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MET CS682 ASSIGNMENT 2

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The purpose of this exercise is to (1) give you practice exploring development processes, and (2) identifying risks when embarking on a project.

Please leave the headings and the gray text unchanged except for the hints section which should not be included in your solution. Observe the page limitations; however, you may include as many appendices as you wish. All appendices should be referred to in the main text. Include your last name in the file name of the assignment. (Example: SmithMichael\_CS682Assignment1.docx)

**The Scenario:**

# The *GardenByDesign* company specializes in landscaping, garden design, lawn care, and specialty items such as koi pools and bonsai. Specifically, this system is to provide sales staff a mobile solution for design, estimates and sales while they are in yards visiting clients.

You are beginning to plan systems analysis and design for the GardenByDesign system introduced in Assignment 1. Your solution will build on what you developed for systems analysis in assignment 1

The following project characteristics apply:

* The CEO is interested in features for GardenByDesign which conflict with what many of the other key stakeholders think is important should and can be delivered in the initial release. You may select one of the important requirements you determined for this from your assignment 1.
* It has not yet been determined whether GardenByDesign will be cloud-hosted or locally hosted.
* Your team has 2 developers experienced with programming of this type of system: 8 developers are needed to complete the initial delivery within the expected timeframe of six months.
* The two developers are on opposite US coasts. One of the developers is very talented but has difficulty working with others, however they must be on the job for contractual reasons.
* The CEO believes that GardenByDesign must integrate with several other applications such as lawn service systems, but other key stakeholders disagree—at least for the initial development.
* The CEO would like to hire as many offshore developers who are potentially in substantially different time zones to keep costs low-–up to 4 developers.
* Initial delivery is to be in six months.

# Process

Consider each of the following development processes in terms of how suitable it would be for this particular project.

1. Waterfall Process
2. An iterative (Rapid Application Development) process with 3-4 iterations
3. Agile Process

## 1.1 Comparison

For each of the three listed development processes, provide one strength and one and weakness relative to this particular project. You are free to assume any additional assumptions or constraints that are consistent with the description given here but be sure to specify them. (up to 2 pages of 12-point text)

# Process Considerations

**Waterfall Process**

Strength:

**Detailed documentation**: The waterfall model stresses on documenting information at each stage. When there are unforeseen shifts in the staff, like when employees quit in the middle of the project, the waterfall model focuses on information being made available so the replacement of those employees can pick up on the project swiftly. The initial delivery of *GardenByDesign* system should be within 6 months. If the developers that worked on the project quit after 6 months, the developers hired later to fill their positions can accelerate the process by going through the documentation. Documentation also helps the existing developers remember and recall the processes followed earlier.

Weakness:

**Unstable/ unknown requirements**: The waterfall model focuses on trailing after a set of phases, continually stepping ahead. Back tracing is not feasible, which makes it hard to go back and revise/ modify requirements. If there is a shift in scope of the project, pivoting will be challenging. When there are abrupt changes in requirements, the project will not deliver the value originally envisioned. There is still some gap in requirements for *GardenByDesign* system. For instance, whether *GardenByDesign* will be cloud-hosted or locally hosted is still not determined.

Decision justification:

Since the requirements are not fully determined and the scope of the project may change, the waterfall model may not be the best approach for this project. Back tracing to make any changes in the requirements is not easy. To use this approach, the requirements need to be defined before development starts which is not the case for this scenario.

**Agile Process - Scrum**

Strength:

**Unknown requirements/ quick delivery**: Agile is equipped to accept changing/ unknown requirements and delivering what the user truly wants. Agile allows collection of requirements through user stories and conversations. True to agile manifesto, the process prioritizes its reaction to changes over following a plan. Scrum can facilitate teams to instantly carry out effective project deliverables. Scrum embraces feedback from end users. Suppose the user wants *GardenByDesign* to integrate with other applications after the initial release. The change can be adopted and the product can still be delivered quickly. Brief development stages allow delivery of working software after every 2 to 4 weeks sprint.

