirements.
Deliverable	A requirement or product element that may be independently aggregated, measured, or provided to a customer; also a subcomponent of a goal, or objective that may be further decomposed into work packages.

Delphi Technique	The use of experts, typically externally sourced, to identify, resolve or prioritize requirements. Elements include <i>unanimity, anonymity,</i> and <i>cyclic evaluation.</i>
Diminishing Returns	A condition that suggests positive value will diminish as additional work or effort is conducted.
Display Action Response	A subset of wireframe development used to design the user interface elements of a solution, system, or website.
DITL	Day-in-the-Life Testing. A semi scripted test relative to the performance of a product or solution that either is or represents the use of the product or solution throughout a day of regular interaction.
Ecosystems Maps	An RML based systems model that displays only system level interactions.
Elicitation	Drawing forth, typically referencing information. In the BA domain referencing requirements.
Elicitation Plan	A premeditated series of task, steps, or techniques designed to draw forth information from a specific audience.
Enterprise Business Architecture	A documented framework displaying the locations, people, processes, infrastructure, systems, data, and technology as it exists within an organization.
Epic	A set of related User Stories assembled to create a release or the full product.

ERD	Entity Relationship Diagram. Data model diagram focused on identify data relationships and cardinalities.
ETL	Extraction, Transformation, Load. The three elements required for successful transition when a data related product or service is being delivered.
Evaluation	The process of determining the value of a product or solution relative to the value identified in the business case or original situation statement. A confirmation that the full value of a product or solution has been met and continues to be met through the product life cycle.
Exploratory Testing	A form of black box testing wherein the testers are given no information with the purpose of attempting to identify unplanned uses, features or defects within the product or solution.
Extreme Programming	An Agile methodology wherein developers work in dedicated pairs, alternating work. While one develops the code, the paired developer actively reviews the work for errors or to make design and coding recommendations.
Fishbone/Ishikawa Diagram	Also called a <i>Cause and Effect</i> diagram; a graphical representation of categorized causal sets toward root cause determination.

Five Whys	Also known as Five W's. An iterative interview process that continues to refine information by asking progressively deeper questions based upon information provided in the preceding answer. Sometimes associated with who, what, when, where, why?
Force Field Analysis	The determination, often presented in tabular or graphic format, of the factors influencing, supporting, deterring, or preventing change.
Format	Structure, layout.
Glossary of Terms	A descriptive list (like the one you are reading) that provides definition and meaning to the vocabulary used by a tribe or a specific field of practice.
Go/No-Go	A process to determine whether an activity, project or effort should be continued, cancelled, completed, deferred or otherwise altered.
Goal	Strategic, long term and often high level desire of a business or individual.
Grooming	Grooming the Backlog. References a review of User Stories within an Agile Backlog for the purpose of prioritization, selection, assignment, and/or review.
Hurdle Rate	The percentage rate used as a threshold for investment or project selection decisions.
Identifier	A unique label (number, symbol, phrase) used to differentiate one element, requirement, or effort from others.

IIBA	International Institute of Business Analysis, originally a business analysis research organization; creator and maintainer of the Business Analysis Body of Knowledge (BABOK)® and oversight for CBAP and other business analysis certifications.
Impact	The cost or use of resources necessary to deal with a solution, effort or risk event.
Influence	Also called Power. The ability of a stakeholder to affect the resources or outcome of an effort.
Integrated Change Management	A combination of Configuration Management, Process and Documentation management as well as overall change monitoring, management and control.
Interest	The indication that a stakeholder desires data or information relative to an effort or event.
Internal Rate of Return	The projected annualized yield for an effort or project. Expressed in percentage values.
Interrelationship Diagram	A simplified graphical representation of the relationship between the components of a solution or a system.
Interrelationship Diagrams	Also called an Interface Flow. A diagram showing the relationship and linkages between primary system elements. A common use is the linkages for navigation between web pages.

Interview	A dialog between an individual asking questions and an audience of from one to five people from whom information is sought.
INVEST	The necessary elements of an Agile User Story: Independent, Negotiable, Valuable, Estimable, Small, Testable.
Just-in-Time	A short-term effort that delivers a product or solution in one pass.
Kanban	An Agile methodology that uses a columnar board to track user stories as they pass from submission, through development into delivery and completion. Kanban board may represent an organized backlog though is typically of longer duration.
KPI	Key Performance Indicator. A large scale metric used to monitor, control or predict the performance of an organization.
Lean	To minimize or diminish waste. Offered a reference to some Agile or production methodologies, including Six Sigma and Continuous Process Improvement.
Lessons Learned	The documented, living history of a project. Lessons Learned are actively documented during the project, formalized and archived at the end of the project.
Long term value	The continued value of a product or service post acceptance, signoff, and transition as determined by extended evaluation.

Metric(s)	A measurement system or technique.
Mockup Report	A template or sample layout that is used for report or communication design.
Models/Modeling	Manual review, capture, or representation of a scenario or process.
MoSCoW	Must Have Should Have Could Have Won't. A prioritization system.
Multivoting	A decision process wherein participants are given multiple votes, and potentially multiple differently weighted votes, in order to vote for prioritization of a requirement.
Natural Order	Also called Hard Logic within technology solutions is the mandatory sequence of activities, efforts or events occurring within a situation or scenario.
Need	The essential resolution of a problem or opportunity.
Net Present Value	The value in current dollars for an investment or project that incorporates its cost and all returns to a stated future date.
Objective	A target that can be measured during achievement.
Onion Diagram	A representation of stakeholder relative to a product solution that uses a concentric circle/oval pattern with the greater influence and interest displayed closer to the solution at the center.

