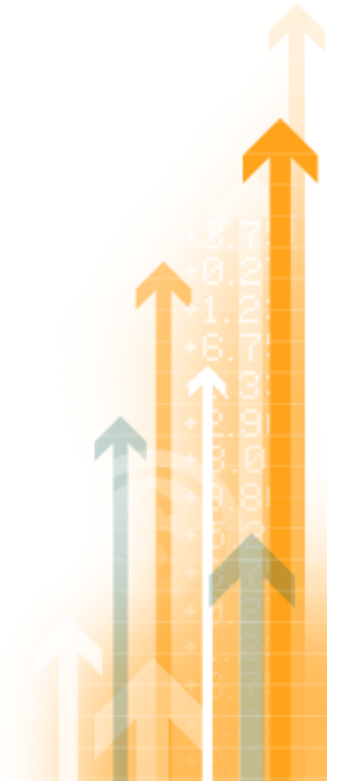


# ➔ Lesson Introduction

The *Requirements Management and Communication* Knowledge Area "describes the activities and considerations for managing and expressing requirements to a broad and diverse audience."

- Communicating requirements helps stakeholders have a common understanding of the requirements
- Managing requirements assists with understanding the effects of change, **and**
  - Links business goals and objectives to actual solutions being implemented
  - Allows requirements to be reused for future needs.



## Requirements Management

In Lesson 3, we discussed the *Requirements Management Plan*, which the BA puts together as part of the planning activities in the *BA Planning and Monitoring* Knowledge Area. If you recall, this plan deals with the activities that define requirements development, the process that will be followed for requirements change control, as well as which requirements attributes will be considered and the how requirements traceability is to be implemented.

In this lesson, we'll look at the activities that the BA performs in carrying out this plan.

## Requirements Communication

If you ask several businesspeople to identify the biggest problem in business, it is likely that they will say "communication." Unclear, ambiguous, or incomplete communication leads to incorrect and unproductive activities, the need for rework, missed deadlines, wasted time and money, and frustration. It seems as if everyone should want to spend more time improving their communications skills.

Needless to say, you may have the best requirements ever captured and documented - but if you don't know how to communicate those requirements to stakeholders and solutions developers, you may wind up with anything from a project that isn't funded because nobody understands it to one that does not provide what the end users want. **Good communications shows your stakeholders the benefits of your project and shows your technical team how to design it so the end users will actually use it.**



# ➔ Lesson Objectives

**Upon completing this lesson, you should be able to:**

- Describe the activities for managing the solution scope and requirements.
- Define the activities and techniques needed for requirements traceability.
- Describe how to maintain requirements for re-use.
- Select and structure a *Requirements Package*.
- Determine the appropriate type and level of requirements communication in order to reach common agreement and understanding with stakeholders.



## Scope Creep

Most people have heard of project teams that started out solving one problem but ended up solving another problem by the time they'd finished. Maybe they ended up not solving any problem! This is often due to scope creep. When this happens, the focus of the project "creeps" away from its original desired end result. This can happen when stakeholders introduce new requirements, seek to modify existing requirements, or cause developers to digress from their original development plan.

If an official change to the project's purpose occurs (usually initiated by key stakeholders), the requirements must be modified appropriately, in accordance with the change management policies in place.

In order to minimize scope creep, the business analyst must begin the project by defining a requirements *baseline*. This is simply the set of project requirements written down formally and subject to change management processes. Changes to the requirements are compared against this baseline, which allows the business analyst and stakeholders to see immediately if the project objectives begin to deviate from the original objectives.

## Manage Requirements Conflicts

In an ideal world, all requirements are captured accurately and projects are completed on time, under budget, and on target. Stakeholders in such a world always agree on project deliverables and on the requirements.

Of course, we don't live in such a world and stakeholder disagreements over requirements are a fact of life on most projects. The business analyst plays an important role in addressing these disagreements if and when they arise.

