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EDGE Mentoring App

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EDGE Mentoring App

An Interactive Qualifying Project

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Abstract

The EDGE Mentoring Program helps incoming freshmen transition more easily into Worcester Polytechnic Institute (WPI). In the EDGE Program, mentees are paired with sophomore, junior, and senior mentors, who guide incoming students in three areas: academic, social, and personal wellness. Additionally, in today's college environment, mobile applications (apps) assist college students in areas such as time management, sleep, fitness, and social networking. The goal of this interactive qualifying project (IQP) was to develop a mobile app that will help peer mentors in the EDGE Program. The mentors in the EDGE Program could then use the app to help their mentees succeed. It is envisioned that the app will be used to extend the scope and value of the EDGE Program in future years into the rest of the freshmen population at WPI by serving as a virtual mentor, which also leads to increased one-on-one personal mentoring and program expansion.

Executive Summary

Over the past fourteen weeks our Interactive Qualifying Project (IQP) team has worked closely with Worcester Polytechnic Institutes' (WPI) Office of Disability Services (ODS) staff, Aaron Ferguson, Laura Rosen and Jessica Szivos as well as, our project advisors, Professors Eleanor Loiacono and Justin Wang to develop the initial iteration of a mobile app for the EDGE Program. The EDGE Program or Empowerment through Direct Goals for Education is a mentoring program offered in the fall semester (A and B Term) to incoming freshmen to aid them in the transition into college life. The incoming Freshmen are placed with Sophomores, Juniors, and Seniors and together they work on various techniques that help the first year students be successful during their four years of college. These techniques focus on three main facets of the average college student life: academic, social, and personal wellness. The mentors provide their mentees with PDFs, Word Documents, videos and other helpful resources on how to manage all three categories.

To better assist first year students, the ODS asked this IQP team to design a mobile app that can be used by EDGE mentors. Mobile apps are used by many colleges to make the transition for incoming Freshmen less challenging. For instance, mobile apps help college students in prioritizing their time (through the use of a planner), in navigating through a college campus (through the use of an interactive map), and in obtaining more sleep (through sleeping apps). The goal of this project was to provide an app that would give mentors of the ODS' EDGE Program a way to easily access all of the resources given to them. All the tools and features would be placed in the mobile app, and would be shared with the first year mentees.

Through researching mentoring programs, students transitioning into college, and the benefits of using mobile apps in a university setting the team was able to understand the reasoning behind a need for the EDGE Mentoring App. In continuing to understand the project the team talked with the ODS staff and conducted both surveys and interviews with the mentors and mentees. In doing this we were able to find

out what our clients wanted in an app and what aspects of college life were the EDGE mentees struggling with. This information provided the team with a focus on where we wanted to take the app.

When the team was done gathering all of the necessary information needed to provide reasoning for the EDGE Mentoring App, the team was then able to begin both the design and technical aspect of app development. The team began by designing the initial home screen. Through research on Human Computer Interaction (HCI) and through feedback from the clients we were able to create a home screen that was simplistic and visually appealing. It consisted of a search bar at the top of the page, a list of resources to follow, and at the bottom there were three icons for social, personal, and academic tools. Finally, there was a help button that pulls up an additional screen of tips on how to navigate through the app.

After designing the home screen more focus was placed on creating the "skeleton" of the app. We had to figure out what platform to use, as well as, the database and the language to start coding the app in. The team first started by choosing a platform to build the app on. Through surveying EDGE mentors we found that most mentors had iPhones and the team chose to use iPhone's iOS platform. Next, the team had to choose a language to code the app in, and we decided to select Swift because it is a newer and more simplistic language to use. Finally, the team selected the database for the app and we chose the Parse Database. Parse handled most of the fundamental details of the database and allowed for the programmers on the team to focus more on creating a better user experience. Once those details were figured out the team was able to successfully create the functionality of the app and create a "skeleton" for future project teams to build upon.