Open-Ended	A question which offers the respondent an opportunity to respond in almost any manner they choose while providing the information.
Opportunity Analysis	A synonym for Root-Cause analysis that emphasizes opportunities rather than problems.
Opportunity Cost	The return that might be achieved if an alternative course of action was to be pursued.
Org Chart/Organizational Chart	A diagram displaying the hierarchical accountability, support, or reporting structure for an organization.
Organizational Process Asset(s)	Any information (including documents), equipment, processes, or knowledge that may be used to enhance or simplify subsequent operational or project efforts.
Ownership	The accountability or authority for an object or an effort.
Package(s)	A formally, predefined set of information, typically assembled for simultaneous delivery or communication purposes.
Pareto Principle	The “80-20” rule suggesting that 80% of the symptoms arise due to only 20 of the causes. A means to determine and focus solutions on root cause element or elements.

Participant Observer	An elicitation technique in which the observer is guided through the process being evaluated. The guide is a subject matter expert for the process.
PBP	Payback Period. The amount of time an investment or project will require to recover or return the invested funds.
Persona	A characterization of stakeholders according to <i>motivation</i> and <i>influence</i> characteristics.
PEST/PESTLE	A form of force field analysis that considers political, economic, social, technical/ legal, and environmental factors.
PII	Personally identifiable information. Information that may be used to identify a specific individual, their private contact and life information, financial, and other private details.
Plurality	A decision process wherein the largest group selects the outcome even if the largest group is not the majority.
PMI	Project Management Institute. International standards based organization that oversees credential processes within the fields of Project Management, Business Analysis, Risk, Programs, Portfolios, Scheduling, and Agile methodologies.
PMI-PBA	Project Management Institute's Professional Business Analyst credential.

Portfolio	A collection of strategic assets, which may include programs or projects, as well as stock, cash, facilities, equipment and personnel.
Prequalified	Reviewed and determined in advance.
Process Flow Diagram	A diagram displaying a sequence of activities or event in a process. Other names or examples include: swimlane diagrams, process maps, process diagrams, flow charts, workflows, Value Stream Maps, or SIPOC.
Process Flow/Workflow	A graphical representation of a process sequence that includes decisions points and potential outcomes.
Product	The result, whether tangible or intangible of a development and implementation effort.
Product life-cycle	The existence of a product from idea inception to end-of-life. Stages typically labeled: Develop, Acquire, Operate, Support/Maintain, Dispose.
Product Owner	The owner of the product or solution. Used specifically in Agile projects to represent the owner of the result or the appointed representative on the Agile team.
Product Scope	The entirety of the requirements and metrics necessary to determine the value of the product or solution.
Program	A set of related or interconnected projects, and the operational structure that supports them.

Progressive Elaboration	Adding detail to information as additional details, clarification or conditions are identified.
Project	A temporary, unique endeavor designed to affect change, produce a product or service, or enhance an outcome.
Project life-cycle	A methodology selection associated with project management that outlines the work cycles conducted: Predictive, Incremental, Iterative, Adaptive, and Just-in-Time are the common methods.
Project Resource Management	One of the 13 project management knowledge areas, in this instance focused on identifying and managing human and other resources.
Project Scope	The entirety of the work necessary to complete a product or solution.
RACI Diagram	A form of RAM used to identify team members (and others) who are Accountable, Responsible, Informed, or Consulted relative to work/deliverables.
RAM	Responsibility Assignment Matrix.
Regulation	A mandatory or imposed guideline or constraint.
Requirement(s)	A measureable component of solution delivery containing attributes, characteristics, and categorization that enable verification and/or validation toward the desired solution.

Requirements Management	The effort to gather, document, manage, and analyze requirements.
Requirements Package	A predefined set of requirements information, including test, tables, drawing, description, and instructions for their use. Developed solely and singly by the Business Analyst.
Retrospective	A summary review of the Sprints, Releases or <i>completion</i> of an Agile project; or the documentation associated with the lessons and changes resulting from the effort.
Risk	An event, measured for probability and impact, that should it occur would have a positive or negative influence on the outcome of an effort.
RML	Requirements Modeling Language. A structure modeling language used to define requirements based on their objective, system, people, or data components.
ROI	Return on Investment. The total or annualized return for the investment, usually expressed in percentages or annual percentage rates (APR).
Rolling Wave	Clarity of estimating information is more accurate in the near term (near the observer) than information closer to or beyond the time horizon.
Root Cause	Problems create symptoms that are typically visible. Root cause represents the underlying factors that generate a problem and its more visible elements.

Salience Model	A stakeholder referent model associating Power, Legitimacy, and Urgency across three overlapping circles in a Venn diagram.
Scope	All of the work, including assumptions and constraints, associated with the completion of a project or other effort.
Scope Creep	Any unmanaged changes or unmanaged attempt to change the scope of a product or project.
Scope Management Plan	The project management knowledge area focused on gathering, analyzing, managing and documenting the scope of a project.
Scrum Master	One possible title for an Agile Project manager or leader
Sequential process	A time based process with predecessors and successors that are time linked.
Signoff	Formal acceptance of requirement, component, product, or solution value and delivery by the customer or end user; typically associated with the signing of formal documents and the agreement to make full payment.
Simulation	Computer assisted or generated representation of a scenario or process.
SIPOC	A process flow diagram where SIPOC stands for suppliers, inputs, process, outputs, and customers. Usually associated with six-sigma process improvement.