Examples of stakeholder disagreements can range from trivial, such as the color or font used in a graphical user interface, to significant, such as deciding which wireless telephony standard the company should adopt for its communications system. At an even more fundamental level, stakeholders may disagree on specific functionality being proposed for a solution, such as whether users should be able to sort data from a relational database using a variety of criteria of their choosing or if they should be satisfied with the default sort criterion.

A business analyst can serve as an intermediary, helping stakeholders understand the sources of their disagreement and then leading them to a consensus solution, or she can step out of the way and let the stakeholders resolve their differences themselves. It all depends on the particular situation at hand and on organizational policies governing such situations. **In all circumstances, however, the business analyst must document any conflicts that arise using a change log document. It is important to maintain an audit trail of what is done to research, discuss, and resolve the conflict.**

The business analyst will, in most situations, coordinate meetings, oversee the documentation process, and ensure that all stakeholders are kept informed. Finally, she must obtain official approval for problem resolutions once they are adopted.



## Managing the Requirements Change Process

The only aspect of a project that doesn't change is the need for change! Change is inevitable but must be managed so it doesn't derail the entire project. Of course, if there is too much change, it might indicate that the project scope or even its vision were not sufficiently well-defined from the beginning.

The process of keeping requirements changes under control is called change management. The main thrust of change management centers on planning and documenting requirements changes carefully to ensure they remain in alignment with high-level design specifications. In addition, the business analyst must ensure that all relevant documents (such as *Traceability Matrices*) are updated for the benefit of project team members.

In many organizations, the business analyst acts as a "requirements police officer" ruling out changes to requirements that do not align with project objectives. The analyst usually consults with key stakeholders when changes seem to be needed in order to evaluate and prioritize those changes as well as assess their business value.

## Requirements Change Management Example

Let's look at an example of how change management might work.

Itoyo Electric, Inc. manufactures household appliances including washing machines and dryers. Itoyo is in the process of designing and prototyping a new generation of washing machines for sale primarily in developed countries. The new washers will have high-tech features based on information gleaned from marketing surveys and focus groups.

One of these features is the ability to read Radio Frequency Identification (RFID) tags sewn into clothes and automatically adjust washer settings (temperature, agitation speed, and cycle length) to accommodate different types of fabrics. However, international standards organizations have been unable to decide upon a uniform coding system for labeling fabrics. As a result, different clothing manufacturers may choose different coding systems for the same fabrics, rendering the washing machine incapable of choosing the correct settings for all the clothes a family might own.



Itoyo's management now faces the challenge of deciding whether to continue designing the washer with the RFID capabilities included or to abandon the RFID capabilities until an international standard can be established. One alternative might be to build the RFID capability into the washer design as an optional feature that consumers could disable. This would require some redesign work that would impact the original identified requirements for the product. Since the RFID functionality was originally a key product objective, the company decides to go ahead and include it with the option to manually enable or disable it. Finally, management decides to go with the RFID functions but with the option of manually enabling or disabling them.



## **Itoyo Electric Example**

Here's what might happen next:

- Itoyo executives instruct the washing machine's project manager to prepare a change request and enter it into the change management system.
- The project's senior business analyst next enters the description of the change into a log and updates the appropriate requirements documents.
- Using an already-established communications plan, the analyst formally promulgates the modified design requirements to everyone on the project team and requests that department heads working on the project give their approval.
- Design engineers working on the project evaluate the change request and develop a plan to implement it. They also inform the business analyst about the impact this change will have to the development costs and to the design schedule.
- After reviewing the change request, key department heads sign off on it and the change becomes official! The engineers begin implementing the modified design.

## **Itoyo Electric Example - Continued**

And next:

- Software developers working on the washer's operating system make note of the change request and begin to modify the software accordingly. The business analyst reviews the changes to the user interface (touch screen display) and concludes they will be easy for consumers to understand.
- Itoyo technical writers who monitor the change request log regularly make a note to add a section to the user manual that describes the RFID feature and explains how to enable it (once an international standard is in place).

Remember, this is only a simplified example - the way things are done in your company may be different!

## Requirements Signoff

The last formal step of the requirements process is gaining formal approval of the requirements package from project stakeholders. They may physically sign the documents or approve them electronically, depending on the organization's approval policies and procedures.

