

Griswold University Software Solution

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Abstract

The Griswold University software solution seeks to address the business problem of resource consumption when the university's students need to access their personal information. Griswold University only allows the student body to access this information from campus resources. This method of disseminating knowledge is consuming vast amounts of university resources. The solution to this resource problem will be to develop a mobile application allowing the student body to access this information on their mobile devices. The project will need to be conducted in tandem with other projects that are being undertaken. To make the best use of resources, there will be a prioritization of the resources to project that offers the best return on investment to the university. Resources for this project will be allocated when available, and no other higher-priority project will require them. There are many different stakeholders in this project. The IT department will be one stakeholder. The IT department will need to see an improvement in resource utilization. The next stakeholder group will be the student body. The student body will be the application's primary users, and their needs will be at the forefront of the application design. An additional stakeholder will be the administration, whose buy-in will be required to approve funding for the application. The solution will address a few key points. First, the required reduction in campus resources being used. Second, it will address the issue of student engagement with their academic activities. Metrics that will be used will be the utilization of student questionnaires to gauge their engagement and acceptance of the application. Other metrics will measure the reduction in the technology resources that are used after the implementation of the application.

Keywords: Griswold University, mobile application, resources, students

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Griswold University Software Solution

Griswold University's software solution seeks to address the university's resource allocation and management problem. The current state of the university's IT infrastructure does not make efficient and productive use of the currently available resources. The existing IT infrastructure relies heavily on on-campus resources to provide university students with information.

Students need to use only the campus resources to conduct their scholastic activities. These activities include accessing their personal information, reviewing their current and past academic schedules, accessing any appointments they may have, and other everyday student activities. The current solution does not allow this functionality off-campus or via computing resources that are not wholly owned and operated by the university's IT department.

The current solution only allows for the full engagement of students with campus activities while they are on campus. Students not currently on campus cannot access the information they need to complete their day-to-day activities.

When students are on campus, they must access this information in two ways. The first way is through a campus computer-based in a lab or a designated campus area. The other way is through kiosks scattered throughout the campus but not always easily accessible to the students. These computers are connected to the main university servers via a wired connection.

The current infrastructure does not allow students to access the network via Wi-Fi, as is common on other area campuses. As you can surmise, the existing access points do not allow for ease of use or information distribution. The current solution does not allow students to engage and participate in the activities they need to in a manner that most college students have become accustomed to.

The current student body needs to be constantly on the go and accomplish their tasks in a manner that allows them to move about freely in their day-to-day lives. The current solution hinders this and is not a *selling* point for the university in drawing new tech-savvy students who are always on the go.

While this project will not be the only project being engaged by the university, it will be one that will bear many benefits to the stakeholders. With a proper allocation of resources and a schedule that will make the best use of all the university's resources, there will be a little noticeable impact on the other projects.

Resources for this project will be allocated from other projects as they become available and only when those resources are not needed in the near term. Very exact scheduling will need to be undertaken to ensure that the resources will be available to this project and others higher in precedence.

Resources not currently available to the university will be outsourced to the appropriate contractor. This outsourcing will allow the project to continue and further reduce the impact on any projects commencing during this period. This consideration will need to be explored to maintain appropriate timing and deliver the project in the desired timeframe.

With the project's implementation, multiple parties or stakeholders will be involved in the project's success. These stakeholders will come with different views of the project and what will constitute a successful project. Each stakeholder will need to contribute their ideas about a successful project. There must be constant communication between the stakeholders and the development team. For the project to be successful, all the needs of these stakeholders will need to be addressed, and any concerns must be mitigated and acknowledged.

The stakeholders come from various parts of the university. Each of these stakeholders will have a different view on how the current solution affects them and what they need to have to "buy in" to the project.

A few key points will need to be achieved for the project to be successful. These key points are a reduction in the use of campus resources by the student body, a reduction in administrative costs that the IT department currently handles, and a decrease in expenses, as seen by the administration. The following paragraphs will discuss how the stakeholder will see these points and how any proposed solution will impact them.

The first stakeholder will be the IT department. The IT department must be convinced that the expenditure on IT capital and human resources will result in an actual reduction in campus resources and provide them with no more administration costs than the current solution. Successful engagement with IT will mean that there has been a reduction in campus resources used by the students and a net gain in resources that can be allocated to another campus IT activities.

IT will use key performance indicators to help understand if there is an actual reduction in the resources being used. They will look at usage rates of the resources in terms of bandwidth and the number of logins that the students perform.

The next stakeholder will be the student body. Student body feedback will drive the success and features of the proposed software solution. The proposed solution will be created through needs analysis to meet them cost-effectively and promptly. Students' needs should be addressed as this will significantly impact the acceptance of the project and whether the proposed solution will provide the desired outcome.

The student body needs high acceptance and use for the project to have a favorable outcome. Without this acceptance, the project will fail, and no reduction in campus resources will be had.

During the project processes, these stakeholders will need constant input and their "wants and needs" to be addressed. Neglecting the needs of these users will have a detrimental impact on the project and the successful adoption by the group that is most likely to benefit if these stakeholders are not satisfied. There will be a reduction in resources used to perform these tasks, and student engagement at the university will be increased.

The final stakeholder will be the administration. This is where the approval for all monetary and human resources will ultimately come from. The administration will oversee the project's allocation of financial and human resources. This stakeholder group must be convinced of the overall success to envision the expenditure of monetary resources and human capital to complete the project.

The administration will have the "power of the purse" for this project. All expenditures will need to be justified to the administration. Reasons for the project will need to be explained in monetary terms, and what tangible benefits this project will bring to fruition.

The salient points that this project will bring about are the following:

- There will be a reduction in campus resources. The reduction will make resources available for other projects and endeavors that the university needs. This point aims to please both the IT department stakeholders and the administration.
- There will be a reduction in the need for superfluous computing equipment. For example, the information kiosks can be removed from the network, thereby saving campus resources in terms of maintenance, campus computing power, and network

bandwidth. Key point is aimed at satisfying concerns expressed by the IT department regarding the administration of the infrastructure.

- There will be better engagement by the student body. Students can access their information when and where they want it. Students can accomplish their tasks independently and at a time of their choosing. The point is aimed at making students more engaged in their campus.
- Resources previously allocated to the current solution will be available for other projects and campus activities. Point addresses the IT department's and administration's concerns and frees up resources for other campus activities.

These points will be the determining factors in the success of the proposed software solution. If all points, as stated above, are met, then the project will be considered a success. If any of these points are not addressed to the satisfaction of the stated stakeholders, the project will not be successful, but if the points are addressed adequately, the project will yield great results.

For the project to be considered a success, there will need to be metrics. Multiple metrics will measure the project to gauge the proposed solution's success or outcome.

Some metrics that will be used to understand the outcomes will be qualitative and quantitative. The project will need to look at different aspects of the proposed solution to see if the solution has met with a favorable outcome. At the same time, some metrics will be easy to quantify using quantitative analysis, like measuring the number of logins by students before the implementation versus the number of logins after the solution is implemented. Other metrics will be gathered through more personal means. For example, we will institute a series of questionnaires to understand how the students are engaging and using the current solution.

These questionnaires will form a benchmark for understanding the student body's engagement and acceptance of the software solution. For the solution to be considered, the student body must actively use it to conduct their daily activities while minimally using the previous solution. The student body must see the features and implementation as superior to the current solution. If this is feasible, the proposed solution will be seen as having a favorable outcome.

Needs Analysis

The issue at hand for the university is the inefficient use of the campus IT resources. The current solution for students to access their information is using campus resources. Students cannot use mobile or other devices to access their student accounts. This has raised the problem that is under discussion in this paper.

To better understand the problem, a needs analysis was conducted, which sought to understand what exactly the problem is to be solved along with the causes of the business problem. The following section will detail the problem, the causes, the impact on the stakeholders, how the proposed solution will solve the problem, and any alternatives proposed during the analysis.

Problem and Causes

Griswold University has used the exact solution to provide student information for the last three decades. The current mode of delivering information is to use computers in the computer labs or via the information kiosks in different parts of the campus.

While there have been upgrades to the hardware used to process and display the information to the students. There has yet to be an update on how these resources are used and

implemented. The current infrastructure does not allow the student to access this information on the go or via other devices not owned and operated by the university.

While the current solution does provide the information and the features that the students need, they need help accessing it at their leisure and via a means that is easy and intuitive for them. Students are interested in accessing their information and performing other activities from their mobile devices. Students feel that this ability will allow them to be more productive and engaged with their academics and activities on campus.

This antiquated infrastructure and how it is currently being utilized does not allow for ease of access by the students. It does not allow for the most efficient use of resources. The current allocation of resources results in resources being used to process the requests of the student instead of using these same resources to accomplish other tasks that the university requires.

For example, the various departments can invest the current computing power into research. Departments have noted that they desire to do research that could use the additional resources the university currently devotes to the students.

Impact on Each Stakeholder Group

The problem discussed in the opening sections of the paper will have various impacts on the different groups or stakeholders on campus. Three main groups on campus will be affected by the problem. These three groups or stakeholders are the following:

1. The student body.
2. The IT department administration
3. The university administration

Each of these groups has a vested interest in any solution, and each stakeholder is affected differently. The following paragraphs will explore these interactions with the current and proposed solutions.

To facilitate the project and keep the stakeholders informed, we need to devise a stakeholder communication plan. This plan allows for input and provides a way to engage the interested parties in the project and get their feedback when it commences. The table below lays out the stakeholders involved, along with other information. The information included in the plan will be the following:

- Stakeholder
- Title or role
- Interest
- Influence
- How will they contribute
- Best way to management

Stakeholder	Title/ Role	Interest: How much does the project affect them (1,2,3)	Influence: How much do they have (1,2,3)	What are the Stakeholder's Most Important Goals?	How will they Contribute?	Best Way to Manage
Matthew Heino	Project Manager	1	1	To stay on time and budget	Will be the daily lead, delegate project tasks	Phone Calls, milestones updates, weekly emails summaries of tasks, in-person meetings
IT Department (Main contact: Yolanda Cruz)	Head of the IT Department	1	1	Reduction in the resources used	Provide the IT resources to accomplish the project	Phone Calls, milestones updates, daily emails summaries of tasks, in-person meetings
Student Body (students)	NA	1	1	Mobile application for day-to-day tasks	Desired features	Email
Administration (Main contact: Priya Thomas)	VP of University	2	1	Reduction in costs and resources capital	Monetary human resources	Phone Calls, milestones updates, daily emails summaries of tasks, in-person meetings

Stakeholder Communication Plan

Using the plan mentioned above, we can contact the stakeholders and get their input on their needs. The following paragraphs will show how each of these stakeholders is affected by the current solution and how they can benefit from the proposed solution.