Situational	Unique to a specific scenario, condition, or constraint, or set of conditions and constraints in combination.
Skill	A learned or development knowledge or aptitude.
SMART	Specific, Measurable, Achievable, Relevant, Time-bounded.
Solution	The response to a problem or opportunity.
Solution Validation	Confirmation of solution value PRIOR to transition.
SOP (Standard Operating Procedures)	A set of standards or guidelines identifying daily operational procedures that may include scripts or standards for exception handling.
Sprint	A time-boxed Agile iteration, often limited to two weeks of design, development and delivery effort. Sprint suggests 'built together'.
Stakeholder Register	A matrix (row/column) structure used to collect stakeholder attributes, communication requirements, and other project relevant information.
Stakeholders	Anyone who has a 'stake' in the outcome of the project. Sponsor(s), customer, user, team members, vendors, regulators, the general public, or any other individual group that may have interest or influence over an effort or its outcome.

Standup	A short daily meeting used to provide status, uncover issues, and define the daily work of an Agile project.
Status	An attribute associated with tracing the work performed to create, manage, review or document an object.
Storyboarding	The sequencing of User Stories, typically on a chart or board, associated with Agile methodologies.
Structured	With an established framework or pattern.
SWOT	Strengths, Weaknesses, Opportunities and Threats. A common business analysis technique. A form of Force Field Analysis.
Synchronous	Simultaneous, real time, live.
SysML	Systems Modeling Language. A structures modeling language that uses box stacking and linking to identify the components and high-level interactions of a system based solution.
Talent	An innate biological, physical or mental ability.
Test Case/Script	A set of written instructions designed to help testers identify the (potential) defects in a product or solution.

Testing	Efforts to verify or validate the work of a project, the completion of requirements, or the subsequent establishment and maintenance of value.
Threshold	A predefined boundary or limit.
Time-boxed	Bounded by a fixed start and finish time or date, or constrained by another specific time limit.
To-Be	The desired state of an organization.
Traceability Matrix	A business analysis technique that incorporates a hierarchical table of solution requirements, their attributes, and other information used to trace and control the creation of associated value. Also called the Coverage or a Coverage Matrix.
Tracing/Traceability	The tracking of an object or effort that incorporates elements of ongoing, linked activity.
Transition	The formal transfer of a product or solution from development to production; typically associated with the completion of project final administrative closure.
Tribe	A sociological group with a common goal, commonly distinguishable characteristics, or a common language that act in a collaborative manner. Size typically starts at 20 and rises to 250 before subgroups may form.
Triple Constraint	In project management terms, the standard baseline constraints for a project: Scope, Schedule, and Cost.

Types	Prequalified or defined categories based on characteristics or attributes.
UAT/User Acceptance Testing	Testing conducted by the end user or an end user representative that immediately precedes formal acceptance, signoff, and transition of a product or service.
UML	Unified Modeling Language. A structure diagramming language used to represent requirement and/or component interaction and process flow.
Unanimity	Full consensus. All participants are in full agreement.
Unstructured	Without an established framework, albeit general guidelines may exist.
Use Case	A specifically defined requirement stated in the form subject-action verb – object.
Use Case Diagram	A graphical representation of the interaction between an actor and a product, component, or process. The object is placed in the middle of a circle, with actor relationships represented outside the circle.
User Story	A single requirement or deliverable description associated with Agile work; produced by the user or product owner.

Validation	The determination that a component, deliverable, effort or product matches the requirements or the defined need. Validation is associated with value.
Value	The determination that a product or solution delivers the predefined need, meeting or exceeding financial, organizational, functional and non-functional metrics of value.
Verification	The determination relative to the correctness of truth of a requirement, action, or work effort.
Weighted Ranking	Also called <i>Multi-Criteria Decision Analysis</i> . A technique to rank requirements in a quantitative and hierarchical manner.
White Box	Term typically associated with testing where the tester is provided at least some information regarding the purpose, function, features or internal mechanisms of a product or service. Test cases are commonly used. Also called structural or glass box testing.
Wireframe	A page layout or architecture used for displaying the interactions of solution components as visibly seen by the customer or end-user.
Work Authorization System	A formal aspect of Traceability associated with approval of work before funds are released.
Work Breakdown Structure (WBS)	A graphical, hierarchical diagram that represents all of the work to be conducted on a project.

PMI Project Vocabulary Lexicon

The PMI Lexicon of Terms is being provided for reference purposes. The lexicon provides vocabulary and meaning that may be used on the PMI exam, although the PMI-PBA candidate is not expected to have the same depth of project, program, or portfolio management experience, expertise or situational application as a Project Management Professional. Words in the lexicon may help the candidate to differentiate between project and business analysis work, and to better partner with project managers through the use of a common language.

Acceptance Criteria

A set of conditions that are met before deliverables are accepted. See also ***deliverable*** and ***requirement***.

Activity

A distinct, scheduled portion of work performed during the course of a project.

Activity Code

An alphanumeric value assigned to each activity that enables classifying, sorting, and filtering. See also ***activity identifier*** and ***activity label***.

Activity Identifier

A unique alphanumeric value assigned to an activity and used to differentiate that activity from other activities. See also ***activity code*** and ***activity label***.

Activity Label

A phrase that names and describes an activity. See also ***activity code*** and ***activity identifier***.

Actual Cost (AC)

The realized cost incurred for the work performed on an activity during a specific time period. See also budget at completion (BAC), earned value (EV), estimate at completion (EAC), estimate to complete (ETC), and planned value (PV).