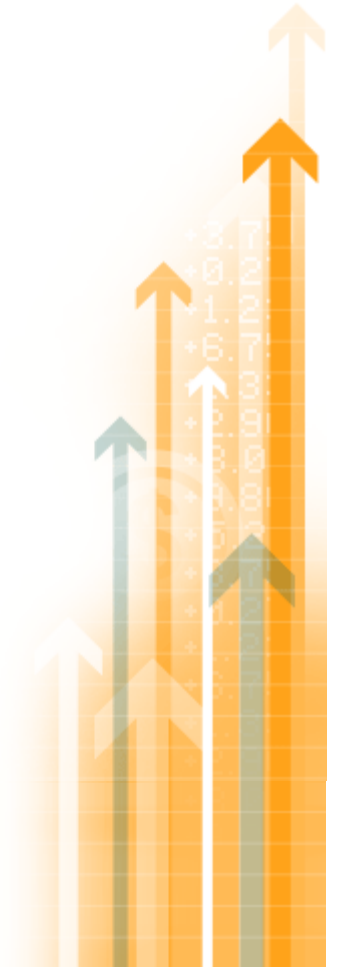
For smaller projects, all stakeholders may need to approve and sign all requirements documents. For larger projects with larger numbers of diverse requirements, the package may be divided into smaller portions (for example, user interface requirements may be separated from database response time requirements) with only stakeholders interested in or knowledgeable about a particular portion needing to approve it and sign off on it.

The business analyst then files copies of all the documents in project archives.



## ➔ Self Check

1. **Which one of the following is an example of scope creep?**
  - a. An application that was originally designed to collect and archive student evaluations about their courses now being expanded to include course "wish lists" for upcoming semesters.
  - b. A marketing campaign that cross-sells various related products from the same manufacturer.
  - c. New software developers added to a project after it has started.
  - d. A formal change to the basic functional requirements baseline stipulating that the new application being developed must work on a newly-released version of the Macintosh operating system.

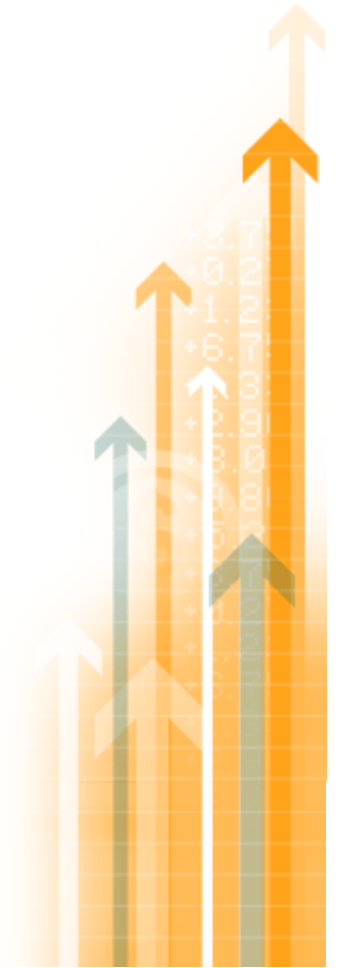


## ➔ Self Check

- 2. ABC Financial, Inc. is planning to introduce a new line of home loan products that are designed to help first-time home buyers make wiser purchasing decisions despite the uncertainties of the housing market.**

**Originally, borrowers were going to have to visit ABC's offices to apply for one of these loans. Now the CEO of ABC Financial has declared that he wants people to be able to apply and receive approval over the Internet. This means a lot of extra work for the IT department!**  
**What should the lead business analyst do?**

- a. Convince the CEO that this scope creep is not acceptable!
- b. Initiate the change process.
- c. Establish new percentage rates for the loans since the lead business analyst has a hunch that people who apply for loans online are more likely to default on their loans.



## Requirements Traceability

Another way to keep scope under control is to include traceability in the requirements development process.

*Requirements Traceability* is the ability to identify and document the lineage of each requirement, including its derivation (backward traceability), its allocation (forward traceability), and its relationship to other requirements.