The first group, the student body, is affected in many ways. The current study body is very tech-savvy, and they have become accustomed to accessing information when they want, and in the mode they want. The current solution does not allow for this. The current solution will only enable students to access and perform their tasks on campus, and no other places are available. The student body cannot access the information in the manner they prefer. The student body prefers to access information and perform their school-related tasks while they are on the go or if they are off-campus.

In the mobile age, a solution that allows for accessing and performing a task on the go is what interests them. The current solution does not even remotely meet this need or desire. It was a proposed solution when mobile computing was a novelty and very expensive. Times have changed, and the need for a solution to bring about change has come.

The proposed solution will allow the student body to access the information and perform tasks when they see fit. Students will no longer be forced to access this information using campus resources like the computers in the lab or via kiosks.

The student body can access this information and tasks on their phone or other mobile devices. The proposed solution will provide a safe place to store this information since information will be remotely stored on the mobile device. Information that does not change frequently can be downloaded to the device instead of accessed every time the student uses it.

For example, viewing a student's schedule, this information can be downloaded once and only need to be updated if there are changes to the student's schedule. With the current solution, this is not possible. The current solution needs to download or update this information every time there may be a change in the way this information is rendered to the student.

The next stakeholder group, the IT department administration, is the group that bears the burden of administering the current solution. With the current solution, the IT department must ensure that a minimum number of computers and kiosks are available for student use. This number does not include computers that are currently used for academic reasons. The computers used for academic reasons are administered separately and do not count towards the required number of computers for student information access. This adds to administrative overhead as well as resource allocation problems. Resources currently used for student information are unavailable for academic tasks and vice versa.

With the proposed solution, there will be the ability to use the students' provided computing power to handle, store, and render information to the student. Using student-provided equipment will free up computing resources that could be used for other academic tasks.

For instance, the computing resources allocated to student information functions can now be appropriated for other academic purposes. This is especially beneficial when some outages or repairs need to be done on current educational resources. With the freeing up of resources, there will be a less dire need to fix the resource. A new computer resource can be allocated from the surplus computers once used to provide student information.

Another improvement that will be gained will be the dismantling of the information kiosks. With the proposed solution, there will be no need to keep these kiosks functioning. The resources can then be made available for other uses. An example would be the freeing up of

wired jacks to provide additional amenities to the student. With future upgrades to the IT infrastructure, wireless access points can be added at points currently occupied by the kiosks.

From a financial perspective, there will be a saving in infrastructure maintenance. The kiosks are expensive and time-consuming to maintain. They require resources for hardware maintenance and labor expense. Note that the necessary hardware is becoming more difficult to procure and price because of its age.

With the removal of the kiosks, there will be more available human resources in terms of technicians to fix academic computers and other IT resources found throughout the campus. The proposed solution will make having the kiosks redundant and the need to maintain them unnecessary. These freed-up resources can be allocated to other campus concerns.

The final group, the university administration, is affected in multiple ways. The administration needs to allocate money and workforce to the current solution. These resources must be allocated yearly, and this solution's costs increase annually. Reasons for this include the increasing costs of labor as well as parts to maintain the kiosks. The kiosks currently use less up-to-date hardware, and because of this, they are difficult to obtain parts for.

The kiosks were created and implemented to provide students with an easy way to access their information at a time when computing hardware was expensive, and using this style of information dispersal was the most cost-effective. As time went on, this method of information dissemination was replaced by other means that included using specific computers on campus to provide this information. The kiosks remained in place, but the hardware, over time, has become increasingly more costly to replace and source. Some components need to be acquired from third parties. This solution adds to the expenses that the university incurs.

Additionally, the administration must allocate money to the IT budget to grow and update academic computing resources. This is outside the budget that is currently earmarked for the current student information solution. This places a strain on an already tight budget for operating the university.

The proposed solution will shift most computing resources onto the students' mobile devices. Computers that currently provide this information can be repurposed for other campus needs, including being available for academic research and other needs of this nature. The kiosks will no longer be needed since the students can accomplish the same tasks using their mobile devices. This will free up human and monetary capital previously used to maintain the kiosk in working order.

While affected differently by the problem, each stakeholder will benefit from the proposed solution. The students will gain ease of use when accessing their information and the ability to perform their day-to-day tasks. This ease of use is not afforded to them under the current IT solution and is the focus of the problem identified in this document.

While the IT department will see an easing in their day-to-day maintenance and resource allocation duties, the IT department will no longer need to maintain two disparate systems in the form of computers and kiosks, along with academic computing resources. They will only need to maintain the mobile application and the resources that it will utilize. The IT department will no longer need to worry about the number of computers that need to be allocated to provide student information.

The administration will see the added benefit of reduced costs. With the current solution, the university must allocate resources to maintain these specialized computing resources. Maintaining the kiosks is increasing, and these costs are becoming more difficult to predict and

budget. Parts for the kiosks are not easily procured, but the kiosks need to be maintained for the student body to access their information. With the proposed solution, the need and expense of maintaining the kiosks will no longer need to be considered.

This section discussed the current solution's impact and the university's business problem. Each of these stakeholders has a different experience of the current solution and will have a different experience on what will constitute a successful solution to the business problem.

The proposed solution was one of a few solutions that were discussed. In the next section, there will be an examination of other proposed solutions and why they were not considered for implementation.

Solution Alignment

The proposed solution was not the only one considered to solve the business problem – of inefficient computing resource allocation. Other solutions were considered but ultimately rejected for various reasons. The reasons for the rejection of these solutions are that they do not adequately address the concerns of the stakeholders.

The first alternative proposal was to install more computers to allow students access using more up-to-date computers. This solution was dismissed immediately as it did not address the significant needs of one of the key stakeholders – the student body. The new computers would have replaced the information kiosks. These new computers will be more powerful and allow more transactions to occur locally. This would have reduced the reliance on the school's central servers and computation resources in these servers. However, it did not address the student body's need to have this information while on the go.

The second alternative was to install wireless access points in place of the kiosks. This was a viable solution. However, even this solution failed to address students' ability to access

their information while away from campus. While this would have aided in reducing the costs of administration that both the IT department and the university's administration sought. It did nothing to help the student engage fully with their campus. This solution did address the concerns of the IT department and the university administration in terms of budget.

Why was this proposed solution selected over the previously mentioned solutions? It addresses the concerns of all involved stakeholders. With a reasonable capital expenditure, you can offer a solution that checks all the boxes for the stakeholders.

With this solution, there will be no change in the overall way the university handles student data. It will still conform to all required standards the current solution adheres to. The present method is required to adhere to the same statutes that the new solution will need to implement the appropriate FERPA protections, but this will be in line with what is currently being used by the current solution (U.S. Laws And Your Student – Parenting College Students, n.d.).

Since the proposed solution will need to transmit information over the Internet, there will need to be considerations for laws and regulations that govern these events. Examples of regulations that may need to be implemented govern financial transactions by the students. Laws that may apply to this type of transaction are variable and must be enforced at a state and federal level. For instance, New York requires that financial transactions have appropriate cyber security and encryption levels. This legal requirement is spelled out by the New York Department of Financial Services (Crane, 2021).

Additional laws to consider would be the users' privacy, which will pertain to any communication between the student and the university. The application will need to comply with the Electronic Communications Privacy Act (ECPA) [1986] (Internet Privacy Laws

Revealed – How Your Personal Information Is Protected Online, n.d.). Information stored may involve another law called the Stored Communications Act (Macedo & Zemsky, n.d.).

The laws mentioned above will be enforced to keep the student's data secured when this data is transmitted or stored on any device. Some of these laws will already be abided by the university. The only caveat is that the university's current policies may need to conform to these as they pertain to data transmission over wireless.

The legal department will need to be further consulted to see what other areas of law this application will need to be addressed in the creation of this application. The laws mentioned above and regulations are not an exhaustive list but a primer on the legalities of producing an application for students.

Regarding the actual development of the software solution, there will be guidelines that must be followed to ensure quality. Since this software will be produced in-house, we will need to make sure the production of the software is as streamlined as possible. To accomplish this, we will abide by the following suggested guidelines.

During the production of the code, we need to keep code creep to a bare minimum. Adhering to the concept of YAGNI, "You ain't gonna need it," we will only write the code required to meet the requirements of the essential features. The developers will not produce code and other items irrelevant to the feature currently being worked on. This approach will save development time and costs in the production of the solution (30 Best Practices for Software Development and Testing, n.d.).

The software produced will be tested and tested again. This process will ensure a working product and ensures that there will be few hiccups when the application is released to

the student body. During the project, we will use the mentality of "Test, test, and test again "to develop a solid product that will be a joy to use by the students (Miller, n.d.).

With these laws and production concepts stated, we can turn to the question of what technologies will be used to ensure that this solution will stay current and desired by the students. When we first produce the application, we need to choose a platform that is the most abundant on the campus.

Based on research, the first mobile operating system to target will be the Android OS. This is the most prevalent OS in the world. It accounts for about 70% of all mobile devices currently in use (Statista, 2022). If we target this OS first, we can accomplish vast acceptance by the student body.

We will use Flutter's open-source framework to produce applications from a single code base during development. We can create multiple applications for various platforms, e.g., iOS, Android, and Windows. We can port this application to other platforms using this production method for minimal cost. The current staff does not have experience dealing with Flutter and its associated language Dart, but it is easy to use, and the framework is very intuitive (Heller, 2022).

Taking this approach to the development and management of the application will yield a solution that will be cost-effective and will be available to most of the campus population. Utilizing the platform-independent Flutter framework will make it easy to address the needs of students who cannot use mobile devices.

This approach will allow one application to be ported to any environment. This is an important thing to take note of. With the adoption of more accessible and open-source environments, we will need to be able to produce an application that adapts to these changing needs. With this course of action, the university will be able to stay ahead of the technology

trends by being able to produce an application that can be ported to current environments as well as any future ones.

Cost Analysis

This project seeks to save both money and computing resources for the university. In this section, there will be an examination of the costs that the university will incur pursuing this project. Prices for some items will be negligible or zero. This is true of the IDE software that will be used to create the software for the solution. Human resources costs will be broken down by role within the project.

Items that will cost the most money will be the labor of the IT professionals employed to create the application. The individuals that will be used will be developers and other in-house staff. The university already employs these, and their salaries are accounted for in its budget.

This section will illustrate how their hourly rate will be applied to the project. One cost that will not contribute directly to the project will be formal training in the previously mentioned Flutter framework and Dart. This expense will be necessary to bring the current staff up to speed on the framework and is a far cheaper option than hiring an outside firm to produce the application.

Itemized Costs

Weekly Costs for the Project

Descriptions of each expense category:

Labor cost – labor that is used for tasks that specific members of the team do not produce. For example, additional IT support or other technical help.

Survey cost – Cost to create and administer the survey to gather the features and requirements for the application.

Development cost – The cost of the software developers used to create and test the application and any database operations.