Following the mobile app development process, the team was able to create a finished product for the EDGE Mentoring App. In the final prototype, the team completed developing the user interface, which includes the app's main menu and submenus. The main menu and submenus allow the EDGE mentors (the users) to add, view, and search for resources that they find helpful or that they can share with their first year mentees. The team also included a splash screen, which shows the logo for the EDGE

Program while the app is loading. Finally, a landing page/help screen was included and this page provides instructions on how to use the app.

In addition to developing the app, the team identified areas in which future IQP teams can focus on in this project. Our team developed a "skeleton" for the EDGE Mentoring App that future teams can build off of. One example is future teams can focus on adding more visual design features to the mobile app. Furthermore, a future team can focus on developing more features in the mobile app. In this IQP iteration the team was unable to develop our own tools and resources in the app, such as time-management tools; this was due to time constraints. However, a future team can build their own features in the app.

Additionally, the team tried to determine the monetary costs and benefits of the EDGE Program and the EDGE Mentoring App. Determining the costs and benefits was important in this project in order to evaluate the effectiveness of the EDGE Program and the EDGE Mentoring App. For instance, the team tried to evaluate whether the EDGE Program and the EDGE Mentoring App would result in a positive economic benefit. Furthermore, a Marketing Strategy was developed as a way to ensure a path forward for the EDGE Mentoring App, not only to ensure longevity and sustainability of the app, but also to help further the goals of the EDGE program in a meaningful way. The primary marketing consideration for the development within this phase was marketability including the ability of the app to provide a value proposition with app version 1 to the existing target user base. The Marketing Strategy charts a model for growth and detailed tasks through app versions 2 and 3, which would meaningfully increase the reach and impact of the EDGE program to the freshman class over time, thereby closing the gap between students with disabilities and transition issues and other freshman students.

In summary, this IQP project team was able to take the first steps in creating a mobile app for the EDGE Mentoring Program. We set a foundation in which progress can be made and down the line this mobile app can be used in other college campuses.

Background

Worcester Polytechnic Institute (WPI) has a project-based curriculum where students learn hands on how to become problem solvers. In their junior year students are expected to complete their Interactive Qualifying Project (IQP). An IQP is a team-based project of students from different majors and/or backgrounds. They are given an issue that a project sponsor (client) is facing and have to come up with a solution. The team-based aspect of an IQP allows students to learn and benefit from colleagues, who have a distinct background. For example, a biomedical engineering student can benefit greatly by working with a computer science student because the two students bring unique skillsets to the project.

Another unique component of the IQP is the connection of technology with societal issues and human needs. Students learn to solve a societal need through the use of technology and science. In this setting, students can solve real-world problems with an understanding for the social and humanistic contexts of their work.

In addition to working in a group setting, a faculty advisor guides the small student team. By conducting research and by using social science methods, students develop a solution to a societal problem. Furthermore, students work with project sponsors, which can include nonprofit or government agencies. The teams work to solve a problem for the project sponsors, similar to a consulting company. Students then deliver solutions and findings that they have found in the project to the faculty advisors and the project sponsors. These findings are delivered in the form of a formal research report and a group presentation.

The project that this IQP team will focus on will be under the guidance of Professor Wang, who is a WPI professor in Economics and Professor Loiacono, who is a WPI professor in Information Technology. One of Professor Loiacono's areas of expertise is in information technology (IT) accessibility for people with disabilities. Through this research interest, she has collaborated with WPI's ODS. Professor Loiacono's goal is to improve services provided to students and people with disabilities, and she aims to achieve this goal through the use of mobile apps.

In particular, Professor Loiacono and the ODS want to implement a mobile app into the EDGE Mentoring Program. Professor Loiacono aims to design an app that will result in a strong user experience. The hope is that through the development of a mobile app, Professor Loiacono and the ODS will be well positioned to submit a grant for further development and refinement of the EDGE Program and the mobile app.

Introduction

WPI's Office of Disability Services (ODS) has asked a team of students to develop a mobile app to aid their mentors in the Empowerment through Directed Goals for Education (EDGE) Program. The team will work for fourteen weeks analyzing the EDGE Program and other mentoring programs as well as, researching how freshmen with and without disabilities transition into college. The team will look at what features to include and how to develop the mobile app. The team will also analyze the costs versus the benefits of having a mentoring program, such as the EDGE Program at WPI, and the costs versus the benefits of having a mobile app developed for the mentors. This project's goal was to create the first iteration of the EDGE Mentoring App that future IQP students can continue to develop. Additionally, the project aims to adopt this app in other college campuses around the country.