Requirements traceability shows how requirements are interrelated, which helps the business analyst identify how changing one set of requirements might impact other requirements thereby causing unanticipated changes in another component of the solution.

Watch this YouTube video on requirements traceability.

Traceability must include the entire chain of requirements, for any hardware, software, training, documentation, etc., through scope, testing, and acceptance criteria, to enable validation and verification of the completed solution's acceptability. (The acceptance testing plan should have been defined during requirements assessment, and included in the project plan.)

## Traceability

Business analysts must document traceability accurately and consistently. Typical techniques for doing this include:

- Using a unique, unambiguous, and permanent numbering scheme for requirements
- Ensuring that the requirements statements themselves are unique and unambiguous
- Assigning role responsibilities for maintaining links between requirements and upper-level end-product specifications
- Developing written procedures for ensuring traceability
- Specifying criteria for determining which requirements require traceability

One method for keeping track of requirements and their connection to specific product characteristics (design specifications) makes use of a Traceability Matrix. The best way to learn how to construct a trace matrix is through a very simple example.

## Traceability Matrix Example

Suppose you are working on a project in which the end product is a web-based user interface for an online shopping business that allows people to enter their user names and passwords, and then retrieve a list of items they have purchased in the past. The requirements for this user interface might include:

- The ability to enter non-ASCII characters
- Case insensitivity.
- A means for retrieving or resetting forgotten passwords.
- The ability to see a list of products purchased in the past along with the date of purchase and the price.
- An option that allows users to specify search parameters, such as a date range or product category, that reduces the number of items returned.

See an example of a traceability matrix on the next page.





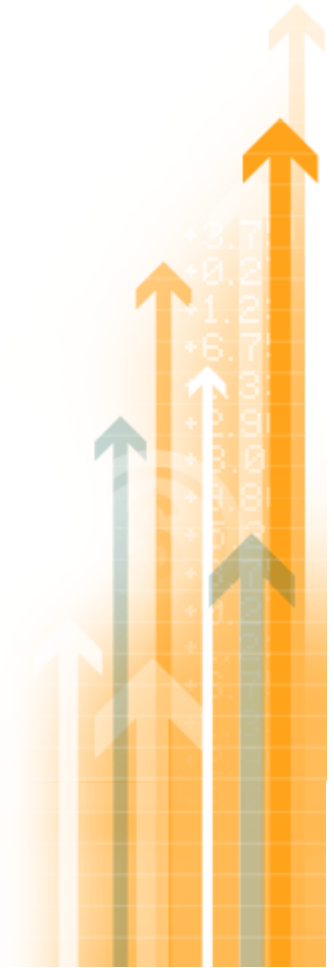
## **Impact Analysis**

A Business Analyst can assess the effect of a proposed change in the requirements for a solution and determine how this change will impact other requirements, the solution scope or the stakeholders. Collectively this assessment is called *Impact Analysis*.

Traceability, for example, is a useful tool for performing impact analysis. When a requirement changes, its relationships to other requirements or system components can be reviewed. Each related requirement or component may also require a change to support the new requirement. These components can also be traced to their related components and those components reviewed for needed changes. Knowing the impact of a change helps business decision makers evaluate their options with facts.

# ➔ Self Check

1. **What do Traceability Matrices show?**
  - a. Correlations between resources (people) and tasks in a project.
  - b. The relationship between product features and user requirements.
  - c. The communications that must occur between project managers and stakeholders.
  - d. The cause-effect relationship between the marketing campaign for a new product and sales figures.



## Maintain Requirements for Re-use

The business analyst should take measures to archive and preserve requirements after the solution is implemented so that they can be re-used for other purposes. The requirements that should be maintained (i.e., in a requirements repository) are those that are candidates for long-term use, such as:

- Requirements that an organization must meet on an ongoing basis (such as quality standards)
- Requirements to be reused in future similar projects
- Requirements that satisfied a current solution but that are still needed (or could be needed) by stakeholders

This information can eventually become part of the *Organizational Process Assets* for the organization. By not "re-inventing the wheel," the organization can reduce the analysis time and effort in future projects, assist in the maintenance of previously implemented solutions and support training, corporate governance and standards compliance.

