Midterm

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INT 4203, Systems Analysis and Design

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October 25, 2022

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**1) Identify and briefly describe five common fact-finding methods.**

There are many different types of fact-finding methods which are described in the textbook *Systems Analysis and Design* written by Scott Tilley all of which are: performing interviews, giving out surveys, documentation review, observation, sampling (Tilley, S. p. 20), studying organization charts (Tilley, S. p. 56, 64), Joint Application Development (JAD) which brings users into the development process (Tilley, S. p. 109), brainstorming (Tilley, S. p. 125), performing outside research (Tilley, S. p. 126), and analyzing maintenance and help desk logs (Tilley, S. p. 389). However, the five most common fact-finding methods are: performing interviews, giving out surveys/questionnaires, document review/sampling, observation, and performing outside research.

Interviews – The interviewing fact-finding method is an in-depth way of finding out the facts directly by asking someone about the system. In order to complete the interview fact-finding method there are 7 steps: determine the people to interview, establish objectives for the interview, develop interview questions, prepare for the interview, conduct the interview, document the interview, and evaluate the interview (Tilley, S. p. 116). It’s also important in the interview to make sure you know when to properly ask open-ended and close-ended questions to be more productive and get answers which suffice (Tilley, S. p. 117-118). There are also other types of questions such as range-of-response questions which are things like on a scale of 1 to 10, how would you rate … good, neutral, bad (Tilley, S. p. 118). Interviews are good for a limited number of people as it uses up a lot of time compared to other methods.

Surveys/Questionnaires – Surveys/questionnaires are a good method of fact-finding to get a large number of responses back in a quick and efficient way, however, may not be as personal as doing interviews (Tilley, S. p. 123). These may often be done by sending out an email to an entire department with a link to a Google Form or any other survey link. Surveys are able to ask a wide range of topics/questions such as “workloads, reports received, volumes of transactions handled, job duties, difficulties” and many other questions which may be important to ask (Tilley, S. p. 123). It is good to make sure in surveys to make the questions brief, user-friendly, have provided clear instructions, having logically ordered the questions, not to lead on responses, limit open-ended questions, have a general comments section, and to test it beforehand with a small group (Tilley, S. p. 124).

Document review/analyze the data/sampling/brainstorming – During document review you take a look at the documentation which already exists about the current system and try to understand it (Tilley, S. p. 122). It’s important to also keep in mind that documentation may be old or out of date, discontinued or have modified procedures (Tilley, S. p. 122). During document review it’s also important to look at samples of actual completed forms or other information, copies of actual forms, and review blank copies of forms (Tilley, S. p. 122). With brainstorming you get together a small group of people and have a discussion about something specific like a problem or opportunity (Tilley, S. p. 125). It allows everyone in the group to participate and have new ideas, allowing people to build off of each other, and can have more of a structured of unstructured method (Tilley, S. p. 125). With sampling, it is similar to document review, you take examples of actual documents such as records, reports, operational logs, and other forms, and then use a sampling technique to analyze the data inputted (Tilley, S. p. 125). Sampling allows you to represent an overall population rather than a specific population (Tilley, S. p. 126).

Observation – With observation, you are able to see the system in action, giving yourself an additional perspective to understand the system and its procedures (Tilley, S. p. 122). You can confirm what people have said are true during interviews or surveys with observing everything personally and are able to find that documentation and interviews may not be correct (Tilley, S. p. 122). It is a good idea during observation fact finding to have a list of checkboxes to look for during your time observing to ensure everything said was correct or not and so you do not forget something to say or ask or to look for (Tilley, S. p. 122). It’s also a good idea to look after the Hawthorne effect during observations (Tilley, S. p. 122-123).

Performing outside research – It’s also a good idea when fact-finding to look outside of the organization, going to the Internet can be a really good source of information if used correctly, there are also IT magazines, books, technical material, and news which can be good sources of information (Tilley, S. p. 126). On top of these sources of information you can go to professional meetings, seminars, and have discussions with other professionals in order to solve problems or find information which you need (Tilley, S. p. 126).

**2) Explain the differences between a Gantt chart and a PERT/CPM chart.**

A Gantt chart has the goal of showing planned and actual progress on a project and is a horizontal bar chart that is able to show a set of tasks which are and need to be completed (Tilley, S. p. 76). A Gantt chart also uses time as the horizontal axis which is an important distinction from other types of charts and shows tasks in vertical arrays which has a planned starting and ending time of each task, on top of this in a Gantt chart the length of the bar visually shows how long its duration is supposed to be (Tilley, S. p. 76). It is also possible with Gantt charts to create task groups in order to simplify projects, allowing you to easily view tasks and its subsidiary tasks (Tilley, S. p. 77). With a Gantt chart, you also are able to add another contrasting bar onto the tasks bar to show progress on each task (Tilley, S. p. 77). Gantt charts are able to show you the overall progress of the project, however, when it comes to detailed information per task it starts to lack information needed (Tilley, S. p. 77).