Analogous Estimating

A technique for estimating the duration or cost of an activity or a project using historical data from a similar activity or project. See also ***bottom-up estimating***, ***parametric estimating***, ***program evaluation and review technique (PERT)***, and ***three-point estimating***.

Apportioned Effort

An activity where effort is allotted proportionately across certain discrete efforts and not divisible into discrete efforts. [Note: Apportioned effort is one of three earned value management (EVM) types of activities used to measure work performance.

See also ***discrete effort*** and ***level of effort***.

Assumption

A factor in the planning process considered to be true, real, or certain, without proof or demonstration.

B

Backward Pass

A critical path method technique for calculating the late start and late finish dates by working backward through the schedule model from the project end date. See also *forward pass*.

Baseline

The approved version of a work product that can be changed using formal change control procedures and is used as the basis for comparison to actual results. See also *cost baseline*, *performance measurement baseline*, *schedule baseline*, and *scope baseline*.

Bottom-Up Estimating

A method of estimating project duration or cost by aggregating the estimates of the lower-level components of the work breakdown structure (WBS). See also *analogous estimating*, *parametric estimating*, *program evaluation and review technique (PERT)*, and *three-point estimating*.

Budget at Completion (BAC)

The sum of all budgets established for the work to be performed. See also *actual cost (AC)*, *earned value (EV)*, *estimate at completion (EAC)*, *estimate to complete (ETC)*, and *planned value (PV)*.

C

Change Control

A process whereby modifications to documents, deliverables, or baselines associated with the project are identified, documented, approved, or rejected. See also ***change control board*** and ***change control system***.

Change Control Board

A formally chartered group responsible for reviewing, evaluating, approving, delaying, or rejecting changes to the project, and for recording and communicating such decisions. See also ***change control*** and ***change control system***.

Change Control System

A set of procedures that describes how modifications to the project deliverables and documentation are managed and controlled. See also ***change control*** and ***change control board***.

Change Request

A formal proposal to modify any document, deliverable, or baseline.

Code of Accounts

A numbering system used to uniquely identify each component of the work breakdown structure.

Communications Management Plan

A component of the project, program, or portfolio management plan that describes how, when, and by whom information will be administered and disseminated. See also *project management plan*.

Configuration Management System

A collection of procedures used to track project artifacts and monitor and control changes to these artifacts.

Constraint

A limiting factor that affects the execution of a project, program, portfolio, or process.

Contingency Plan

A document describing actions that the project team can take if predetermined trigger conditions occur.

Contingency Reserve

Time or money allocated in the schedule or cost baseline for known risks with active response strategies. See also *management reserve* and *project budget*.

Control Account

A management control point where scope, budget, actual cost, and schedule are integrated and compared to earned value for performance measurement.

Corrective Action

An intentional activity that realigns the performance of the project work with the project management plan. See also ***preventive action***.

Cost Baseline

The approved version of work package cost estimates and contingency reserve that can be changed using formal change control procedures and is used as the basis for comparison to actual results. See also ***baseline, performance measurement baseline, schedule baseline, and scope baseline***.

Cost Management Plan

A component of a project or program management plan that describes how costs will be planned, structured, and controlled. See also ***project management plan***.

Cost Performance Index (CPI)

A measure of the cost efficiency of budgeted resources expressed as the ratio of earned value to actual cost. See also ***schedule performance index (SPI)***.

Cost Variance (CV)

The amount of budget deficit or surplus at a given point in time, expressed as the difference between the earned value and the actual cost. See also ***schedule variance (SV)***.

Crashing

A schedule compression technique used to shorten the schedule duration for the least incremental cost by adding resources. See also ***fast tracking*** and ***schedule compression***.

Critical Chain Method

A schedule method that allows the project team to place buffers on any project schedule path to account for limited resources and project uncertainties.

Critical Path

The sequence of activities that represents the longest path through a project, which determines the shortest possible duration. See also ***critical path activity*** and ***critical path method***.

Critical Path Activity

Any activity on the critical path in a project schedule. See also ***critical path*** and ***critical path method***.

Critical Path Method

A method used to estimate the minimum project duration and determine the amount of scheduling flexibility on the logical network paths within the schedule model. See also ***critical path*** and ***critical path activity***.

D

Data Date

A point in time when the status of the project is recorded.

Decision Tree Analysis

A diagramming and calculation technique for evaluating the implications of a chain of multiple options in the presence of uncertainty.

Decomposition

A technique used for dividing and subdividing the project scope and project deliverables into smaller, more manageable parts.

Defect Repair

An intentional activity to modify a nonconforming product or product component.

Deliverable

Any unique and verifiable product, result, or capability to perform a service that is produced to complete a process, phase, or project.

Discrete Effort

An activity that can be planned and measured and that yields a specific output.

[Note: Discrete effort is one of three earned value management (EVM) types of activities used to measure work performance.] See also ***apportioned effort*** and ***level of effort***.

Duration

The total number of work periods required to complete an activity or work breakdown structure component, expressed in hours, days, or weeks. See also ***effort***.

E

Early Finish Date

In the critical path method, the earliest possible point in time when the uncompleted portions of a schedule activity can finish based on the schedule network logic, the data date, and any schedule constraints. See also ***early start date, late start date, late finish date***, and ***schedule network analysis***.

Early Start Date

In the critical path method, the earliest possible point in time when the uncompleted portions of a schedule activity can start based on the schedule network logic, the data date, and any schedule constraints. See also ***early finish date, late finish date, late start date***, and ***schedule network analysis***.