## Considerations for Requirements Re-use

In order to maintain and re-use requirements, the BA should heed these best practices:

- Requirements must be clearly named and defined
- Requirements must be easily accessible to other business analysts
- If a repository is used, there needs to be an explicitly identified "repository manager"

Requirements that are maintained and re-used should be expressed in a form that makes them suitable for long-term usage by the organization (even in the absence of the stakeholders who originally defined the requirements). Also, in some cases, requirements that weren't originally approved or implemented may be maintained for a possible future initiative.

## The Requirements Package

A *Requirements Package* is the collection of the business analyst's work. It is the documentation, formulation, and organization of all the requirements the business analyst has gathered from the stakeholders, packaged in a structured, comprehensive set of project requirements.

The objective of the requirements package is to ensure that the requirements are effectively communicated to, understood by, and usable by a stakeholder group or groups. Therefore, the requirements package must be presented in formats understandable by the stakeholders. For this, it must be clear, concise, accurate, and have the appropriate level of detail for the intended audience.

Requirements packages may be prepared for:

- Early assessment of quality and planning
- Evaluation of possible alternatives
- Formal reviews and approvals
- Inputs to solution design
- Conformance to contractual and regulatory obligations
- Maintenance for re-use

## Prepare Requirements Package

The primary goal of developing a *Requirements Package* is to convey information clearly; misunderstood requirements lead to project rework and cost overruns.

When deciding how to present requirements, **ask**:

- How detailed do the requirements need to be?
- What information is important to communicate?
- What is the appropriate level of detail to include?
- What will the particular stakeholder understand by the type of audience they represent, and what their preferred style of communication is?
- Are the requirements package presentation and the requirements details appropriate for the type of audience that needs to review it?
- How does the requirements package support the previous and subsequent phases or project activities and deliverables?

Are you a "bilingual" communicator?  
This YouTube video will tell you.

## **Steps for Developing a Requirements Package**

### **Determine the contents, organization, and layout of the requirements package**

The requirements package must be cohesive, logical, and understandable. It must transmit an effective message to the group (or groups) of people who will be participating in the formal review process. In situations where the technical knowledge or other characteristics of the people in these groups differ significantly, the business analyst may need to create more than one requirements package and tailor each one for each group.

### **Identify the makeup of the audience(s) to which the requirements package will be submitted for review**

Before developing the final version (or versions) of a requirements package, the business analyst needs to examine each group of stakeholders systematically to determine their needs and expectations. This allows her to develop a strategy for communicating with them effectively.



## **Additional Steps**

### Assemble the Package

The business analyst begins producing a requirements package by identifying the different types of documents needed to provide a concise yet detailed description of the desired project outcomes and the means of achieving them. The documents that are needed will differ depending on the size and extent of a project, whether the project is to be developed in-house or by an external vendor, and the type of project.

Typically, the package includes well-organized information about:

- *Solution Scope*
- *Business Requirements*
- *Stakeholder Requirements*
- *Solution Requirements (Functional and Non-Functional)*
- *Transition Requirements*

...along with appropriate diagrams, renderings, flowcharts, etc. that help clarify the message.

The business analyst who develops a requirements package must be especially skilled in ensuring the requirements are complete, sufficiently detailed, understandable, and (most importantly) actionable by the targeted audience.

## Requirements Package Table of Contents Example

### 1. **Business Objectives**

- i. Project Goals and Objectives
- ii. Stakeholders
- iii. Product/Solution Scope
- iv. Risks
- v. Costs

### 2. **Constraints**

- i. Mandated Constraints
- ii. Naming Conventions
- iii. Assumptions

### 3. **Stakeholder Requirements**

- i. Stakeholder Requirements

### 4. **Functional Requirements**

- i. Functional Requirements
- ii. Data Requirements

### 5. **Non-functional Requirements**

- i. Look and Feel Requirements
- ii. Usability and User Experience Requirements
- iii. Performance Requirements
- iv. Operational Requirements
- v. Support Requirements
- vi. Security Requirements
- vii. Legal Requirements