Weakness:

**Distributed/ Inexperienced team**: Scrum process, agile in its nature, emphasizes on pair programming and face-to-face interactions. Scrum focuses on working software over detailed documentation. Scrum team requires personnel to have experience and work together as a team. *GardenByDesign* wants to hire some developers offshore which is not supported by Agile methodology. Without documentation and experience, the Scrum process is not for inexperienced employees and distributed team.

Decision justification:

Although the Scrum process supports changing requirements and offers to deliver in a timely manner, it is not completely suitable for *GardenByDesign* system as the team is distributed. A Scrum requires the team to work together which is impossible considering the geographical distance between the developers. The distance also adds to the communication gap which negates the importance of communication in agile processes. Furthermore, the lack of experience needed to complete the project rules out the scrum process as the scrum team considers skilled personnel.

**Phased RAD process**

Strength:

**Distributed team:** The Phased RAD approach trails after the waterfall methodology, so the extensive documentation and arrangements for training distributed team and offshore developers are realized. *GardenByDesign* company has 2 experienced developers who are distributed thus far (by being on opposite US coasts). The company wants to hire up to 4 developers offshore and 2 more developers for the project, further distributing the team. The Phased RAD approach is well-geared toward distributed teams as it helps the team by allocating time for training and provide the full documentation.

Weakness:

**Incomplete initial versions:** Phased Development breaks the entire system into a series of versions that are developed subsequently. Although the phased approach delivers the system to the users faster than the traditional waterfall, the iterations in the beginning are sketchy on purpose as only a few requirements are implemented to accelerate the process. The limited functionality of the system in earlier iterations may upset the users. For instance, the initial version *GardenByDesign* system does not have a feature to archive designs. The sales staff would want the Archive feature for quicker perusal of selected designs when they are reporting sales and design estimates. Not having the feature, may irk them as they would have to scroll through an enormous number of designs to get to the design and the information they are looking for.

Decision justification:

The Phased RAD approach supports the strengths of the waterfall methodology (documentation and distributed teams). The Phased approach makes way for *GardenByDesign* system to make use of these strengths and overcome weaknesses of the waterfall methodology in accommodating changing requirements. The Phased approach’s weakness of upsetting the user is something that can be fixed. The subsequent release of the product will have the Archive feature available. However, even without this fix the system still provides information like Design Estimate and Sales value. For this reason, the missing Archive feature will not be much of an issue.

## 1.2 Recommendation

Designate one process—or a combination of processes—that you consider *most* appropriate, including outline of key project phases for this specific project – develop a road map and link to this project characteristics. Where applicable, explain how standard processes should be augmented or altered for this project (up to 1/2 page of 12-point text)

A combination of Agile and RAD processes seems to be the best way to go about this project. There are some inconsistencies in the requirements that can be solved by following Agile manifesto of collecting requirements through user stories and conversations. With the team being distributed, there will be some issues with communication. Agile processes do not support offshoring, but the team can still follow its communication and collaboration virtually. Scrum team takes in only experienced developers which is not the case in this project. Phased RAD process comes into play to solve this issue. Developers will have access to documentation and can be trained so experience is not very critical here.

Phased Development fragments *GardenByDesign* system into a series of versions that are released subsequently. The approach starts by planning and conducting initial systems analysis for supporting business initiatives. Subsequently, the requirements that are most essential for the system are designed, implemented, and tested in the first version. The first version of the system is released to the user who will provide their feedback post using the system. The feedback and other requirements will be presented for analysis for the second version, which will be designed, implemented, and tested. The second version of the system is released to the user, the next iteration starts, and the process spirals through the waterfall model surrounded by each release.

## 1.3 Explanation

Explain why the process you selected would work best for this particular project. Explain in detail how it would fit the given circumstances. Avoid giving a generic response. (up to 1 page of 12-point text)

The Phased RAD approach works for *GardenByDesign* system as the business is hiring developers offshore and is dealing with a distributed team. Since there are only two developers that are skilled for the project, the approach can allocate time for training the new developers. The process emphasizes on following a plan and provides comprehensive documentation. Documentation can help newly hired developers to understand and accelerate the project. This also helps the project team to track the project timeline. Unlike Agile processes, the developers need not have experience, work together as a team, or have face-to-face interactions. There are, however, some limitations to Phased approach to this project. There are inconsistencies in requirements and the talented developer has trouble working with the others.