Earned Value (EV)

The measure of work performed expressed in terms of the budget authorized for that work. See also ***actual cost (AC), budget at completion, estimate at completion (EAC), estimate to complete (ETC)***, and ***planned value (PV)***.

Earned Value Management

A methodology that combines scope, schedule, and resource measurements to assess project performance and progress.

Effort

The number of labor units required to complete a schedule activity or work breakdown structure component, often expressed in hours, days, or weeks. See also *duration*.

Enterprise Environmental Factors

Conditions, not under the immediate control of the team, that influence, constrain, or direct the project, program, or portfolio.

Estimate at Completion (EAC)

The expected total cost of completing all work expressed as the sum of the actual cost to date and the estimate to complete. See also *actual cost (AC)*, *budget at completion (BAC)*, *earned value (EV)*, *estimate to complete (ETC)* and *planned value (PV)*.

Estimate to Complete (ETC)

The expected cost to finish all the remaining project work. See also *actual cost (AC)*, *budget at completion (BAC)*, *earned value (EV)*, *estimate at completion (EAC)* and *planned value (PV)*.

F

Fast Tracking

A schedule compression technique in which activities or phases normally done in sequence are performed in parallel for at least a portion of their duration. See also *crashing* and *schedule compression*.

Finish-to-Finish

A logical relationship in which a successor activity cannot finish until a predecessor activity has finished. See also *finish-to-start*, *start-to-finish*, *start-to-start*, and *logical relationship*.

Finish-to-Start

A logical relationship in which a successor activity cannot start until a predecessor activity has finished. See also *finish-to-finish*, *start-to-finish*, *start-to-start*, and *logical relationship*.

Fixed Formula Method

A method of estimating earned value in which a specified percentage of the budget value of a work package is assigned to the start milestone and the remaining percentage is assigned when the work package is complete. See also *weighted milestone method*.

Forward Pass

A critical path method technique for calculating the early start and early finish dates by working forward through the schedule model from the project start date or a given point in time. See also *backward pass*.

Free Float

The amount of time that a schedule activity can be delayed without delaying the early start date of any successor or violating a schedule constraint. See also ***total float***, ***critical path***, ***near-critical activity***, and ***near-critical path***.

Functional Organization

An organizational structure in which staff is grouped by areas of specialization and the project manager has limited authority to assign work and apply resources. See also ***matrix organization*** and ***projectized organization***.

G

Gantt Chart

A bar chart of schedule information where activities are listed on the vertical axis, dates are shown on the horizontal axis, and activity durations are shown as horizontal bars placed according to start and finish dates.

H

Human Resource Management Plan

A component of the project or program management plan that describes the roles and responsibilities, reporting relationships, and staff management. See also ***project management plan*** and ***staffing management plan***.

L

Lag

The amount of time whereby a successor activity will be delayed with respect to a predecessor activity. See also *lead*.

Late Finish Date

In the critical path method, the latest possible point in time when the uncompleted portions of a schedule activity can finish based on the schedule network logic, the project completion date, and any schedule constraints. See also *early finish date, early start date, late start date, and schedule network analysis*.

Late Start Date

In the critical path method, the latest possible point in time when the uncompleted portions of a schedule activity can start based on the schedule network logic, the project completion date, and any schedule constraints. See also *early finish date, late finish date, early start date, and schedule network analysis*.

Lead

The amount of time whereby a successor activity can be advanced with respect to a predecessor activity. See also *lag*.

Lessons Learned

The knowledge gained during a project which shows how project events were addressed or should be addressed in the future for the purpose of improving future performance.

Level of Effort

An activity that does not produce definitive end products and is measured by the passage of time. [Note: Level of effort is one of three earned value management (EVM) types of activities used to measure work performance.] See also ***apportioned effort*** and ***discrete effort***.

Logical Relationship

A dependency between two activities or between an activity and a milestone. See also ***finish-to-finish***, ***finish-to-start***, ***start-to-finish***, and ***start-to-start***.

M

Management Reserve

Time or money that management sets aside in addition to the schedule or cost baseline and releases for unforeseen work that is within the scope of the project. See also ***contingency reserve*** and ***project budget***.

Matrix Organization

An organizational structure in which the project manager shares authority with the functional manager temporarily to assign work and apply resources. See also ***functional organization*** and ***projectized organization***.

Milestone

A significant point or event in a project, program, or portfolio.

Milestone Schedule

A type of schedule that presents milestones with planned dates.

Most Likely Duration

An estimate of the most probable activity duration that takes into account all of the known variables that could affect performance. See also ***optimistic duration***, and ***pessimistic duration***.

N

Near-Critical Activity

An activity with a total float that is deemed to be low based on expert judgment. See also ***critical path***, ***free float***, ***near-critical path***, and ***total float***.

Near-Critical Path

A sequence of activities with low float which, if exhausted, becomes a critical path sequence for the project. See also ***critical path***, ***free float***, ***near-critical activity***, and ***total float***.

Network Logic

All activity dependencies in a project schedule network diagram. See also ***early finish date, early start date, late finish date, late start date,*** and ***network path.***

Network Path

A sequence of activities connected by logical relationships in a project schedule network diagram. See also ***early finish date, early start date, late finish date, late start date,*** and ***network logic.***

Node

A point at which dependency lines connect on a schedule network diagram. See also ***precedence diagramming method (PDM)*** and ***project schedule network diagram.***

O

Opportunity

A risk that would have a positive effect on one or more project objectives. See also ***issue, risk,*** and ***threat.***

Optimistic Duration

An estimate of the shortest activity duration that takes into account all of the known variables that could affect performance. See also ***most likely duration*** and ***pessimistic duration.***

Organizational Breakdown Structure

A hierarchical representation of the project organization, which illustrates the relationship between project activities and the organizational units that will perform those activities. See also ***resource breakdown structure***, ***risk breakdown structure***, and ***work breakdown structure (WBS)***.