Training cost – Cost to train the developers in Flutter. This includes the online instructional material.

Additional cost – Any extra hardware or human resources needed to create the application. This includes hardware updates to the server (*if required*). The human resources are billed on an as-needed basis. *These resources are not long-term project participants.*

Weekly Costs by Category

Week #	Labor Cost	Survey Cost ¹	Development Cost	Training Cost	Additional Costs	Total Costs
1	\$0	\$400	\$0	\$1995	\$0	\$2395
2	\$100	\$0	\$3000	\$0	\$0	\$3100
3	\$100	\$0	\$3000	\$0	\$0	\$3100
4	\$0	\$0	\$3000	\$0	\$0	\$3000
5	\$0	\$0	\$3000	\$0	\$0	\$3000
6	\$0	\$0	\$3000	\$0	\$0	\$3000
7	\$300	\$0	\$3000	\$500	\$2500	\$5300
Total	\$500	\$400	\$18000	\$2495	\$1500	\$22895

¹ **Note:** That **Survey Cost** includes creating, distributing, and processing the survey. The cost is low because this expense will be handled chiefly by the student body. Students at the university will do the processing. They will review the questionnaires that will be distributed via email. The survey cost reflects the time to create it in a digital format. The \$400 price cost was based on research for customer surveys (Just a Moment. . ., n.d.).

These are the costs itemized by the week and approximately how much each category will cost this week. In the following table, there will be a breakdown of the expenses by the role

of each participant and how much they will be paid. This better visualizes how the money is being spent on the university's staff.

Training costs for the Flutter framework and Dart programming language were calculated to be \$1995 (The Knowledge Academy, 2020). The selection of this platform for providing the training was based on previous experience using them to provide other specialized training to other members of the IT staff and the good reviews through researching the company on this topic.

Estimated Labor Cost Based on Hourly Rates Per Participant

- **Rates in the chart are per hour (\$\$).*
- *Note: Training will be billed to the project's first week.*

	Hours	Rate (\$)	Cost (\$)
Week 1			
Survey Processor	5	15	75
Project Manager	2	40	80
¹ Software Developer 1	20	See Note 1	0
¹ Software Developer 2	20	See Note 1	0
Total Week Cost			155
Week 2			
Project Manager	10	40	400
Software Developer 1	40	37.5	1500
Software Developer 2	40	37.5	1500
² Technician	4	25	100
Total Week Cost			3500
Week 3			
Project Manager	10	40	400
Software Developer 1	40	37.5	1500

Software Developer 2	40	37.5	1500
Total Week Cost			3400
Week 4			
Project Manager	5	40	200
Software Developer 1	40	37.5	1500
Software Developer 2	40	37.5	1500
² Technician	4	25	100
Total Week Cost			3300
Week 5			
Project Manager	5	40	200
Software Developer 1	40	37.5	1500
Software Developer 2	40	37.5	1500
Total Week Cost			3200
Week 6			
Project Manager	5	40	200
Software Developer 1	40	37.5	1500
Software Developer 2	40	37.5	1500
Total Week Cost			3200
Week 7			
Project Manager	5	40	200
Software Developer 1	40	37.5	1500
Software Developer 2	40	37.5	1500
² Technician	4	25	100
Total Week Cost			3300
Total Cost for All Weeks			20055

¹ Software developers will split their time between training using the new software platform (Flutter) and their regular daily duties. These costs will be included in their average workweek allocations. Hours recorded here are to show the hours that will be worked to attain the necessary skills to complete the project.

² Technicians are needed to remove and install hardware for computers that will be running the IDE for development. This cost is reflected in the previous table and is not an additional expense.

Note: Costs for the training are not recorded in this table. This cost is a flat fee that will be displayed in the following table. The hourly rates for the developers were the going rates that the university paid these employees during regular working times.

Estimated Additional Costs for Project Items

Item	Cost (\$)
Hardware	
Web Server	2000
Application Server	2000
Miscellaneous Expenses	
¹ Android App Store Fee	25
² iOS Developer Fee	99
³ Survey Cost	325
⁴ Miscellaneous Expenses	2500
Total Cost:	6999

¹ Google /Android charges a one-time fee for the application's license on their store.

² Apple charges this fee for licensing, but this is per annum.

³ Cost to develop the survey includes creating the right questions.

⁴ Costs if outside labor or expertise is needed to complete the application. Note: This expense may not be required to complete the project (How Much Does It Cost to Develop an App? (2022-2023 Update), 2022).

Note: Some of these fees may be reduced since we are an academic institution and may be afforded a discount on these licensing fees.

These show additional costs that will be incurred for the development of the application.

The chart below shows the aggregated expenses that the project will incur.

Aggregated Costs

Cost Category	Cost (\$)
Labor Costs	20055

Additional Costs	6999
Total:	27054

Justification for Costs

The costs that were itemized above would be incurred during the development of the software solution. There are justifications for all the money expended during the project. We will look at each component separately.

We need the right skill set to accomplish the application for the project's success. The current staff needs to have the prerequisite skill set to be successful in creating the application. The developers have programming skills but need to be in the technology stack this application will require. They do have transferable skills that will make the transition a lot easier. The cost of \$1995 is justified since we will be producing and maintaining the mobile application in-house. This ensures that no outside contractors will be required later to maintain and add improvements to the application.

The actual labor costs are attributed to the production of the code base. The hourly rates are known and will not change during the project. These costs are fixed and will not deviate during the project's progression.

When the application is produced, there will be a cost with publishing the application to the stores for the various operating systems. These costs are minimal and may even be less if the university is eligible for an organizational discount (How Much Does It Cost to Develop an App? (2022-2023 Update), 2022).

To ascertain the "wants and needs" of the student body, we need to conduct a survey to gather the student body's requirements. The survey cost is less than the average amount since the

students will be conducting most of the footwork of gathering the requirements from the students. The \$375 is in line with other estimates for getting a survey done (Just a Moment. . . , n.d.).

If we spend the money on the solution, we can save money that we would have spent on maintaining an aging solution. In research from Winders, we pay, on average, \$561 to repair our aging kiosks and other aging computers (2022). This cost estimate is relatively low considering the age and uniqueness of the kiosks and the increasing difficulty of sourcing parts for the kiosks.


These are most of the small items we will need to spend money on to see the application completed. You may ask yourself how this compares with outsourcing this project to an outside vendor. Based on research, the application that will be produced can cost anywhere from \$40,000 to \$120,000, depending on the complexity of the application (Melnik, 2022).

Our in-house application is only slated to cost about \$27,054. Even with unexpected expenditures, we can bring the project in for what it would cost to produce using outside resources. There are intangible gains to creating the application in-house. Our staff will gain experience in developing the application, and they will be able to maintain the application without help from an outside firm. This will keep costs down in the long run.

Risk Assessment

As with any project, there will come a certain amount of risk. These risks can be planned for and, where appropriate, can be mitigated. With the proper mitigation plan, these risks can be avoided, or their impact can be drastically reduced.

There are some high-level risks that one should be made aware of. These risks should be known, and appropriate measures should be taken to lessen their impact on the project's successful completion.

 WESTERN GOVERNORS UNIVERSITY						
Master of Science in IT Management (MSITM) Capstone Risk Register						
SSM3: Design and Development						
Asset	Threat/Vulnerability	Existing Control	Likelihood	Consequences	Level of Risk	Risk Priority
Student Information	Breach of student information	Abiding by the laws and regulations that are currently in place.	Medium	Lawsuits and fines from the affected parties	High	5
Application	The project is highly dependent on the skill set currently within the university.	None	High	The application will not be completed or begun	High	4
Application	An employee going on vacation	All vacations need to be planned and approved well in advance	Low	The application will not be completed on time, and costs will be incurred	Low	2
Application	Unnatural weather (extreme snow or rain events)	Ability to work from home/remotely	Medium	Delay in the completion of the application	Low	1
Server	Hardware failure on servers	Server monitoring software	Medium	Server failure and network failure	High	5
Application	Estimating / Scheduling errors	Planning all events before the project begins	Medium	Project Milestones may not be reached or completed on time.	Medium	3
Application	Lack of Communication	A stakeholder communication plan is in place	Medium	The project will not deliver the desired outcome and required benefits for each stakeholder.	High	2

- The Risk Priority will run from 1 to 5, with 5 being the highest risk and 1 being the lowest risk.
- The likelihood will have the following values: Low, Medium, and High.

Quantitative and Qualitative Risks

These risks that were discovered were recorded in the register. These risks can be broken down into two types of risks for analysis. The first is the quantitative and the other is the qualitative risk. A qualitative risk is the likelihood of a risk occurring, while a quantitative risk is an ability to derive the possibility of the risk happening through observation and measurable data.

This risk analysis provides benefits. The benefit of this analysis is that you will better understand the risks and how they can be planned. For the university, the most accessible assessments are qualitative ones. These risk assessments are efficiently conducted informally and can gain great insight into the perceived risks as seen by the interested parties ((How Much Does It Cost to Develop, 2019).

Quantitative risks are more difficult to ascertain as they rely on data to make a good guess as to the severity of the risk and how it will affect the project and the desired outcome.

Qualitative Risks. To give a brief and subjective analysis, we will look at each of the seven risks as they appear in the risk register. While this analysis is purely subjective, there will be an attempt to analyze the threat and its impact on the project.

The first threat is “Breach of student information” this threat has been increasingly likely over the years of this type of threat. With the adoption of the mobile solution, there will be a greater risk of this occurring in the future.

With the current solution, the risk of this happening is relatively low since this information is contained locally on the university's servers. The mobile application will expose this information in a new way. There is an increased vulnerability using mobile devices. Based on research there are 70 million smartphones lost every year (Mobile Device Security: Startling Statistics on Data Loss and Data, 2018). The probability that a student's information is compromised increases, raising the likelihood to high. At the same time, theft or similar incidents may only affect a single student. It can affect all the student's information. This threat can be mitigated by using the appropriate precautions like utilizing encryption and authentication to protect access to the information.

"The project is highly dependent on the skill set currently within the university," this is a genuine risk to the project. This threat can be overcome but may not be diminished through mitigation methods. The threat will be high but not insurmountable with the appropriate education and skill set.

"An employee going on vacation" this type of risk will have a low likelihood of occurrence since all vacations must be approved well in advance, and the project needs will be known in advance. Since the possibility of this is low and the impact on the project will be minimal.

"Unnatural weather (extreme snow or rain events)," while this threat is likely to happen, their effect on the project will be minimal since most activities can happen virtually. The impact on the project will be low and should not cause a problem in project completion.

"Hardware failure on servers" is low likelihood since there are already ample resources to handle the load to process the students' requests. This will change with the introduction of the new hardware (servers).