A PERT chart is often used by the military and was created by the United States Navy, and is used to be able to manage highly complex projects, however, CPM charts were created at around the same time as the military’s PERT chart but was made by private companies, however, today they are the same thing and have almost if at all any differences and have merged together (Tilley, S. p. 77). The PERT/CPM chart uses a bottom-up techniques, allowing you to analyze individual tasks, and is made by identifying all of the tasks needed in the project and figuring out around how much time each task will take to perform (Tilley, S. p. 77). After this, you must find a logical order that the tasks are to be performed in, then we must calculate the time to complete the project as a whole, finding out what tasks are critical for delays to not happen (Tilley, S. p. 77).

A Gantt chart has time on the horizontal axis to determine how long the tasks are visually seen for and may be less detailed than a PERT/CPM chart, a PERT chart is done bottom-up and doesn’t have time as it’s axis and is visually shown by the order of tasks to be completed.

**3) What are JAD and RAD, and how do they differ from traditional fact-finding**

**methods? What are the main advantages of team-based methods?**

JAD, or Join Application Development is a fact-finding technique which brings users of the system into the development process as an active participant (Tilley, S. p. 109). With JAD, we acknowledge that users of the system have a critical role in how well the system operates as they know what needs to be done, and gets them to participate in the development process by giving input on operations, desired changes, saying what input and output requirements exist, if there are any issues which need to be brought up like UI design or functionality, and how the project should support normal day-to-date tasks (Tilley, S. p. 109). With JAD we also ask design questions and look for comments by the users actively and then analyze and complete the requested changes. With the JAD team, there are meetings over a number of days or weeks in conference rooms typically which allows users to give their input on systems, there are also roles in a JAD. The roles are the JAD project leader, top management, managers, users, systems analysts and other IT staff members, and the recorder (Tilley, S. p. 109).

RAD, or Rapid Application Development is a team-based technique that aims to speed up the development of information systems and to produce a functioning information system (Tilley, S. p. 111). RAD is similar to JAD in that it uses a group approach, however, goes much further than JAD, RAD has the end goal of producing a entire information system while JAD is just for creating the requirements model (Tilley, S. p. 111). RAD is a four-phase life cycle, requirements planning, user design, construction, and cutover (Tilley, S. p. 111). RAD uses prototyping and user involvement as a main method to get the work done (Tilley, S. p. 111). The RAD team may also use CASE tools to help aid in building prototypes and documentation (Tilley, S. p. 111). RAD focuses on cutting development speed, and expenses, having the goal of quick development while making the necessary changes quickly (Tilley, S. p. 111).

Traditionally, users play more of a passive role in the development of the systems, this allows them to fully participate, have their voices heard more, and test new designs, systems, and functionality before it is ever actually used, letting them request changes with the designs and then actually having them changed.

JAD, unfortunately, is often more expensive than traditional methods and may need a smaller group size to be most effective, however, it is often found that with JAD users are able to feel like they have a sense of ownership in the results of the project and have a higher support for the new system, as well it may grant more accurate system requirements, goals, and have higher commitment to success, which are some of the team-based main advantages (Tilley, S. p. 110).

RAD, compared to traditional methods allows the system to be developed more quickly and save a large amount of money while doing so, which are its primary team-based advantages (Tilley, S. p. 112). Unfortunately, RAD, puts stress on the mechanics of the system and not emphasize the company’s strategic needs for the system, and may introduce risk to not work with long-term objectives (Tilley, S. p. 112). RAD, may also have a loss in quality because of how quickly it is wanted to be done (Tilley, S. p. 112).

**4) What are agile methods? Are they better than traditional methods? Why or why not?**

Agile methods are a developmental technique which is in use to develop a system incrementally rather than trying to get it all at once (Tilley, S. p. 22). Agile does this through building a series of prototypes and getting feedback and making adjustments, repeating this process up to dozens of times, this allows it to get a large amount of user feedback throughout the development process making sure it is exactly how they want it (Tilley, S. p. 22). Agile methods also often use a spiral model for development, showing a series of iterations/revisions made (Tilley, S. p. 23). Agile methods are often more risky than traditional methods. There are also many agile approaches such as scrum (Tilley, S. p. 113).