For this project, the CEO is interested in adding additional features to the system which the stakeholders do not find essential. Suppose the CEO wants to add a chat feature in *GardenByDesign* app. The stakeholders think that chat may not be as important as finding designs and analyzing design estimates and sales. The requirement of whether the system will be locally hosted or cloud-hosted is not stated. Agile development method helps when there are missing requirements by applying a user story framework. The developers and the end users can communicate together virtually to understand what the system must do using the user story framework.

User story framework:

As a <type of user>, I want <some goal> so that <some reason>.

Example 1: As a CEO, I want a chat feature in the app so that the employees can message each other.

Example 2: As a Sales Administrator, I want the designs to be categorized (Lawn, Landscape, Koi Pond etc.) and want each design to display the estimate and sales value for the selected year so I can report yearly sales trends to my manager.

When developers share data with each other, they will be more flexible as they enable cross-training and get an understanding on in what way the company functions. Decent interactions inspire the developers to engage in depth of proficiency in their role. Agile stresses on communication and collaboration over documentation. Howbeit, documentation is still very crucial for this project as it is dealing with distributed teams. Phased RAD approach can resolve this issue. Phased RAD approach also supports the CEO’S idea of hiring some developers offshore to keep costs low. So, the Phased approach is indirectly helping in keeping the company’s costs low. By combining the two approaches, we are also overcoming the weaknesses of each approach.

# Risk Analysis

## 2.1 Five Risks

Based on the job characteristics provided, identify five risks in this project with the highest potential to affect the process of testing and implementation phases specifically. Avoid giving a generic response: focus on this particular system under development and its particular characteristics. Note the hints below in the section “Hints on Risks.” (up to 1 page of 12-point text)

* **Quality:** The organization wants the project built using front-end technologies and only the 2 existing developers have the experience. The newly hired developers have experience only in back-end technologies. The business will lose profit and pay for rework and rectification if the delivered product is of low quality.
* **Deadline:** The business will incur significant costs if the project is not completed on-time. The business will have to deal with additional foreign exchange fees to pay offshore developers if the project continues beyond 6 months.
* **Requirements:** If the stakeholders abruptly decide they want to add new features to *GardenByDesign* system and change its scope, then all the efforts put into creating the original system has no value. The change in scope makes the original system an unwanted system.
* **Resource:** The management may fail to hire skilled workers that will be able to work on the project. There are possibilities of existing developers leaving the project. This can add extra pressure on hiring managers. Hiring new employees at a later stage of the project can be expensive.
* **Communication**: The project team has never worked with each other before. There will be time and language barriers that can make developers hesitant from contacting each other. Lack of communication in the team can lead to plenty of misperceptions, which can be challenging to run the project successfully.

## 2.2 Selected Risk

Select one of these risks and provide as below.

The business will lose profit as it may lose customers if the delivered product is of low quality. The organization wants the project built using front-end technologies and only the 2 existing developers have the experience. The newly hired developers have experience only in back-end technologies. The system that will be built may be low in quality as most developers lack relevant experience.

### 2.2.1 Likelihood

Explain specifically the likelihood of occurrence of this risk. (up to ½ page of 12-point text)

The probability of risk is high with a likelihood of 8 on a scale of 1-10. Since only 25% of the team is skilled for the project and the remaining 75% is not, there is a room for error. This is a team that has not worked together before. There is a possibility that the inexperienced may unintentionally introduce errors into the system that may go unnoticed till the release.

### 2.2.2 Impact

Explain specifically the impact on the project of this risk. (up to ½ page of 12-point text)

Delivering a low-quality product can impact the business negatively as the profitability decreases and the business loses customers’ loyalty. A low-quality product also affects the company’s reputation. The project budget will increase: the cost of rework and maintenance and extra cost to ensure low impact will be delivered. A new schedule will have to be put in place. The developers’ contracts will have to be extended, pay additional offshore fees, and pay test engineers to catch all the defects in the system by performing additional tests. Rework can demotivate employees to work on the project, so there are chances of some of the team members quitting. This will again add to the cost of hiring replacements.