Organizational Enabler

A structural, cultural, technological, or human-resource practice that the performing organization can use to achieve strategic objectives. See also ***organizational project management***.

Organizational Process Assets

Plans, processes, policies, procedures, and knowledge bases specific to and used by the performing organization.

Organizational Project Management

A framework in which portfolio, program, and project management are integrated with organizational enablers in order to achieve strategic objectives. See also ***organizational enabler***.

Organizational Project Management Maturity

The level of an organization's ability to deliver the desired strategic outcomes in a predictable, controllable, and reliable manner.

Parametric Estimating

An estimating technique in which an algorithm is used to calculate cost or duration based on historical data and project parameters. See also ***analogous estimating, bottom-up estimating, program evaluation and review technique (PERT), and three-point estimating.***

Path Convergence

A relationship in which a schedule activity has more than one predecessor. See also ***path divergence, predecessor activity, and successor activity.***

Path Divergence

A relationship in which a schedule activity has more than one successor. See also ***path convergence, predecessor activity, and successor activity.***

Percent Complete

An estimate expressed as a percent of the amount of work that has been completed on an activity or a work breakdown structure component.

Performance Measurement Baseline

Integrated scope, schedule, and cost baselines used for comparison to manage, measure, and control project execution. See also ***baseline, cost baseline, schedule baseline, and scope baseline.***

Performing Organization

An enterprise whose personnel are the most directly involved in doing the work of the project or program.

Pessimistic Duration

An estimate of the longest activity duration that takes into account all of the known variables that could affect performance. See also ***most likely duration***, and ***optimistic duration***.

Phase Gate

A review at the end of a phase in which a decision is made to continue to the next phase, to continue with modification, or to end a project or program. See also ***project phase***.

Planned Value (PV)

The authorized budget assigned to scheduled work. See also ***actual cost (AC)***, ***budget at completion (BAC)***, ***earned value (EV)***, ***estimate at completion (EAC)***, and ***estimate to complete (ETC)***.

Portfolio

Projects, programs, sub portfolios, and operations managed as a group to achieve strategic objectives. See also ***program*** and ***project***.

Portfolio Balancing

The process of optimizing the mix of portfolio components to further the strategic objectives of the organization.

Portfolio Charter

A document issued by a sponsor that authorizes and specifies the portfolio structure and links the portfolio to the organization's strategic objectives. See also ***program charter*** and ***project charter***.

Portfolio Management

The centralized management of one or more portfolios to achieve strategic objectives. See also ***program management*** and ***project management***.

Portfolio Management Plan

A document that specifies how a portfolio will be organized, monitored, and controlled. See also ***program management plan*** and ***project management plan***.

Portfolio Manager

The person or group assigned by the performing organization to establish, balance, monitor, and control portfolio components in order to achieve strategic business objectives. See also ***program manager*** and ***project manager***.

Precedence Diagramming Method

A technique used for constructing a schedule model in which activities are represented by nodes and are graphically linked by one or more logical relationships to show the sequence in which the activities are to be performed. See also ***node*** and ***project schedule network diagram***.

Predecessor Activity

An activity that logically comes before a dependent activity in a schedule. See also ***successor activity*** and ***summary activity***.

Preventive Action

An intentional activity that ensures the future performance of the project work is aligned with the project management plan. See also ***corrective action***.

Probability and Impact Matrix

A grid for mapping the probability of occurrence of each risk and its impact on project objectives if that risk occurs. See also ***risk***.

Procurement Management Plan

A component of the project or program management plan that describes how a team will acquire goods and services from outside of the performing organization. See also ***project management plan***.

Product Life Cycle

The series of phases that represent the evolution of a product, from concept through delivery, growth, maturity, and to retirement. See also ***project life cycle***.

Program

A group of related projects, subprograms, and program activities that are managed in a coordinated way to obtain benefits not available from managing them individually. See also ***portfolio*** and ***project***.

Program Charter

A document issued by a sponsor that authorizes the program management team to use organizational resources to execute the program and links the program to the organization's strategic objectives. See also ***portfolio charter*** and ***project charter***.

Program Evaluation and Review Technique (PERT)

A technique used to estimate project duration through a weighted average of optimistic, pessimistic, and most likely activity durations when there is uncertainty with the individual activity estimates. See also *analogous estimating*, *bottom-up estimating*, *parametric estimating*, and *three-point estimating*.

Program Management

The application of knowledge, skills, tools, and techniques to a program to meet the program requirements and to obtain benefits and control not available by managing projects individually. See also *portfolio management* and *project management*.

Program Management Office

A management structure that standardizes the program-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques. See also *project management office*.

Program Management Plan

A document that integrates the program's subsidiary plans and establishes the management controls and overall plan for integrating and managing the program's individual components. See also *portfolio management plan* and *project management plan*.

Program Manager

The person authorized by the performing organization to lead the team or teams responsible for achieving program objectives. See also *portfolio manager* and *project manager*.

Progressive Elaboration

The iterative process of increasing the level of detail in a project management plan as greater amounts of information and more accurate estimates become available.

Project

A temporary endeavor undertaken to create a unique product, service, or result. See also *portfolio* and *program*.

Project Budget

The sum of work package cost estimates, contingency reserve, and management reserve. See also *contingency reserve* and *management reserve*.