When starting this project the team needed to understand the EDGE Program and what it offers. The EDGE Program has been accessible to WPI freshmen for three years. This program focuses on helping first year students in their transition from high school to college, and the program is available to both students with and without disabilities. With WPI's fast paced and rigorous course load, this program offers first year students the tools they need to manage throughout their four years. The tools emphasize three components of a college student's life, and these components include academic, social, and personal wellness. Academics tools can include test-taking strategies, note taking methods, and organizational skills. Social resources might focus on time management skills and getting involved on campus. Finally, personal wellness might emphasize healthy eating habits, emotional wellbeing, and how to get sufficient sleep. All of these factors play a key role in the daily life of a college student and are difficult to manage.

With the development of this mobile app, the tools that are given to the mentors to help the mentees will be right at their fingertips. These tools can be in the form of a calendar to schedule events, a to-do list, or notifications/reminders sent to a student's phone.

This IQP will primarily focus on the initial app development phases and will target mentors involved in the EDGE Program. Additionally, the team will gather information on which areas first year

mentees struggle with. The first objective of this project was to gather information from the literature on peer mentoring programs, the transition from high school to college for students, and the steps in mobile app development. Knowing the reasoning behind why apps function a certain way and why students find the transition into college difficult, helped in selecting specific features for the EDGE Mentoring App. Another objective was to collect data and gain feedback from the EDGE mentors and mentees. By taking all of this information into consideration the initial app development stages can commence.

In the following pages, this report explains the process in creating the EDGE Mentoring App. The next part of this report is the literature review section. This section discusses the background literature that the team obtained, which was helpful in designing the mobile app.

1. Literature Review

1.1 Mentoring College Freshmen

The research process began by examining the transition for students who enter college, as well as examining effective mentoring practices in higher education. A system that several colleges use to help incoming freshmen transition into postsecondary schooling is mentoring programs. These programs utilize a student-to-student relationship, in which upperclassmen provide a guiding hand through challenges newer students might be facing. Challenges that first year students face include a sense of loss for what has changed in their life such as relationships that may have been replaced.

Moreover, in high school, a student typically has a structured schedule. But in college, a student is in charge of creating and implementing his or her own schedule that is typically different each day. This schedule can include night classes or having free time throughout the day. Students may have a heavier workload outside of the classroom and professors with different teaching styles. Furthermore, students move into residence halls, and no longer live with their families. Instead, they live independently and usually with a roommate. This is another component of the transition for incoming freshmen.

Finally, students have to make a personal transition. Entering as an incoming freshmen can mean being a new comer in a strange and unfamiliar community. There may be days where students feel they cannot stand their roommates, professors, or classes. However, mentoring is one way universities are trying to help students during this initial transition period. A study conducted at the University of Pittsburgh shows the importance of mentoring (Budny, Paul, and Bon, 2006). Previously, the University held a once a week lecture in which incoming students learned about different engineering fields. However, the program received poor student feedback and thus in the Fall of 2001, the University of Pittsburgh modified the program to include a once a week student mentoring session in which a mentor would instruct 10-15 freshmen (Budny, Paul, and Bon, 2006).

In order to facilitate the transition, the University of Pittsburgh's mentoring program sought to guide students in academic and social areas. It was found that their mentoring program had a significant

impact on increasing the retention and performance of college freshmen (Budny, Paul, and Bon, 2006) The percentage of students with first semester honors increased while the percentage of students with first semester probation (with a GPA below 2.0) decreased. Additionally, the percentage of students leaving the university decreased (Budny, Paul, and Bon, 2006).

This study also examined the workload outside of class since a key challenge that incoming freshmen often face is the increase in homework assignments. In a student survey, the median number of hours that college freshmen at the University of Pittsburgh reported spending on homework in high school was 2 hours per week. Meanwhile, the median number of hours spent on homework in college was about 15 hours per week (Budny, Paul, and Bon, 2006).