"Estimating / Scheduling errors," low likelihood since this is a small project that will have the appropriate resources allocated to it. Steps will have been implemented to ensure all project phases are well-defined and the timeframe is well thought out.

"Lack of Communication" is low likelihood since there will be a well-established communication framework among all interested stakeholders.

Quantitative Risks.

"Breach of student information" this threat can cost the university a lot if it occurs. This loss is not only money but a lack of confidence in the ability of the university to keep the students' data safe. A breach of student data can cost the university as much as \$294 per capita. This expense can add up quickly if multiple students' data is compromised (Negrea, n.d.).

"The project is highly dependent on the skill set currently within the university," "An employee is going on vacation," this type of risk is hard to quantify. Losses here are in terms of labor lost on the project, and there is no easy way to quantify the cost that may be incurred with this risk.

"Unnatural weather (extreme snow or rain events)," the project will incur no cost if this risk occurs. This risk can be easily mitigated. The cost will be minimal since this threat will marginally affect these activities.

"Hardware failure on servers" will directly impact the project's progress. It will not allow campus activities to commence. This activity can cost the university up to \$5600 a minute (Key Hardware Failure Facts You Need to Know | Integration International Inc., n.d.). While this estimate may be high for the university, it does illustrate the costs that may be incurred.

"Estimating / Scheduling errors," the cost incurred here will be from the extended time it will take to complete the project. We will use in-house labor so that the costs will be restricted

to the hourly wages paid to the software developers, technicians, and other required labor.

Additional costs for this threat include wasted and unproductive time by the employees. Each of these can be hard to quantify for this project. However, the best estimate will be the Cost = Number of hours (\sum * Hourly rates per labor participant). This will yield the additional cost incurred by the mobile solution if the proper scheduling is not maintained or initiated.

"Lack of Communication" will inevitably result in a rework of the product to meet the needs of the stakeholders. The cost of the rework will affect the ability of the university to complete the project based on research; the university may need help to complete the project. Research has shown that only 2.5% of firms complete the project they intend to implement (ISITLab – Development Studio | Professional Websites, Design, Mobile Applications, and Digital Marketing, n.d.).

Cost Benefit Analysis

"Breach of student information," the cost of this risk is \$294 per capita (Negrea, n.d.). This cost is relatively high if more than just a few students are affected by this. There are intangible costs to this threat occurring. A tangential cost of this threat will be a blow to the university's reputation when it comes to how the university handles and cares for student information. This will make it harder to draw students to the university.

"The project is highly dependent on the skill set currently within the university," this threat bares the underlying uncertainty of not having the skills to complete the project. This is the cost that the university will bare if the threat comes to fruition. The upside is that the project will bear fruit on many fronts. The staff will gain skills to maintain and update the application. This will keep the costs of maintaining the application and provide the in-house skills to grow the

application as the needs change over time. This vulnerability can be mitigated by providing the personnel with the proper education before beginning the project.

"An employee is going on vacation" costs the university in terms of loss of production. The work product will suffer if the employee goes on vacation during the project. There will be a reduction in the deliverables delivered throughout the project, and milestones and completion dates will be affected. If appropriate policies are in effect, this threat can be reduced to almost nothing.

"Unnatural weather (extreme snow or rain events)" this event can cost the university some time and production, but this will only happen in the most extreme cases. This threat can be adequately planned, and these precautions will be discussed in the next section.

"Hardware failure on servers" threat can have a very severe impact on the project. It can result in downtime for an extended period. This is a cost in terms of production associated with the project and the disruption of campus activities that may be affected by the outage. This can be mitigated by appropriating the proper hardware and monitoring the hardware for any signs of stress.

"Estimating / Scheduling errors" this danger will cost the project and university money. It might also result in idleness for project labor. This danger will cost the university work product from the idleness of the labor, which may endanger the project's completion. Properly laying out the tasks and the processes that need to be accomplished will help reduce the impact of this threat on the project.

"Lack of Communication" communication is essential to ensure that all project goals are met and meet the stakeholders' expectations. With proper communication, all parties can have their views and their needs subsequently met by the project. The cost of not having adequate

communication will mean that the project goals do not align with those of the stakeholders. Good communication is essential to keeping the student engaged with the project. If the student body is not contacted promptly, it may hinder the acceptance of the project. Poor communication could lead to a lack of acceptance of the mobile solution. This could lead to the project being a total failure.

Mitigation of Risks

Each of these risks mentioned in the preceding sections can have actions taken to lessen their severity and impact on the project. Each of the risks will have a detailed explanation of how this risk will be mitigated and what the expected outcome will be.

“Breach of student information,” the university currently abides by all laws and regulations to protect unauthorized access to the student's personal information. This will need to be augmented to consider that this information will now be transmitted over systems the university does not currently control. The mobile application will use encryption of the information to ensure that the information is made unreadable and accepted by the intended party – the student.

We will instill in the student and require multifactor authentication to ensure that the right individuals only access the data and the application. We inform the students about the risks of using an application the university does not authorize. The student will be asked to only use the available application through the appropriate app store for their platform. The university will ensure that any vulnerabilities that may appear are addressed expediently. This will ensure that there can be minimal chance of a data breach from a flaw in the application.

“The project is highly dependent on the skill set currently within the university,” The threat is a genuine danger that can be mitigated by educating the developers involved with the project. As discussed in a previous section, provisions are afforded in the budget and timeline to educate the developers in the proposed framework.

"An employee is going on vacation," since the university has policies regarding leave and vacations, it is just a matter of enforcing the policy of requesting vacation. Vacation requests can be denied until the project is over or scheduled when the required individual is not needed. Since this project will happen in the future, all vacation requests can occur before the perspective start date.

“Unnatural weather (extreme snow or rain events) " these events may occur sporadically during the project. Since the project is slated to start during the winter months, we can assume that while the project, there will be a few snow days on the calendar. This risk is mitigated by allowing the affected individuals to work from home. At the same time, some aspects of the project may require that the individual is on campus to complete them. The number of times being physically present might only happen a few times over the project.

"Hardware failure on servers" to mitigate this risk, there are provisions for additional equipment to reduce the loads on hardware. There are monies earmarked for buying new servers and other needed hardware components.

"Estimating / Scheduling errors," this project will be a significant endeavor engaged by the university. Scheduling will be crucial to the success of the project. With proper planning and constant communication among all involved parties, there should be little error in the schedule and provisioning of the required resources.

"Lack of Communication" this threat will impact the project in many ways. To mitigate this, we created a Stakeholder Communication Plan, as seen at the beginning of this document. This will set forth the modes, frequency, and information that must be issued to the stakeholder. This will help facilitate communication among the parties and ensure that their concerns and wants are addressed during the project.

Justification of Approach

This is going to be a large project for the university to undertake. Choosing the proper methodology will go a long way in ensuring the project is a success and meets the needs of the stakeholders. In contrast, we can pursue almost any type of project management methodology. This project is best suited for the Agile approach.

Agile was chosen since the parties involved need constant feedback on the progress, and the stakeholders will need to have their voices heard over the project's progression. We could have chosen the waterfall approach, but this will limit the input of the stakeholders to the beginning of the project and does not allow for changes to the work product as the project progresses. This is fine for some projects but not ideal for a project where the staff needs more experience producing a product of this nature.

For this project to be successful, we need to keep the stakeholder involved throughout the project. With Agile methodology, this can occur, and with each iteration of the project, there will be a work product that will be a working feature that the stakeholders desire.

The project's success will not only need to meet the needs of the stakeholders, but it needs to have a quantifiable way to see if there are improvements over the previous solution.

During the project, we will measure the progress and stakeholder acceptance using various methods and accepted key performance indicators.

In terms of software development. We will look at several key indicators. These indicators are cycle time, development velocity, change failure, development frequency, and PR requests (5 Software Development KPIs for a Savvy Engineering Leader, 2022). These KPIs will be used to help measure the project's progress. Each of these will be discussed, and how they will aid in understanding how they will measure the project's progress.

Cycle time is a measure of the time from when the work was started to when the work was delivered. We want to see a very low time. This would signal that code and deliverables are being produced rapidly. This indicator can be compared against benchmarks to see if the project is progressing at a good rate (5 Software Development KPIs for a Savvy Engineering Leader, 2022).

Development velocity measures how much work is being produced over a given period. We are using the Agile method when creating the mobile application. We want to see that there is suitable work being delivered throughout a given interval of time. This work will be aggregated to see gross work product over a given timeframe (5 Software Development KPIs for a Savvy Engineering Leader, 2022).

The change failure rate is a measure of code quality. It measures how deployments of code cause a failure in the software solution. We want to see the percentage to be very low. We will never have a zero-percentage rate. We can strive for low single digits, meaning the developers create a high-quality product (5 Software Development KPIs for a Savvy Engineering Leader, 2022).

With our Agile methodology, we will seek to produce a viable work product as often as possible. Deployment frequency looks to measure the frequency of how often the developers push code into production. We want to see a fast turnaround time, but not at the cost of increasing another indicator like change failure rate. We strive to produce high-quality code above anything else (5 Software Development KPIs for a Savvy Engineering Leader, 2022).

The last KPI to produce the software will be PR size. This is the amount of time it takes to review the cycle times. We want to strive for reviews that are as quick as possible. Longer PR times will mean that the code is sitting idle and is neither in production nor in a state of development.

These KPIs can be charted and modeled to show how they change over time. With these graphics, we can look at subtle changes that may point to problems in the project. Using data modeling, we can set triggers that will alarm us if any of the metrics are straying from the accepted norms that have been established.

Using these KPIs will help maintain the project, and we will be able to see progress based on more quantifiable means. We can measure most KPIs presented earlier with meaningful numbers instead of just feeling our way through the project.

Project Resource Management Plan

The project resources that will be required are minimal and can be found using the university's IT staff and student body. Most of the project will be handled by the developers with the student body and a professional survey processor. Additional resources will be computer hardware and software needed to produce the mobile software solution. The project will create a software product along with the required documentation. Resources will revolve

around the procurement of the software and the hardware that will be needed to run the development environment.

Resources

Resources for this project will primarily be labor, with very few tangible assets required. The only physical assets that will be necessary will be the hardware to run the environments that will be used to create the mobile application and the hardware additions to handle the wireless aspects of the application.

These servers will handle the inbound and outbound requests from the application to access the information currently stored on the university's internal infrastructure. The following is a list of resources that will be required for the project:

- | | |
|----------------------------|-------------------------|
| 1. Project Manager | 6. Server (web) |
| 2. Software developers (2) | 7. Server (application) |
| 3. Technician (1) | 8. Financial resources |
| 4. Survey processor | 9. Time resources |
| 5. Students (10) | |

Each of these will be discussed in greater detail in the following paragraphs. Each resource will have a specific role in the success of the project. The first will be the software developers.

The project manager will be responsible for the scheduling of the events and procurement of the resources required for the project's completion. The project manager will only be part-time and will be working on other projects on campus.