### 6. **Migration to the New Product/Solution**

- i. Transition Requirements
- ii. End-user Documentation and Training

### 7. **Other**

- i. Next Releases
- ii. Requirements Parking Lot

### 8. **Appendix**

- i. Supporting Information
- ii. Diagrams and Charts

## Finishing Up

### Prepare the package for formal presentation

The requirements package should look similar to a well-organized book, complete with a table of contents that clearly lists the different sections of the document with each section corresponding to a different requirement category. The different sections should be laid out, bound, and tabbed in a professional manner. An executive summary should provide the main points in a page or less.

The nature of the project will determine how detailed or thorough the requirements must be. For example, a completely new software application obviously requires a full set of detailed *requirements (solution and business)* but an application that is being upgraded may need only the technical side of the solution requirements that pertain to the portion being upgraded.

Generally speaking, the amount of documentation usually winds up being proportional to the size and scope of the project. A full-scale development project for a new product that encompasses innovative hardware and integrated software obviously will need a very complete requirements analysis and lengthy, detailed documentation. On the other hand, an upgrade from an existing computer operating system to the latest release of the same product may need only technical requirements - especially if the applications a user runs on the system are not changing.



## Communicate Requirements

Once the business analyst has prepared the *Requirements Package*, she must present it to the various stakeholders.

Our business analyst will use different means to communicate these requirements at different points during the project's lifecycle. The objectives of these communications include obtaining stakeholder approval, providing status updates, clarifying requirements, communicating design changes, etc.



It's the job of the business analyst to know what to communicate to which stakeholder at what time using which method.

## **The Appropriate Communication Format**

This is perhaps one of the most important tasks associated with the communication of requirements. The audiences to which the business analyst must present this information can range from high-level managers, who may have almost no technical knowledge, to engineers and technicians, who will be the people that create the solution. The format of the communication must match the audience otherwise the message will be lost. The consequences of not tailoring communications to the audience range from bad to worse: the project might be executed incorrectly by technical professionals who misunderstand the requirements or it might not be approved in the first place by high-level leaders who don't see any business benefits.

Various stakeholders must review project information at many points during the project's lifecycle. The business analyst must understand each requirement thoroughly and present those requirements in a way that is understandable and actionable by these stakeholders.

## Conducting a Requirements Presentation

Some of these presentations may be formal while others are less so. Presentations need to be more formal when high-level stakeholders are in the audience and the objective is to gain their approval or support. Formal presentations may also be specified in project schedules such as when major phases are finished and the project team begins to prepare for the next phase, or when the quality assurance staff gives their final approval.

Presentations can be less formal when working with project team members involved in building or testing the solution, discussing requirements with end users and others impacted by the project, or helping trainers develop training programs to address the new procedures or applications. A good rule of thumb is this: if somebody in the audience is in a position to approve the project or one phase of the project, it's best to have a formal presentation. Otherwise, it is often a good idea to "get in the trenches" with the people building or using the solution.

In many cases, business analysts may prepare individual presentations for individual components of a requirements package. There may be one presentation to summarize and fine-tune business requirements, another to communicate technical specifications to a design team, another to discuss interconnectivity with external systems, and so forth.

## Organizing the Presentation

Regardless of whether the presentation is formal or informal, it's always a good idea to organize the presentation and conduct the session efficiently. As in any business meeting, the business analyst should:

- Ask everyone to introduce themselves and state their role
- State the meeting or session objectives
- Provide a project summary or update
- Give the presentation
- Identify and document action items
- Review the meeting objectives and their resolution
  - obtain stakeholder signatures or other commitments, if appropriate
- State the time and location of the next meeting (if necessary)



## Technique - Structured Walkthrough

A *Structured Walkthrough* is a technique that can be used in formal requirements reviews. A structured walkthrough is a particular type of requirements presentation. Its objective is to communicate, verify and validate requirements in a formal, structured setting (BABOK®, page 212).