This research also shows how selecting a proper mentoring approach can have a significant impact in helping students. For example, in 2004, mentors took a pro-active role in talking to students before they had any issues, while, in 2005, mentors utilized a wait and see approach, and only reacted to the issues students faced when they arose (Budny, Paul, and Bon, 2006). In 2004, when the mentors took a pro-active approach, they told the mentees about common challenges that first-year students face (i.e. not getting along with your roommate) and how to solve these challenges before they escalate. Meanwhile, in 2005, mentors took a re-active approach and only offered advice when students told them that they had an issue.

In Table 1.1, incoming freshmen had a poorer performance in 2005 compared to 2004 due to these differing approaches (Budny, Paul, and Bon, 2006). For instance, in 2004, the percentage of freshmen on term honors was 33.64% while in 2005 this percentage decreased to 27.51%. Also, the percentage of freshmen on term probation was 15.89% in 2004 but this rate increased to 20.28% in 2005. Thus, the pro-active mentoring approach aided students more.

Table 1.1 The performance of Freshmen from 2004 to 2005

	2004	2005
Transfer Out	10.75%	7.93%
Term Honors	33.64%	27.51%
Term Probation	15.89%	20.28%
Total GPA, 1.5 or Below	7.94%	12.82%
Average GPA	2.73%	2.67%

Although the University of Pittsburgh study does show that the overall GPA of freshmen increased following the adoption of the mentoring program, there is a limitation with the research methodology. The study did not randomly divide subjects into an experimental group and a control group. For example, the control group could have received no mentoring, while the experimental group would have received peer mentoring. This change in the method would have allowed the results of the two groups to be compared. There is also a concern of grade inflation. Professors simply could have graded easier after the mentoring program was adopted. Additionally, there is an issue of whether the college is becoming more selective during this time period, and thus grades are increasing due to more intelligent students. Finally, the study measured only a student's academic performance, by examining GPA, and the percentage of students with honors and on academic probation. However, social issues and overall student wellbeing are crucial components that were ignored.

1.1.1 Self-Determination Skills for Students with Disabilities

Another study examined the challenges that students with disabilities face upon arriving to college. In this article, a common issue for students with disabilities is deciding whether to self-disclose their disability to professors and other members of the school staff (Getzel and Thoma, 2008). Students

may be eager for a "new beginning" in a college setting without being labeled as they may have felt in high school (Getzel and Thoma, 2008).

Additionally, the study found that more than half of the students enrolled in postsecondary education do not know they have a disability. (Getzel and Thoma, 2008). Being unaware of the challenges they face, students become solely dependent for trying to address any difficulties they encounter without the aid of support resources. As a result, they might not have the correct tools they need to succeed in postsecondary education. This can result in the student facing academic probation or even dropping out of school. Knowing the extent of the disability and whether a student needs to have extended time during exams to be able to process information is crucial. Tools such as these place each student on an even playing field with other students. Though a disability might affect a student's ability to learn at a college level having the right tools in place and knowing the extent of the disability will aid in the transition into college.

The study also pointed out that self-determination skills are essential for students with disabilities (Getzel and Thoma, 2008). These skills are a set of interpersonal skills that include acceptance of a disability and how it affects a person's learning. Self-determination also involves understanding which support services are needed, having the determination to overcome obstacles, and knowing how to describe one's disability to service providers. This skill demonstrates that students are being responsible for getting the help they need and it helps students with disabilities succeed at the college level.

Although these skills are important, further studies are needed to explore what self-determination strategies students with disabilities have used to successfully meet the challenges in postsecondary education.

In order to assess what strategies students have used, researchers in this study needed to select participants with disabilities, who have displayed self-determination at the college level. The researchers selected students who were receiving supports and services related to their disability and who were

identified as having self-determination skills by staff in their Disability Services Office (Getzel and Thoma, 2008).