The software developers will be the resource that is responsible for producing the actual mobile application. This resource will be indispensable in creating the application and will aid in keeping costs down not only now but in the future. These resources are available from the IT staff, and there will be no need to outsource this talent. Costs associated with this resource have already been budgeted for. They are full-time employees of the university.

The technician will be needed to install the required hardware for the computers to run the integrated development environment (IDE). The technician will install and configure the servers that will handle the web functionality that the new application will need.

Students will be the ones who will canvas the campus with the questionnaires to gather the students' wants and needs and will be responsible for aggregating these responses.

The servers allow the web-based components of the mobile solution to interact with the university's infrastructure and process the students' requests. Without them, there cannot be a mobile application.

The financial resources for this application are the sum of \$27,054. This includes all expenses for labor (developers, technicians, etc.) and new hardware expenditures. The university's employee payroll already covers a large part of this cost.

The amount of time required for this project is about 380 hours. This will equate to approximately seven weeks or just under two months of working hours. It is a reasonable time frame to implement the needed features for the mobile application. This time frame may be stretched out if the resources are not available.

Justification of Resources

The resources discussed in the previous section are critical to the project's success. Most of the resources will come from the university's staff, and no further procurement arrangements

will need to be made. The question to be answered in this section is, “Why do we need these resources?”

We have the vital resources already in-house. We need to allocate these resources to the project logically and beneficially. We are developing a software solution that we can create and maintain in-house. The project manager will be the manager of the IT department. We currently have software developers that have the essential skill set to accomplish the creation of the application. The only thing that they need is a primer in the previously discussed framework.

Using our developers will make it more affordable in the long run. We will have the skill set to maintain and add to the application as time progresses. If we were to outsource this part of the project, we would not develop the skills and expertise to maintain the application later. Without the use of our in-house talent, the cost of the project will increase. Our goal with this project will be to reduce the costs currently being endured by the university and produce a software product that is sustainable now and in the future.

The technician will be needed to install hardware upgrades on the computers used to develop the software, and the technician will be utilized to install the servers required for the application. It does pay to have the developers as they are on a higher pay grade, and their hourly rates do not justify the expense when we have a technician that can carry out the tasks at a cheaper rate.

We will employ a survey processor that will be one of only a few human resources that will not come from within the university. We will need this individual’s expertise when creating a comprehensive survey that will address the needs of the stakeholders. We do not have the experience to make such a survey, which is a modest expense to ensure the project's success. We will save a little money by allowing the students to participate in the survey canvassing part.

The students are needed to make sure a large percentage of the student body answers the survey. Students will more likely be successful since this is their peer group and will understand how best to communicate the need for the software application solution. We will save money on this resource. The student body has been very receptive to the idea of the application. The student body has expressed a desire to help by any means possible.

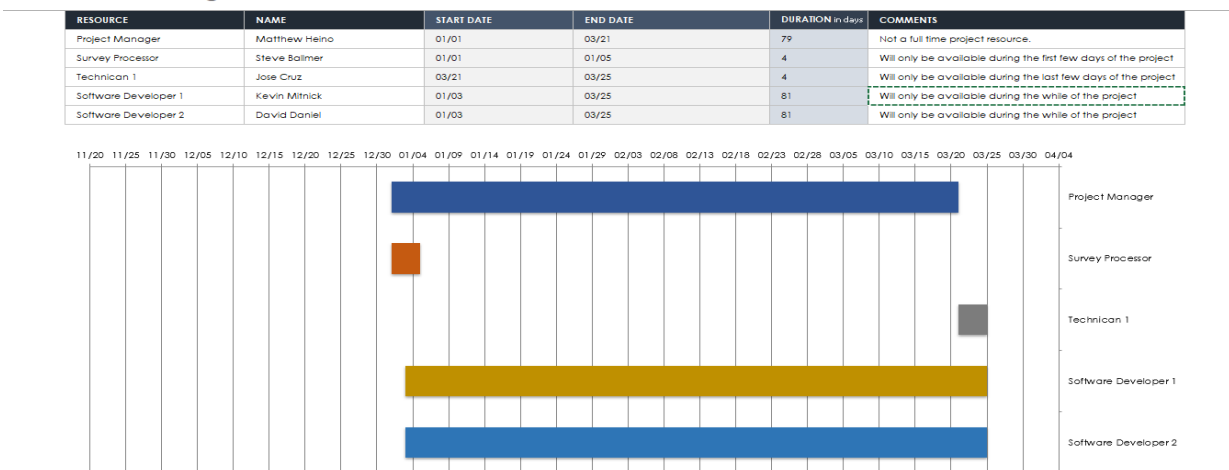
Servers will be needed to handle the Internet requests that the mobile application will require. The servers are a modest expense but will ensure that the application will have the resources to handle the students' requests successfully. We will not need expensive servers since these servers serve a very bare-bones functionality.

Financial resources will be minimal for the application, and most of the expenditure is already in the university's payroll layout. The cost will be \$27,054, all-inclusive. This is reasonable for an application that will meet the needs of all interested parties and provides a growth path for other features of the application.

Time resources amount to a little under two and half months. This is a reasonable timeframe to produce an application that will save the university money and administrative costs in the long run. The IT department spends an ever-increasing amount of time fixing and maintaining the current solution. With the proposed solution, we can see a saving of time and cost.

Resource Allocation Plan

Resource Planning Chart



Resource Plan Chart¹

The resources that are required are mostly university resources. The only resources that will need to be outsourced by the project will be the survey processor and the hardware necessary to upgrade the computers and the server to handle the web requests that will be part of the mobile application.

We have proposed the start of the project for the beginning of January 2023 and will conclude around the middle or end of March 2023. The Resource Plan Chart above shows when each human resource will be active on the project. Only some of the resources will be active throughout the project. For instance, the survey processor will only be active during the project's first week.

While the chart depicts that the project manager will be active during the project duration, they will only be active for a few hours a day as they will be working on other ongoing activities around the campus. The only full-time project participants will be the developers. The developers will be the ones creating and testing the application.

The technician will install the hardware on the lab computers that will be used to create and test the application. The amount of time for the endeavor will only be a few hours and is not reflected in the chart. The technician is active only in the last week or so of the project. The technician will be responsible for installing and configuring the servers near the end of the project. It is of note that it may take time to get the servers. Having them at the beginning of the project is optional, so a little lag is acceptable and is to be expected.

¹Created and modified using the template found here <https://www.smartsheet.com/resource-plans-planning>. Information can be found in the References under Weller, J.

The students, while not reflected in this chart, will be working in tandem with the survey processor to hand out the survey and collect the results and tabulate and categorize the needs of the student body.

Gaps and Impact on Other Projects

The campus will engage in other projects while this project is underway. This project will address the gaps and inefficient use of the campus's resources. The mobile application solution will seek to alleviate some of the gaps in processing the requests of the students. With the current solution, there are severe gaps in the solution's ability to service the students' requests. Student needs are not currently being met. Students are people on the move, and they like their information to be mobile as well.

While the current solution does provide some functionality, it still needs to meet the needs of the current student body. The mobile application will fill the gap in mobility. Mobility will make the students happier and more engaged with activities on campus.

The current solution does not scale to meet the needs of today's student body. With the mobile application, we can scale the application to add features better and keep pace with changing times. With the current solution, we cannot scale the solution. The hardware and the infrastructure limit it. We cannot ask the aging kiosks to perform the same tasks that a mobile device with far more computing power can do.

We can consider this project a "back-burner" project. Since we already have the infrastructure to handle the student requests for information, we can allocate the resources when they become available. There should be minimal impact on other projects that may be needed to utilize resources that are earmarked for this project.

Project Plan

This project will be broken down into a few simple phrases. These phases will correspond to the different states of the project. We will break the project into different software development life cycle phases. Furthermore, combine phases common to software development and project management to derive a project management plan. The phases will be the following (Kissflow, Inc, 2022; Understanding the Phases of the Software Development Life Cycle, 2022):

1. Requirements gathering / Initiation
2. Software Design / Planning
3. Software development / Execution
4. Test and integration / Execution
5. Deployment / Closure
6. Operationalization and Maintenance

These will be the primary phases of the project and the sequence that will happen. Some steps may occur in an iterative nature until the project is completed. We will be using the Agile methodology, and we will move within a phase multiple times until we have implemented all the features that are currently in scope.

Scope

The goal of this project is to implement only some of the wants and needs of the stakeholder. We will need to refine our software solution to the features currently being handled by the computers and the kiosks on campus. Later, we can add other features that may come to light from the student body.

While it would be nice to implement new features that the students have requested. We need to first address the needs as opposed to the wants. This will accomplish the mission that this project sets out to fulfill.

Assumptions

Assumptions about the project will be assumed to be accurate and remain so throughout the project. Assumptions made about the project are listed below:

- Many of the required resources will be available in-house. No outside resources will be required except the survey processor and the trainer to train the developers on the chosen framework.
- The software developers will have all the basic skills to create the application and will not need any other skills that cannot be provided by the training that will commence during the project's first week.
- The university administration will 100% support the project throughout all phases.
- Students have a vested interest in the completion of the project.
- The project manager will have the authority to remove all hindrances that are not the domain of the administration.
- The current server and other university hardware will be able to handle the new work model without any further upgrades other than the ones that were proposed in this new mobile solution.
- University's IT staff will be able to conduct the day-to-day operations whenever they are needed to do so.
- Student volunteers will be able to test the application after each feature.
- There is money allocated to the project to see it to fruition.
- After the project, all student needs will be covered, and they will adopt the new application in place of the current solution.
- The technician can configure and provision the appropriate resources to use the application when it is finally deployed.

- Staff will not go on vacations or take unapproved vacations during the project.

Project Phases

This project will be broken up into various phases. These phases will correspond with the different work products that will be produced. We will break the project into five primary phases of the project. This project will be the following phases Survey, Design, Development, Deployment, and Maintenance and Update.

Survey. During this phase, the survey processor will create the survey. After the survey is created, the survey will be released to the students tasked with completing the survey by as many of the student body as possible. We will deliver this survey via email and the computer the survey company has provided. During this phase, the students will tabulate the data and prioritize the features that the students want for the new application. This step is crucial because it will show the most desired attributes the application must have.

The work product will be presented to the developers. The next step, design, will go about designing the functionality of the application and will create the look and feel of the application.

Design. After the features have been ranked and supplied by the students, the developer will look at the wanted features and ascertain which are required to bring functionality to the application. We already know what features the current solution has, so that we will design those for the application first, but we will look at other features to add some of the most desired “wants” of the students. This is important because we will be able to add valuable features in the first iteration that may be missing from the current solution. We will increase the likelihood that there will be a greater acceptance of the application by the students.