It is difficult to say if agile is better than traditional methods or traditional methods better than agile methods because it cannot be broken down that far as it would be an oversimplification. Some projects may use agile methods better than others and some projects may require traditional methods over others because of the requirements of the project, how the team interacts with each other, and what they are told to use. Both agile methods and traditional methods have their own individual strengths and weaknesses which must be considered for every project. It is also possible that a project doesn’t use a single specific method and is, rather, a combination of methods. For example, agile methods are often very flexible and efficient with change and having frequent feedback and checking back in makes sure you know you are on the right track and helps reduce risk, however, it may require more communications and more technical communications, can lack structure and documentation (Tilley, S. p. 18). While, traditional structured analysis methods are popular and widely used, are well documented, have good existing project management tools and techniques but changes can be costly and may not get good feedback in the beginning which could cause problems (Tilley, S. p. 18).

**5) Describe data and process modeling concepts and tools.**

Data modeling is the idea that you are visualizing the flow of the data throughout a project or system while process modeling is the idea of visualizing the flow of the processes throughout a project or system, however, it is possible to do both without a diagram visualization and can be written out to explain the flow. Data or process modeling are often used to reduce complexity and to assist in developing systems or in projects.

Data flow diagrams, or DFD, is a tool used to be able to model data. It shows how a system is able to store, process, and transform data (Tilley, S. p. 131). With data flow diagrams, it depends on the level you are making the diagrams, make a box which is a process but don’t worry about what is inside it and only the data input and output, however, with lower depth you may want to expand on these (Tilley, S. p. 131). Some data flow diagram examples can be found below. There are, of course, rules for diagramming such as avoiding spontaneous generation, black holes, and gray holes (Tilley, S. p. 149).

**Diagram

Description automatically generated**

(Tilley, S. p. 159).

Business process models, or BPM, is a tool to be able to model processes. It shows the people, events, and interactions within a system. However, there are also lots of other ways to create process models. An example of a business process model may be found below.

Diagram

Description automatically generated

(Tilley, S. p. 10).

Both tools are also able to be made with another tool, called a CASE tool or by hand if needed (Tilley, S. p. 129). However, there are different software that is able to be used to create diagrams such as Visio, and Excel, or just about anything to create diagrams. These diagrams are also able to have differing levels of depth of visualization such as a 40,000-foot view and a 10,000-foot view and could be classified into different levels. For example, a level 0 may be a 40,000-foot view and a level 1 may be a 30,000-foot view, and the higher level the lower level it becomes. Diagramming is also often done by using UML, or Unified Modeling Language, which uses object-oriented concepts and can have different sets of symbols for different meanings like the Gane and Sarson Symbols or the Yourdon Symbols (Tilley, S. p. 146).

**6) Define a use case and a use case diagram, and prepare a sample of each.**

A use case is used in order to represent the steps which are taken in a specific business function or process (Tilley, S. p. 187). Use cases use things called actors, otherwise known as external entities which are tasked of initiating the use case itself which it is able to do by interacting with it like asking it to perform a function or process (Tilley, S. p. 187). It is also possible for a use case to interact with another use case.

A use case diagram often uses UML, or Unified Modeling Language, and is tasked with visualizing use cases, allowing the interaction from external entity and business functions or processes and other external entities/actors to be visually represented in order to simplify down the process (Tilley, S. p. 132). It is also possible to use a CASE tool in order to generate these visualizations (Tilley, S. p. 132).

An example use case is this: A patient is able to make an appointment for their doctors office for a visit. The use case diagram would be this image:

Diagram

Description automatically generated

With this image, we are able to easily identify the actors and the processes, identifying what it is capable of doing. The patient, or external entity/actor is able to make an appointment, which is a business function or process (Tilley, S. p. 187).

**7) What is information technology and why is it important?**

Information Technology, or IT, is not only the hardware but also the software and services that are able to be used in order to “manage, communicate, and share information” (Tilley, S. p. 3). Information Technology is able to help individuals and organizations be able to be more productive, efficient, ensure high quality product delivery and services, it also is able to be used to help maintain customer loyalty and can be used to make good decision (Tilley, S. p. 3). On top of this, it can be used to help provide entertainment such as streaming platforms.

Information Technology not only is able to provide a lot of advantages for an individual and for a business, but it is also extremely important. Information Technology is able to make it so things that we were not able to do before are now possible, allowing new businesses to be made, being able to keep in touch with people far away. It is also able to help save lives with technological innovations in the medical fields, as well as help with space flight, other topics of research, and help assist in tasks usually too harmful or difficult for humans to do (Tilley, S. p. 3). Information Technology is also not important just for innovations but is also the backbone of many companies, how they are able to sell their product, market it, and communicate with customers (Tilley, S. p. 3).