The cost of impact dealing with quality issues can be relatively high. The impact can be estimated to be a 7.

### 2.2.3 Risk Type

State whether the risk is primarily organizational or technical and explain. (up to two sentences)

Organizational risk – The risk deals with matching developers’ skills with project needs. Since the development team does not have enough experienced developers for the project, there is a possibility that the system deliverables will be of low quality.

### 2.2.4 Risk Management

Write an account of how you would deal with the risk. Explain whether you are proposing risk “conquest” and/or “avoidance”. (up to 1 page of 12-point text)

The costs of achieving quality work, performing quality checks, and attaining objectives should be meticulously handled. The everlasting impact of quality on the business should end on a positive note.

Conquest:

The quality issues can be minimized by:

* allocating one of the experienced developers to train the inexperienced before the project begins. This reduces the learning curve during the project so there will be fewer defects in the system.
* bringing in outside expertise for some part of the project so the inexperienced developers receive feedback on their work and ensure they are on the right track. The expert can be assigned to review the work of newly hired developers and catch as many software defects as possible.
* aiming to hire as many experienced developers if possible within the given timeframe.
* motivating the team to focus on the quality as the goal.
* encouraging the developers to communicate with each other so the definition of “quality” is consistent throughout the team.

The cost of managing the risk can be a 6 on a scale of 1 to 10. The project will be planned regardless of the risk. By scheduling time for training, the employees still need to be paid even when they are in training. The outside expert needs to be paid for the duration of the time they are involved in the project.

# References

Show that you used a wide variety of resources by listing them below and clearly indicating in the body above where you used. Make sure to use proper referencing in your paper. We suggest using APA format, but other formats are fine as long as it clearly distinguishes your work from work of others in your response—be mindful of plagiarism rules.

[1] Dennis, A., Wixom, B. H., & Roth, R. M. (2015). Systems Analysis & Design. Wiley.

[2] Module 2: The Management of System Analysis. (n.d.). Retrieved from

https://onlinecampus.bu.edu/bbcswebdav/pid-8604383-dt-content-rid-50582440\_1/courses/

21sprgmetcs682\_o1/course/module02/allpages.htm

# Evaluation



**Please do not include Hints section from your solution.**

# Hints on Process

**Clarity**:

* When you choose an interpretation, an approach, or a technique, an explanation will contribute well here towards clarity, thoroughness
* There is no such thing as a 100% “right” answer to this question. For that reason, it is important that you explain how you made your selection.
* Check for consistency.

**Technical Soundness**

* Understand and outline the key differences between Waterfall, RAD, and Agile processes and explain these thoroughly and clearly within the context of the scenario. The Waterfall, Rapid Application Development (RAD), and Agile processes are referenced in module 2 Part 1.
* Note that RAD and Agile are both iterative in nature.
* Pages 5 through 17 in the textbook will help. The notes and the textbook are not identical: there are many variants on system analysis concepts, and we encourage broad reading and experimentation, this is where research comes in.

**Thoroughness and Coverage**

* Review your solution after completing both part 1 (Development Process) and part 2 (Risk Analysis)—you may uncover additional considerations—as well as check for consistency.
* Research similar business and different SDLC process characteristics to have a better understanding on how they compare and contrast.

**Relevance**

* Reference the specific characteristics of the project in your justification. Don’t be generic. Explain any trade-offs you made developing your recommendation(s).

# Hints on Risks

**Clarity**:

* Risk should be defined precise and to the point stating the issue, what may happen and impact.

**Technical Soundness**

* Rely on the online lecture for this part of the assignment.

**Thoroughness and Coverage**

* Use references to support risk identification, likelihood, cost of impact and cost of management.
* Make sure that you explain how you would mitigate the risk, be explicit about whether your strategy is conquest or avoidance—or perhaps a combination.
* Review your entire solution after completing it—you will uncover additional considerations. Check for consistency.

**Relevance**

* A strong solution has to concentrate on real risks rather than on very unlikely situations.