The developers will lay out the application's look and feel during this time. The developers may ask the students that took part in the survey to look at the design for things like the interface and the overall flow of the application. This is easy to do with prototypes created in software like Figma. This software allows you to build prototypes efficiently. This saves time and money since you are not coding the interfaces but only laying out the look and feel.

Once there is a design, and the functionality is fleshed out, we can move on to the project's next phase – development.

Development. This phase will be very iterative in nature. In this phase, there are many cycles of creating and testing code. Each cycle will correspond to a feature that the finished application will have. One developer will write code for the functionality, and the other will develop tests for the application. This phase will have some student involvement when the feature has passed the desired tests. The feature will be presented to the students to gain their feedback. If the feature passes, it will be fully integrated with the finished features and then again be tested.

This cycle will continue until all needed features are created and tested. This will allow the project to move on to the next phase – deployment.

Deployment. The deployment phase is where the application is deployed to the app store of Apple and Android. During this phase, the technician will set up the servers and provision the server to allow access to the school's infrastructure. We will apply for the appropriate licenses discussed earlier in this document.

In this phase, the developers will upload the application to the store and notify the students that the new application is now available for them to use. With this phase completed, the project will move into the next phase - maintenance and update.

Maintenance and Update. This phase will be where the application will be monitored for any problems that may occur. These problems could be bugs that were not caught during the initial development. The developers will monitor the application for user feedback to improve it.

Since this phase will last as long as the application is being used, we can think about what other features could be implemented to make the application more usable. These features can be implemented as time and resources allow. The goal of this phase is to keep the application usable and up to date with the student's wants and needs.

Timelines

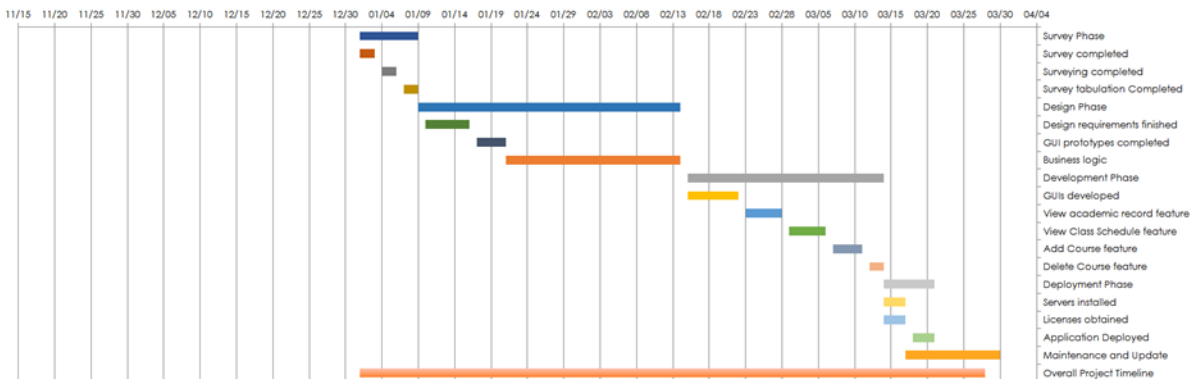
The project timeframe will run from January 1st of, 2023 to the end of March 2023. The table and chart below give the start dates and end dates of the phases are given in the table. The date the milestone is expected to end is the end date.

(**Note:** You can find a larger Timeline Table and Timeline Chart in the Table section of the document located at the end of this document.)

Project Timeline

Phase	START DATE	END DATE	DURATION in days	COMMENTS
Survey Phase	01/01	01/09	8	
Survey completed	01/01	01/03	2	milestone
Surveying completed	01/04	01/06	2	milestone
Survey tabulation Completed	01/07	01/09	2	
Design Phase	01/09	02/14	36	
Design requirements finished	01/10	01/16	6	milestone
GUI prototypes completed	01/17	01/21	4	milestone
Business logic	01/21	02/14	24	milestone
Development Phase	02/15	03/14	27	
GUIs developed	02/15	02/22	7	milestone
View academic record feature	02/23	02/28	5	milestone
View Class Schedule feature	03/01	03/06	5	milestone
Add Course feature	03/07	03/11	4	milestone
Delete Course feature	03/12	03/14	2	milestone
Deployment Phase	03/14	03/21	7	
Servers installed	03/14	03/17	3	milestone
Licenses obtained	03/14	03/17	3	milestone
Application Deployed	03/18	03/21	3	milestone
Maintenance and Update	03/17	03/30	13	An ongoing phase
Overall Project Timeline	01/01	03/28	86	

Timeline Table ²



Timeline Chart³

The chart and table above illustrate the timelines for the phases and the time interval for each project's milestones. In the next section, there will be a discussion about what will be happening during the phase in terms of milestones that will be expected to be completed.

²Created and modified using the template found here <https://www.smartsheet.com/resource-plans-planning>. Information can be found in the References under Weller, J.

³Created and modified using the template found here <https://www.smartsheet.com/resource-plans-planning>. Information can be found in the References under Weller, J.

Survey Phase. This phase will run from January 1st to the 9th. There will be several milestones that will be important to the project. The first will begin on the 1st of the month, and this is the Survey completed milestone. This milestone will start with the survey processor developing the survey that will be administered to the student body.

This is where all the questions will be developed, and the survey will be formatted for delivery to the students. This milestone will end on the 9th. The duration is relatively short because we already know what we need to do for the application. This survey is to see what other features could be added during this project. These features need to make sense both from a development standpoint and an economic one.

After the survey is completed, we will enter the surveying completed milestone. This will begin on the 4th and terminate on the 6th. We do not see it extending past two days as we can gather information quickly from the student on campus. The survey does not be to be completed by all members of the campus. We need to get a feel of the features that they want in the application.

The survey tabulation milestone will commence once the surveying is completed. This is projected to start on the 7th and finish on the 9th. Students will prepare a report that will list the features that the students will want in the application. This report will highlight the most desired and exciting features they would like to see in the application. This report will be presented to the developers and used in the project's next phase.

Design Phase. The design phase will run from January 9th to February 14th. There will be a few key milestones that will happen during this phase of the project. The first will be finishing the design requirements. During this milestone, we will finalize any features that may be added to the application. The added features will be ones that were of exceptional merit. These

features will be discovered during the survey phase and are good candidates for the current application project. This milestone will conclude on the 16th.

With the requirements completed, we can move on to the next milestone, the production of the GUI prototypes. This will commence on the 17th and run until the 21st. The time to produce the GUIs will be short and is not time-consuming using software like Figma. We will employ help from the students to get feedback on the designs. We want to ensure that the interfaces are user-friendly and appealing to the students. This involvement will aid the application's acceptance of the interface's flow.

The next milestone will be business logic. This milestone will run from January 21st to February 14th. This milestone will create all the logic that will be required. Since a lot of the logic is already implemented in the current solution, we will need to change the information from that business form into a form that can be handled and displayed by the mobile application.

Development Phase. This project phase will run from February 15th until March 14th of, 2023. This phase will see most of the functionality produced. During the phase's early iterations, there will be a focus on the functionality provided by the current solution.

GUIs development will be the first milestone. This milestone will commence on February 15 and terminate on the 22nd. During this milestone, the GUIs will be developed and tested. Testing will be done to ensure that they function in the manner prescribed by the requirements. The student will test the interfaces to see how well they interact with them. The time required to build these is not long, given that the designer included with the IDE is a drag-and-drop type of designer.

The next milestone will be the implementation of the view academic record feature. This provides a feature that will allow the student to view their records. This feature will commence

on the 23rd and finish on the 28th. The time required for this feature is minimal since most of the logic has already been implemented in the current solution. The only change will be transforming the information in a manner the application can use.

View class schedule will be on March 1st and end on the 6th. This feature is very similar to the development path for the previous feature. Most of the logic has already been completed. It just needs to be modified to be used for the mobile application.

Add course will begin on March 7th and end on the 11th. The delete course will start on March 12th and end on the 14th. These features will follow the same development as the previously mentioned features. Most of the logic has already been completed. It just needs to be modified for the mobile application.

When these features are finished, the phase is completed. The application will move into the deployment phase.

Deployment Phase. This phase will run from March 14th to the 21st. In this phase, we will see the servers installed. The proper licenses are obtained, and the application is deployed to the app stores. Two of the milestones will be occurring simultaneously. The two are server installation and licenses being obtained. These do not need to depend on each other and can be performed together. They will both begin on March 14th and end on the 17th. The reason that the license will take three days is that it may take a while to get approval for the lower fees for the licensing.

The final milestone will be the actual deployment of the application to the app stores. This milestone will run from the 18th to the 21st. This time frame is a little conservative but will account for any problems during the deployment of the application.

After we have deployed, we will be done with most of the project. We will move into the Maintenance and update phase of the project.

Maintenance and Update. This will be an ongoing part of the project. It will commence after the deployment of the application. The software will be updated, and new features may be rolled out.

Dependencies

Project dependencies are events that need to happen for the project to be implemented successfully. In the case of this mobile solution, we can discuss a few key areas that need to happen for the project to be successful.

The first area is the ability of the university's staff developers to learn the desired framework. If the developer cannot learn this framework, a project reworking may need to be implemented. Nevertheless, this could be remedied by bringing on a subject matter expert that could offer help and guidance in the new framework. Failure in this aspect is improbable. The developers on staff are competent, and this project is well within their abilities.

The next area will be the ability to source the servers and the necessary hardware upgrades. As of the writing of this document, there are still lingering issues over the procurement of computer hardware, specifically computer chips. This may affect the ability to deploy the application on time. At the same time, it might not affect the development process since these computers already meet the minimum requirements. The additional hardware for development is to make compiling and simulations less time-consuming.

When we deploy the application, the university goes to deploy the application there will need to be a license to publish the application to a store successfully. Getting these licenses may take some time since the university may be eligible for a reduced-cost license. This is because

the university is a not-for-profit and is engaged in education. This may only delay the deployment of the application and may not come to be realized at all.

The project depends on full support from the student body and the administration. If either one of these stakeholders falters, then the project may fail. The student body must have total buy-in for the project to be accepted and utilized. The administration must enthusiastically support the project to remain a priority and fully funded.

Risk Factors

Risk factors were discussed in a previous section of this document. In the last section, we were presented with a series of risks that could happen during the project. There are a few risk factors that should be investigated in further detail. During the project, some risks may affect the success of the project.

We can categorize these risk factors into a few categories. These categories will be human risk factors, financial risk factors, and environmental risk factors. This project will need to deal with all three throughout the project.

Human risk factors are a risk that will involve the human resources that are involved in the project. Human resources will provide the bulk of the mobile application's labor. Human beings are not always predictable and react in a manner that may be destructive to the project.