**8) Identify the main components of an information system. What is a mission-critical system?**

The main components of an information system are “technology, people, and data to provide support for business functions such as order processing, inventory control, human resources, accounting, and many more. Some information systems handle routine day-to-day tasks, while others can help managers make better decisions, spot marketplace trends, and reveal patterns that might be hidden in stored data” (Tilley, S. p. 4). In other words, the main components of an information system is the hardware, and software that it contains as well as the data, processes and people. Information systems are able to control things such as day-to-day tasks which saves people’s time as well as help managers make critical decisions by showing them data to say what will happen if they make certain decisions.

A mission-critical system is a system that if it goes down will prevent the company from operating normally (Tilley, S. p. 5). Some examples of mission-critical systems are their ERP systems, transaction processing systems, database applications, and many more. Without these systems, they may not be able to operate at all, or may be able to but have large amounts of delays.

**9) What are four types of feasibility? Which type focuses on total cost of ownership? Which type is influenced primarily by users?**

The four types of feasibility are: operational, economic, technical, and schedule feasibility.

Operational – Is it operationally feasible? Operational feasibility asks if it will be effectively used after the project has been completed, and if old and new users of the systems will be able to use it without difficulty, otherwise it may not be worth it (Tilley, S. p. 57). It also must take into account workplace culture (Tilley, S. p. 57). Some questions you can ask to determine if something is operationally feasible are:

“Does management support the project? Do users support the project? Is the current system well liked and effectively used? Do users see the need for change?

Will the new system result in a workforce reduction? If so, what will happen to the affected employees?

Will the new system require training for users? If so, is the company prepared to provide the necessary resources for training current employees?” (Tilley, S. p. 57).

However, there are many more questions to be asked to determine if something is operationally feasible.

Economic – Is it economically feasible? Economic feasibility asks if the benefits from the project are more than the estimated costs of the project, also known as total cost of ownership, TCO (Tilley, S. p. 57). Economic feasibility is not only initial costs but also takes into account support and maintenance costs as well as acquisition costs (Tilley, S. p. 57). Some areas of interest for economic feasibility are:

“People, including IT staff and users

Hardware and equipment

Software, including in-house development as well as purchases from vendors

Formal and information training, including peer-to-peer support” (Tilley, S. p. 57).

However, there are many others that may be considered when looking at if something is economically feasible such as tangible costs and intangible costs and benefits.

Technical – Is it technically feasible? When looking at if something is technically feasible, we must look at the technical resources required in order to properly develop the system or project, as well as purchase and install it or operate the required systems and determine if it is feasible of if the technology even exists at this moment in time (Tilley, S. p. 58). Some questions to consider in technical feasibility are:

“Does the company have the necessary hardware, software, and network resources? If not, can those resources be acquired without difficulty?

Does the company have the needed technical expertise? If not, can it be acquired?

Does the proposed platform have sufficient capacity for future needs? If not, can it be expanded?” (Tilley, S. p. 58).

However, there are, of course other factors and questions which may need to be asked when determining technical feasibility.

Schedule – Does it fit within our schedule? When looking at scheduling feasibility we must see if the project is able to be implemented within the amount of time which we have determined needed as well as looking at how time and cost interaction (Tilley, S. p. 58). Some questions to consider in scheduling feasibility are:

“Can the company or the IT team control the factors that affect schedule

feasibility?

Has management established a firm timetable for the project?

What conditions must be satisfied during the development of the system?” (Tilley, S. p. 59).

However, there are many other questions to ask such as if you accelerate the schedule are there any risks as well as questioning the risks associated and more (Tilley, S. p. 59).

Economic feasibility focuses on total cost of ownership, TCO, whereas operational feasibility is influenced primarily by users as they determine if the system is suitable for them.

**10) What specific information do you need to create a work breakdown structure?**

When creating a work breakdown structure, or WBS, you need to know the differences between Gantt Charts and PERT charts (Tilley, S. p. 91). You also must know all the tasks, their durations and be able to identify the task patterns, their dependencies, dates, maybe even costs, and the total project duration (Tilley, S. p. 91). You also must have events or milestones and be able to identify them in the chart you decide to use (Tilley, S. p. 78). On top of this, you must know/determine the critical path that must be taken without causing delays (Tilley, S. p. 85).

References

Tilley, S. (2020). Systems analysis and design (12th ed.). Cengage.

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