This technique requires a complete requirements package, a list of appropriate reviewers, and a pre-selected meeting vehicle (i.e., a conference room for in-person or meeting software for distance meetings).

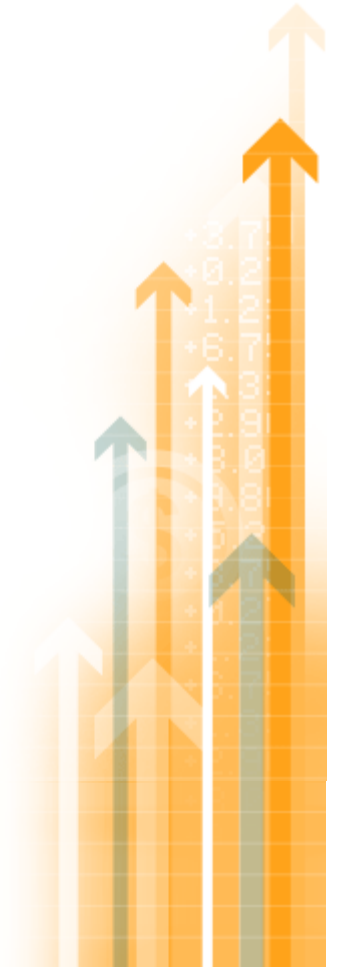
Because this is a formal session likely to be attended by influential stakeholders, business analysts need to prepare for the review carefully with attention to detail. Small details, such as providing invitees with sufficient advance notice, guiding participants through the review process (if needed), and ensuring that participants understand their role and the objectives of the session, are very important for the success of the review.

Appropriate participants include stakeholders (or their representatives) who were involved in the specification of the requirements and stakeholders (or their representatives) who will work on building the solution based on those requirements. Ideally, the participants in a structured walkthrough should read and understand the requirements documentation in advance of the review session so that the time is spent focusing on questions to be answered and changes to be made to the requirements.



## ➔ Self Check

1. **Which of the following meeting objectives are appropriate for a requirements presentation in which the audience consists of software engineers? (Choose all that apply.)**
  - a. Determine if the requirements are sufficiently detailed to begin sketching out the application's architecture.
  - b. Gain formal approval for the requirements.
  - c. Ensure that a competitive analysis has been thoroughly documented.
  - d. Identify specific technical requirements that need further documentation.

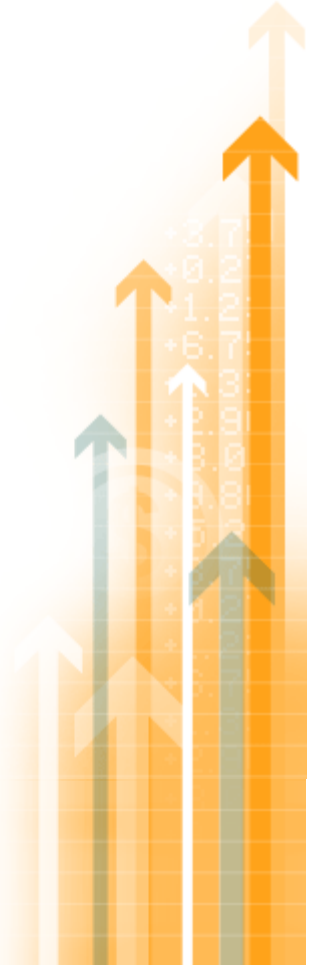


## ➔ Self Check

2. What does the image shown here represent?



- a. The BA must ensure that she communicates to stakeholders in the same way so they do not feel slighted.
- b. The BA must know what to communicate to which stakeholder at what time using which method.
- c. The BA should use the Circle of Influence theory to communicate to stakeholders.



## ➔ Lesson Summary

In this lesson, you learned about the *Requirements Management and Communication* Knowledge Area. This lesson's key topics included:

- Manage Solution Scope & Requirements
- Manage Requirements Traceability
- Maintain Requirements for Re-use
- Prepare Requirements Package
- Communicate Requirements

The BA engages in these activities to ensure that stakeholders are aware of and in agreement with the implementation of the requirements pertaining to the solution under consideration.