As discussed in the previous section on risk, we rely on the staff to provide all the labor. Suppose we were to lose one of the developers. This could jeopardize the project completion timelines, and costs will need to be amended to account for the time lost and possibly bring a new developer onto the project and get them up to speed on the framework.

Life events in people's lives may put the project at risk. A death in the family may require any of the human resources to take time off to deal with the event. This interruption may have

an impact on both the timeline and the cost of the project.

These risks can be mitigated by hiring and providing ample employee support. If we support the employees, they will be less likely to leave the project. We will need to provide all the resources that they desire. This could be in the form of more training or additional time off once the project has been completed. This is to show that we value the work they have put in to complete this project.

The next category of risk factors is the financial risks that the project may experience. The project is for the university, and the budget at the university is quite tight. We can expect that the enrollment numbers for the university could drop by about 1.1% (Nadworny, 2022).

While this decline in enrollment is not as alarming as in years past, it can impact the university's financial resources. If the enrollment numbers fall because of unexpected events, we could also see the money collected fall. With the current money needed to support all the operations and projects of the university and not going to this project.

Our project has very little exposure to environmental factors, but the risk is still there. Unless there is a catastrophic event, the project will move on without too much of a hitch. We can plan for inclement weather by providing adequate work-from-home resources to allow the developers and others to conduct their work.

There is one caveat. It regards another pandemic; while this possibility seems remote, it should be considered. If we experience this event again, we must be ready. The only event that needs a physical body on campus is the installation of hardware and servers. Since this will be done over a relatively short timeframe, it will decrease the likelihood and the severity of the risk on the project.

These risks should be considered, as it is impossible to account for all the risks that may happen during the project. However, if we categorize them, we can devise measures to help mitigate the risk and reduce their overall impact on the project.

Important Milestones

Throughout the project, there will be many milestones that will mark essential points in the project. This section seeks to explain the critical milestones of the project further.

Survey completed. (January 1st through January 3rd) This milestone will be when the survey is created with the aid of the survey processor. The surveys are needed to see what the students want from the application. The processor will create the questions based on previous experience with this type of survey. Using their experience, they craft questions to get the students to open up about what they need from the app instead of what they want from the application. When this survey or questionnaire is completed, it will be turned over to the student who will be the ones who canvas the campus to make sure that as many people can voice their opinions about the application.

Surveying completed. (January 4th through January 6th) With the survey completed, this milestone will conclude when a sufficient number of students have answered the survey. This will lead to the next milestone.

Survey tabulation completed. (January 7th through January 9th) The student volunteers will begin tabulating the data when they complete surveying. They will look for trends in the data that indicate that there are features that the majority of the students want. When the tabulation is completed, it will be used as input for the next milestone.

Design requirements finished. (January 10th through January 16th) This milestone will start with the document resulting from the tabulation. From this, the developers will create a

requirements document that will have a listing of all desired features of the application. While some may be added to the current release, the majority will be used as a reference to add features during the maintain and update phase that was discussed earlier.

GUI prototypes completed. (January 17th through January 21st) With the requirements completed, we can design the look and feel of the application. This will be accomplished first to accomplish an overall tone for the application. At the same time, these prototypes will have no initial functionality. They can give the stakeholders a view of what the application will accomplish based on how the data will be presented to them. It will aid in initial buy-in. The prototypes help gather further support for the project since there will be a tangible deliverable showing the functional layout and the features that will be implemented.

Business logic. (January 21st through February 14th) This milestone will handle the business logic that will provide the functionality for the application. This will take a few weeks to accomplish because the logic will need to be augmented from the current solution. There will be some changes in the current solution. We are trying to interface with two different systems and need to ensure that the logic to perform these functions is sound and will do what we need.

GUIs developed. (February 15th through February 22nd) This milestone will deliver the actual GUIs used in the application. As stated earlier, this is the easiest deliverable showing the application's functionality. We can begin to get feedback about the flow of functionality.

View academic record feature. (February 23rd through February 28th) This is the first milestone and will be the easiest to implement. This milestone will be the first of the features currently implemented by the current solution. This will be needed to allow the other basic features to operate. Along with GUIs, it will show that a useful feature has been created, and the application will slowly take shape.

View Class Schedule feature. (March 1st through March 6th) This is the next development milestone and will be relatively easy to implement. It will provide another feature that is currently in use by the students. The product of this milestone will add a valuable piece to the application.

Add Course feature. (March 1st through March 6th) This milestone will result in the add course feature that the students will need to utilize to complete adding courses to their academic term.

Delete course feature. (March 7th through March 11th) This milestone will result in the delete course that must be utilized to complete deleting courses from their academic term.

These features are currently implemented in the current solution and need to be among the first ones to create to move from the current solution to the new one.

Servers installed. (March 14th through March 17th) This milestone will be conducted with the licenses obtained milestone. The technician will install and configure the servers to handle the students' requests. However, milestones can happen anytime during the project and can be moved if their requirements make it necessary.

Licenses obtained. (March 14th through March 17th) This milestone will be going on simultaneously as servers are being installed. The duration may take three days, but this was because it may take time to get the discounts for the licenses for being an academic institution.

Application deployed. (March 18th through March 21st) There is a three-day window, and it may be able to be completed sooner if the licenses and server installs do take the full length of time. Deploying encompasses loading the application onto the university's server and ensuring all other requirements are met.

Details of Project Launch

A project launch is an important event. The project launch will help educate all the parties about the project's purpose and get all parties enthusiastic about the project. The launch will focus on what the project will accomplish and how the project intends to get and meet the goals or milestones.

The project launch will evolve through eight steps. Each of these steps will have a purpose and help build support. The first step will be to make sure to define the objective of the project. In this case, we want to instill the idea that the proposed project will meet all interested parties' needs. We need to inform the student body that their need to accomplish a task on the go will be accomplished. The IT department will need to see its overall workload decrease. The university administration will need to see their cost decrease.

The project will need to be presented as a vision. The project vision needs to encompass what it will achieve, how it will affect the stakeholders, and when the project will be realized. To make this vision tangible to the stakeholders, we can use the concept of SMART. This is where you are specific about the goals of the project, create goals that can be measured, that the goals are aceptable, the goals of the project must be realistic, and the goals must be time-defined – SMART (Indeed Editorial Team, 2021).

The next step will be to ensure we have clearly defined tasks that the project will accomplish. We need to keep tasks within the scope. With clearly defined tasks, we can use them as milestones that will show how the project is coming along and allow the stakeholders to understand how far the project has come (Indeed Editorial Team, 2021).

The third step is to make sure we have a concrete budget in mind. Throughout this document, there have been costs presented. These costs help to show what various components will cost. With a budget in mind, we can use them to define how much each milestone will cost.

Budgets are an excellent way to ease people's minds. People are less likely to endorse a project if they do not know how much it will cost. A budget will help them to see how the money is spent and what it is intended to accomplish (Indeed Editorial Team, 2021).

The fourth step will require the enumeration of all reasonable risks. As with budgets knowing the risks associated with a project will help ease the minds of the stakeholders. With risks being known, we can plan for them, and this should be done before any project and during the launch (Indeed Editorial Team, 2021).

The fifth step is ensuring the project has a team that will bring the project home. The project manager will assemble the team members most eager to complete this project. They will need to desire to learn the new framework and be willing to work the hours to learn it. This step should not be hard to accomplish since most members of the IT department have been working together for years (Indeed Editorial Team, 2021).

As with any project, there needs to be an incredible feeling of collaboration. This is the sixth step to bringing about a fruitful project launch. While this project may be small and only involves a few select people, it will require vast collaboration. This point is even more critical. With this collaboration, the project will be successfully launched (Indeed Editorial Team, 2021).

While we have discussed steps that mostly involved people and their interactions about a project launch, we need to look at another aspect. We need to look at how tools will facilitate all the previous steps. We will facilitate this by using tools. Selecting the right tools will aid in all the previous efforts and the following one. We will implement appropriate communications and use the right software for the job. This is the seventh step in developing a project launch (Indeed Editorial Team, 2021).

The final step is to make use of meetings. This meeting can be used to interact with the stakeholders of the project. Let them voice any concerns and offer ideas about the project. It will give stakeholders a voice in the project. This will go a long way to ensure stakeholders have some "skin in the game." If the stakeholders feel they have "skin in the game," they will want to ensure the project will be successful.

If these steps are followed, we can be assured that there will be a successful project. Each of the mentioned steps aims to engage the stakeholder on various levels. We want to foster the belief that they have a say in the project and that their voices are and will be heard throughout the project.

Strategy for Implementation

For the project to succeed, we need to have the plan to facilitate that success. We must remember that this project will touch upon multiple areas within the university. We need to have ample support to ensure that the project does not jeopardize any of the current IT operations of the campus. If we devise a plan that is well thought out, we have a successful delivery of the project with very few problems along the way. The strategy will include seven steps to make sure it is a success. The steps are broken down into the following steps (7 Tips for a Successful Software Implementation, n.d.):

1. We will need to define success upfront. Our project's success will mean that the students will perform their functions using the application and slowly abandon the current solution. The IT department will see a reduction in their overhead when it comes to maintaining the current solution, and they will see a reduction in the use of dedicated computers and kiosks. The administration will see that their costs have been reduced in

terms of maintenance and cost to procure parts for the aging solution (7 Tips for a Successful Software Implementation, n.d.).

2. During the coding process, we must ensure that our code conforms and is structured to yield the best possible results and that the code will be easy to maintain and troubleshoot (7 Tips for a Successful Software Implementation, n.d.).
3. We should look at the data used in the project. We have old systems, and the databases may benefit from a "cleaning" of the data. We want to streamline the process, and we may need to see if the data can be presented more skillfully. The current system was produced and has not changed. We may benefit from updating the tables and their data (7 Tips for a Successful Software Implementation, n.d.).
4. To be successful and deliver the project on time, we will create a schedule that will include all the milestones. These milestones will correspond to the different functions that the mobile application will provide to the students (7 Tips for a Successful Software Implementation, n.d.).
5. We will be following the Agile methodology for software creation. We will produce the functionality in a series of phases that will add the functionality incrementally. This will serve two primary purposes. The first is to make it easy to prove quality and to troubleshoot any problems while it is still early in production; the second is to give the stakeholders something tangible. The stakeholders will be able to see the functionality and that the project is evolving from a work in progress to a viable piece of software they can use (7 Tips for a Successful Software Implementation, n.d.).
6. A project is a living and breathing entity. Over the project, it may become necessary to adapt current procedures to make them better or to make them suit the project. For the

project, we want to improve the procedures and processes that are currently in place.

After this project, we want to be able to maintain the software, and we will want to do it by the most efficient means possible (7 Tips for a Successful Software Implementation, n.d.).