Project Calendar

A calendar that identifies working days and shifts that are available for scheduled activities.

Project Charter

A document issued by the project initiator or sponsor that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities. See also *portfolio charter* and *program charter*.

Project Life Cycle

The series of phases that a project passes through from its initiation to its closure. See also *product life cycle*.

Project Management

The application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. See also ***portfolio management*** and ***program management***.

Project Management Office

A management structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques. See also ***program management office***.

Project Management Plan

The document that describes how the project will be executed, monitored and controlled, and closed. See also ***portfolio management plan, program management plan, communications management plan, cost management plan, human resource management plan, procurement management plan, quality management plan, requirements management plan, risk management plan, schedule management plan, scope management plan, staffing management plan,*** and ***stakeholder management plan***.

Project Manager

The person assigned by the performing organization to lead the team that is responsible for achieving the project objectives. See also ***portfolio manager*** and ***program manager***.

Project Phase

A collection of logically related project activities that culminates in the completion of one or more deliverables. See also ***phase gate***.

Project Schedule

An output of a schedule model that presents linked activities with planned dates, durations, milestones, and resources.

Project Schedule Network Diagram

A graphical representation of the logical relationships among the project schedule activities. See also ***node*** and ***precedence diagramming method (PDM)***.

Project Scope

The work performed to deliver a product, service, or result with the specified features and functions.

Project Scope Statement

The description of the project scope, major deliverables, assumptions, and constraints.

Projectized Organization

An organizational structure in which the project manager has full authority to assign work and apply resources. See also ***functional organization*** and ***matrix organization***.

Q

Quality Management Plan

A component of the project or program management plan that describes how an organization's quality policies will be implemented. See also ***project management plan***.

R

Requirements Management Plan

A component of the project or program management plan that describes how requirements will be analyzed, documented, and managed. See also ***project management plan***.

Requirements Traceability Matrix

A grid that links product requirements from their origin to the deliverables that satisfy them.

Residual Risk

The risk that remains after risk responses have been implemented. See also ***secondary risk***.

Resource Breakdown Structure

A hierarchical representation of resources by category and type. See also ***organizational breakdown structure, risk breakdown structure, and work breakdown structure (WBS)***.

Resource Calendar

A calendar that identifies the working days and shifts upon which each specific resource is available.

Resource Leveling

A resource optimization technique in which adjustments are made to the project schedule to optimize the allocation of resources and which may affect critical path. See also *resource smoothing* and *resource optimization technique*.

Resource Optimization Technique

A technique in which activity start and finish dates are adjusted to balance demand for resources with the available supply. See also *resource leveling* and *resource smoothing*.

Resource Smoothing

A resource optimization technique in which free and total float are used without affecting the critical path. See also *resource leveling* and *resource optimization technique*.

Responsibility Assignment Matrix

A grid that shows the project resources assigned to each work package.

Risk

An uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives. See also *issue*, *opportunity*, and *threat*.

Risk Acceptance

A risk response strategy whereby the project team decides to acknowledge the risk and not take any action unless the risk occurs. See also ***risk avoidance, risk enhancement, risk exploiting, risk mitigation, risk sharing, and risk transference.***

Risk Appetite

The degree of uncertainty an organization or individual is willing to accept in anticipation of a reward. See also ***risk threshold*** and ***risk tolerance.***

Risk Avoidance

A risk response strategy whereby the project team acts to eliminate the threat or protect the project from its impact. See also ***risk acceptance, risk enhancement, risk exploiting, risk mitigation, risk sharing, and risk transference.***

Risk Breakdown Structure

A hierarchical representation of risks that is organized according to risk categories. See also ***organizational breakdown structure, resource breakdown structure, and work breakdown structure (WBS).***

Risk Category

A group of potential causes of risk.

Risk Enhancement

A risk response strategy whereby the project team acts to increase the probability of occurrence or impact of an opportunity. See also ***risk acceptance,***

risk avoidance, risk exploiting, risk mitigation, risk sharing, and risk transference.

Risk Exploiting

A risk response strategy whereby the project team acts to ensure that an opportunity occurs. See also ***risk acceptance, risk avoidance, risk enhancement, risk mitigation, risk sharing, and risk transference.***

Risk Exposure

An aggregate measure of the potential impact of all risks at any given point in time in a project, program, or portfolio.

Risk Management Plan

A component of the project, program, or portfolio management plan that describes how risk management activities will be structured and performed. See also ***project management plan.***

Risk Mitigation

A risk response strategy whereby the project team acts to decrease the probability of occurrence or impact of a threat. See also ***risk acceptance, risk avoidance, risk enhancement, risk exploiting, risk sharing, and risk transference.***

Risk Owner

The person responsible for monitoring the risk and for selecting and implementing an appropriate risk response strategy.

Risk Register

A repository in which outputs of risk management processes are recorded.

Risk Sharing

A risk response strategy whereby the project team allocates ownership of an opportunity to a third party who is best able to capture the benefit for the project. See also ***risk acceptance, risk avoidance, risk enhancement, risk exploiting, risk mitigation, and risk transference.***

Risk Threshold

The level of risk exposure above which risks are addressed and below which risks may be accepted. See also ***risk appetite*** and ***risk tolerance.***

Risk Tolerance

The degree of uncertainty that an organization or individual is willing to withstand. See also ***risk appetite*** and ***risk threshold.***

Risk Transference

A risk response strategy whereby the project team shifts the impact of a threat to a third party, together with ownership of the response. See also ***risk acceptance, risk avoidance, risk enhancement, risk exploiting, risk mitigation, and risk sharing.***

Rolling Wave Planning

An iterative planning technique in which the work to be accomplished in the near term is planned in detail, while the work in the future is planned at a higher level.

S

Schedule Baseline

The approved version of a schedule model that can be changed using formal change control procedures and is used as the basis for comparison to actual results. See also ***baseline***, ***cost baseline***, ***performance measurement baseline***, and ***scope baseline***.

Schedule Compression

A technique used to shorten the schedule duration without reducing the project scope. See also ***crashing*** and ***fast tracking***.

Schedule Management Plan

A component of the project or program management plan that establishes the criteria and the activities for developing, monitoring, and controlling the schedule. See also ***project management plan***.

Schedule Model

A representation of the plan for executing the project's activities, including durations, dependencies, and other planning information, used to produce a project schedule along with other scheduling artifacts. See also ***schedule model analysis***.

Schedule Model Analysis

A process used to investigate or analyze the output of the schedule model in order to optimize the schedule. See also ***schedule model***.

Schedule Network Analysis

A technique to identify early and late start dates, as well as early and late finish dates, for the uncompleted portions of project activities. See also ***early finish date, early start date, late finish date, and late start date***.

Schedule Performance Index (SPI)

A measure of schedule efficiency expressed as the ratio of earned value to planned value. See also ***cost performance index (CPI)***.

Schedule Variance (SV)

A measure of schedule performance expressed as the difference between the earned value and the planned value. See also ***cost variance (CV)***.

Scope Baseline

The approved version of a scope statement, work breakdown structure (WBS), and its associated WBS dictionary that can be changed using formal change control procedures and is used as the basis for comparison to actual results. See also ***baseline, cost baseline, performance measurement baseline, and schedule baseline***.

Scope Creep

The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources.

Scope Management Plan

A component of the project or program management plan that describes how the scope will be defined, developed, monitored, controlled, and validated. See also ***project management plan***.

S-Curve Analysis

A technique used to indicate performance trends by using a graph that displays cumulative costs over a specific time period.

Secondary Risk

A risk that arises as a direct result of implementing a risk response. See also ***residual risk***.

Sponsor

An individual or a group that provides resources and support for the project, program, or portfolio, and is accountable for enabling success. See also ***stakeholder***.

Staffing Management Plan

A component of the human resource plan that describes when and how team members will be acquired and how long they will be needed. See also ***human resource management plan***.

Stakeholder

An individual, group, or organization that may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio. See also ***sponsor***.

Stakeholder Management Plan

A component of the project management plan that describes how stakeholders will be engaged in project decision making and execution. See also ***project management plan***.

Start-to-Finish

A logical relationship in which a successor activity cannot finish until a predecessor activity has started. See also ***finish-to-finish, finish-to-start, start-to-start***, and ***logical relationship***.

Start-to-Start

A logical relationship in which a successor activity cannot start until a predecessor activity has started. See also ***finish-to-finish, finish-to-start, start-to-finish***, and ***logical relationship***.

Successor Activity

A dependent activity that logically comes after another activity in a schedule. See also ***predecessor activity*** and ***summary activity***.

Summary Activity

A group of related schedule activities aggregated and displayed as a single activity. See also ***predecessor activity*** and ***successor activity***.

T

Threat

A risk that would have a negative effect on one or more project objectives. See also *issue*, *opportunity*, and *risk*.

Three-Point Estimating

A technique used to estimate cost or duration by applying an average or weighted average of optimistic, pessimistic, and most likely estimates when there is uncertainty with the individual activity estimates. See also *analogous estimating*, *bottom-up estimating*, *parametric estimating*, and *program evaluation and review technique (PERT)*.

To-Complete Performance Index (TCPI)

A measure of the cost performance that is achieved with the remaining resources in order to meet a specified management goal, expressed as the ratio of the cost to finish the outstanding work to the remaining budget. See also *actual cost (AC)*, *budget at completion (BAC)*, *earned value (EV)*, and *estimate at completion (EAC)*.

Total Float

The amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project finish date or violating a schedule constraint. See also *free float*, *critical path*, *near-critical activity*, and *near-critical path*.

Trigger Condition

An event or situation that indicates that a risk is about to occur.

V

Variance Analysis

A technique for determining the cause and degree of difference between the baseline and actual performance. See also ***cost variance (CV)***, ***schedule variance (SV)***, and ***variance at completion***.

Variance at Completion (VAC)

A projection of the amount of budget deficit or surplus, expressed as the difference between the budget at completion and the estimate at completion. See also ***budget at completion (BAC)***, ***cost variance (CV)***, ***estimate at completion (EAC)***, and ***variance analysis***.

W

WBS Dictionary

A document that provides detailed deliverable, activity, and scheduling information about each component in the work breakdown structure. See also ***work breakdown structure (WBS)***.

Weighted Milestone Method

A method of estimating earned value in which the budget value of a work package is divided into measurable segments, each ending with a milestone that is assigned a weighted budget value. See also ***fixed formula method***.

What-If Scenario Analysis

The process of evaluating scenarios in order to predict their effect on project objectives.

Work Breakdown Structure (WBS)

A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables. See also ***organizational breakdown structure, resource breakdown structure, risk breakdown structure, and WBS dictionary.***

Work Package

The work defined at the lowest level of the work breakdown structure for which cost and duration can be estimated and managed.

Workaround

An immediate and temporary response to an issue, for which a prior response had not been planned or was not effective. See also ***risk mitigation.***

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