7. There will be a learning curve during and after the project. The software developers will need time to adapt to their new skills and the information provided during training. We need to afford some leeway to the student body when learning the software. We need to afford the student body the time to adopt the application. We can aid in this by keeping them informed throughout the project. We want this stakeholder group to be the most satisfied. Keeping them in the loop and listening to their concerns is crucial to the project's success (7 Tips for a Successful Software Implementation, n.d.).

The steps listed above will help lay out the logic strategy of the project. We need to address a few other areas that will help define the strategy for the project. We need to adhere to the principles of IT. The strategy should focus on sound IT principles. We want to adhere to technology best practices. We will accomplish this by utilizing the new framework. We will ensure that this product will keep up with current trends in technology.

We will continue to observe all requirements for keeping student data safe and the networks used to purvey secure information using the current standards (Information Technology Services | IT Core Principles, n.d.). The following will cover IS 27000, NIST SP 800, and other common standards pertinent to the university and its infrastructure. Moreover, it will aid in keeping the campus infrastructure secure (Kirvan, 2021).

Additional items will need to be addressed for this project since this project will be dealing with student data. We will not be dealing with it directly. A sample of data will be used

from the university's current data. We will set up a lab that will be able to handle the development needs of the project. Everything will go live once it is adequately tested to ensure no significant flaws with the software.

The university already has backup procedures to guard against any failure of the systems once the software application goes live. This will ensure ample safeguards and ensure the integrity of the data is always maintained.

A highly qualified technician will add the new servers, and there will be safeguards against any failure. Since the servers being installed only handle student requests on mobile devices, there should be no issues if some new servers do not function as they should.

With these tips and existing precautions, there should be very few problems in implementing the project, as discussed. If there is a failure, the initial failure will be relegated only to the new acquisitions and the software being produced. All issues with the production of the software will be contained in the lab, where they can be corrected before it is released into production.

Documentation Deliverables

This project will produce numerous documents as a work product. There will be documents that will come from the creation of the mobile application and the project itself. The documentation will come from the various stages of the development project. These stages were discussed in previous sections, and the documentation breakdown will be broken down by the stage and the types of documents that will be produced (Editor, 2019).

Planning Stage. During this stage, we will gather the requirements and design documentation at a high level and later at a more refined level. These documents are essential to maintain because they will give insight into how the design and functionality were brought

about. Since we requested input from the student body, other functional requirements may be added later. We will want to archive these requirements to implement them later (Editor, 2019).

Quality Assurance. We will produce the test plans and standards documentation. This will document the testing procedures, tasks, test flow, and the types of tests performed while testing the application. It is essential to have this documentation so we have a record of the tests that were performed. If we keep this documentation, we will have a history of the tests performed. Also, if something goes wrong during testing, we can have a record of the event and be able to troubleshoot the problem using previous methods (Editor, 2019).

User documentation. Documentation produced here will be the system documents, user guides, and installation guides. These documents will focus on product use, maintenance, and installation instructions. They provide the "how to" of the product and will provide the student body with a document on how they use the application (Editor, 2019).

Release. This is where the final reports are generated. These final reports will reflect on what went wrong, how problems were corrected, and what might be the next steps in adding features to the software (Editor, 2019).

This project will create documents during all processes. These documents will be associated with the five phases of project management. These five phases are initiating, planning, executing, monitoring, controlling, and closing (Espy, 2021). These will be discussed as to what type of documentation will be produced during the following subsections.

Initiating. During this phase, we will produce the project charter. At the same time, this may be a relatively small project regarding resources and management. The project charter will help lay out the purpose and clarify the project's objectives. This document will help market the

project to the stakeholders and give them a better idea of what the project intends to accomplish. We will deliver the stakeholder register during this phase. This important document will help create the stakeholder communication plan and give a simple place to see all the interested parties in the project (Espy, 2021).

Planning. During the planning phase, we document the scope, the project schedule, the budget, scope management plan, requirements management plan, schedule management plan, Cost management plan, quality management plan, process improvement plan, human resource management plan, communications management plan, risk management plan, procurement management plan, and stakeholder management plan (Espy, 2021). These documents will add more detail to different areas of the project. For instance, the quality management plan will outline what will be required for effective project management and how quality will be instilled in the project. This phase is akin to the software development quality assurance stage discussed earlier.

Executing. Some of the documents discussed earlier in the Planning phase will be updated, including updates to the project plan (Espy, 2021).

Monitoring and Controlling. The documents produced during this phase will be status reports, metrics, and other documented information about the project. During this phase, we investigate the changes that may need to be implemented. This will lead to the creation of change control documentation. In this phase, we will create issue logs to help document any issues that may have arisen during the software's creation (Espy, 2021).

Closing. This phase will create the closeout reports, the final budgets, and other support documents. This will be in tandem with the user documentation phase of software development. This phase will allow for the transition to the release, where the application will enter the

maintenance phase of the project (Espy, 2021). We will produce lessons learned document so that we can document what went right with this project and what went wrong with the project. These are essential documents since we will be maintaining the application for the duration of the application's lifetime. We will want to know the good and the bad, so we exploit what went well and fix the items that did not.

This project will be using an Agile methodology to create the mobile application. This will entail going into and out of these phases multiple times. The final documentation will aid in understanding what the project cycle was like and what the project produced. At the completion, this documentation will help anyone who comes after in maintaining the software solution.

Hardware and Software Deliverables

The hardware deliverables will be the adequately provisioned servers to perform their duties. These servers must be able to handle the requirements and have been set up by the technician correctly.

The software will be a mobile application that meets the stakeholder's needs. It does not need to meet all the requirements initially. It will need to meet the functionality of the current system. The mobile application does not need to implement the needs discovered during the survey. These are the "wants" of the students and can be implemented later.

Evaluation Framework

The project will need an evaluation framework to monitor, assess, and evaluate the quality of the work product. This project will benefit from a framework allowing constant feedback to improve the product or the processes used to create the application.

Using key approaches as defined in the *Project Management Book Of Knowledge (PMBOK)*, we can ensure that quality is maintained during the project. When we build an evaluation framework, we need to keep these concepts at the forefront of framework development. The approaches that we will look to are the following (Project Management Institute, 2013):

- **Customer satisfaction** – During the project, we need to keep the stakeholders involved in the project. To accomplish this, we need to keep them satisfied with the product being produced. We can do this by giving them exactly what they want. The student body will get the features they need and the ability to be mobile. The IT department will have resources freed up, making the administration more manageable. The administration will see a cost reduction in money and human resources needed to maintain the solution. A periodic review will ensure that the features produced to align with what is expected.
- **Prevention over inspection.** For this project to be productive, we need to make sure that the product avoids a feeling of lack of quality. We have two ways to accomplish this: inspecting our way to quality or building the quality in. We should adapt the latter. We want to develop a superior product from the get-go. The developers will need to have solid requirements and specifications to accomplish this. With concrete requirements, we can design the software application to meet these requirements and only these requirements. We will not need to worry about mistakes in features.
- **Continuous improvement.** As the project evolves, changes will inevitably be needed to meet better the stakeholder needs and processes used to create the product. During the project, we will strive to create a project that adds to the value incrementally.

- **Management responsibility.** To ensure their ultimate accountability for the quality of the product, the manager needs to be able to own up to any deficiencies in the work. The management needs the power and the resource to take corrective actions to bring quality back up to par.

The approaches mentioned in the bullet points are some of the areas that will compose the framework that govern the quality of the project. However, how will this framework be brought about? Many tools can be utilized to ascertain the quality of the software product.

For customer satisfaction, we can gauge their engagement in a purely subjective manner by measuring their enthusiasm for the project. How well they offer opinions about the application will help get a feel for its quality. If a quality product is produced, the students should feel happy and engage with the product gleefully.

When it comes to ensuring the solution is of quality, we can employ many data-gathering tools to get the data we need. For example, if we have a defect that we are currently working on, we can utilize different techniques to solve the problem. We can use things like the cause-and-effect diagram to analyze the situation, or if we are looking to streamline a process, we can use flowcharts to try to increase the efficiency of the process by eliminating unnecessary steps (Project Management Institute, 2013).

This document aims to provide an argument for the project and how it will benefit the university. The business problem was the inefficient use of the college's resources when providing information to the students. This has discussed the need for a solution. It has shown how much the solution will cost in time and resources (human and physical), as well as the benefits and risks that the project will entail. This solution aid stakeholders from many areas of the university, and this solution will solve the business problem that has been discovered,

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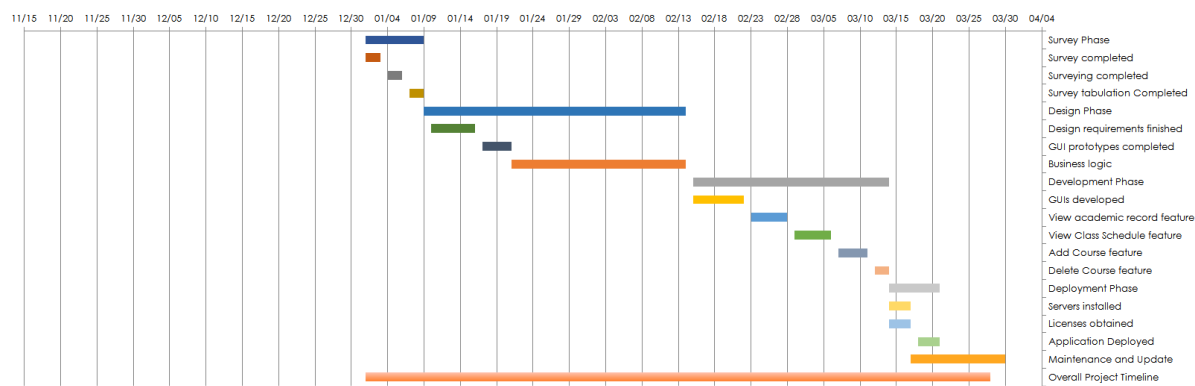
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Table

Project Timeline				
Phase	START DATE	END DATE	DURATION in days	COMMENTS
Survey Phase	01/01	01/09	8	
	Survey completed	01/01	2	milestone
	Surveying completed	01/04	2	milestone
	Survey Idboudion Completed	01/07	2	
Design Phase	01/09	02/14	36	
	Design requirements finished	01/10	6	milestone
	GUI prototypes completed	01/17	4	milestone
	Business logic	01/21	24	milestone
Development Phase	02/15	03/14	27	
	GUIs developed	02/15	7	milestone
	View academic record feature	02/23	5	milestone
	View Class Schedule feature	03/01	5	milestone
	Add Course feature	03/07	4	milestone
	Delete Course feature	03/12	2	milestone
Deployment Phase	03/14	03/21	7	
	Servers installed	03/14	3	milestone
	Licenses obtained	03/14	3	milestone
	Application Deployed	03/18	3	milestone
Maintenance and Update	03/17	03/30	13	An ongoing phase
	Overall Project Timeline	01/01	86	

Timeline Table



Timeline Chart