This method of choosing participants was used because it offered an opportunity to learn from students who had disabilities, who sought supports and services, and thus exercised self-determination skills. The study utilized a focus group, with 34 students and 80% of the students ranged between the ages of 18 to 23 (Getzel and Thoma, 2008). The benefit of using focus groups is that it provided an effective way to obtain results from a small group of individuals, and the group setting provided an atmosphere for collecting information that was more relaxed for the participants (Getzel and Thoma, 2008).

The focus group started by the researcher defining self-determination: "being able to advocate for what you need, understanding your disability and how it impacts your learning, having self-confidence, being independent, and adjusting your schedule to make sure things get done". The first question that was asked in the focus group was: "What do you think an effective advocate does to ensure he or she stays in school and gets the supports needed?" Many participants shared that they previously did not self-disclose their disability, and only chose to after an academic struggle. The students acknowledged learning about oneself (and one's disability), goal setting, and self-management as essential skills (Getzel and Thoma, 2008).

Students also talked about meeting with instructors when they had academic problems. Also for self-awareness skills, students reported that they themselves understood their strengths and needs better than anyone else (Getzel and Thoma, 2008). Finally, the participants discussed the importance of setting short-term goals that are realistic and that help build their long-term career goals (Getzel and Thoma, 2008).

The second question asked was: "What advocacy or self-determination skills do you think are absolutely essential to staying in college and getting the supports you need?" In general the participants spoke of learning about all of the services available to them on campus, and utilizing those resources

(Getzel and Thoma, 2008). Also, participants stressed that developing support systems on campus was very important (Getzel and Thoma, 2008). An interesting finding is that most of the students in the study (who had disabilities) preferred if efforts began earlier in order to focus on strategies for problem solving and identifying resources. This is in contrast to the trial and error approach, in which students only seek help after struggling. However, further research is needed to determine whether these students' recommendations do indeed result in increased self-determination.

An issue with the study is the researcher started the focus group with a definition of self-determination. This could have led the participants to focus solely on those influences on their success and minimize other supports that might have equal or greater importance, such as listening to and considering the input of colleagues and family members. Also, the results in the research were based on the opinions of 34 college students with disabilities.

Overall, the participants emphasized seeking out services, developing support systems, and understanding how their disability affects their learning as being important strategies to succeed (Getzel and Thoma, 2008). The participants also identified that disclosing their disability was a hurdle, and they pointed out that they should have sought resources earlier in their academic career (Getzel and Thoma, 2008).

1.2 Mentoring Freshmen Female Engineering Students

Another study conducted at Washington State University (WSU) examined a model for mentoring female engineering students (Poor and Brown, 2013). The backdrop for this study is that there is a lack of female engineers in the U.S. and there are lower retention rates for women who major in engineering (Poor and Brown, 2013). Additionally, the U.S. is in need of more STEM educated workers.

Women indicated that they left engineering due to the following reasons: 1) isolation 2) not seeing the relevance of courses 3) a chilly classroom environment 4) A lack of role models and mentors (Poor and Brown, 2013). To address the low retention rate, WSU developed a mentoring program called the "Big Sister" Program.

This program involves matching up upper-class women (Juniors and Seniors) with lower-class women (incoming Freshmen) as well as matching female students with professional engineers. The program has been successful in increasing retention rates substantially (Poor and Brown, 2013). The program can be beneficial because students get to talk with mentors, who are in industry. If students can see how they can use their engineering degree they might be more motivated to remain in engineering.

In the fall of 2011, all female engineering students were invited to join the mentoring program. The article found that 42 out of 54 incoming freshmen signed up for program (Poor and Brown, 2013). Of these 42 students, 74% have remained in the program after two semesters (Poor and Brown, 2013). The retention for all 54 Freshmen students after two semesters was only 68% in comparison (Poor and Brown, 2013).

In addition to tracking student retention rates, several mentees were interviewed to gain greater insight into the mentoring program's effectiveness. Generally, mentees said that the mentoring program "gives confidence toward women succeeding in the workplace" and "makes me more connected and involved" (Poor and Brown, 2013). Another mentee explained how her mentor helped her get through calculus simply through encouragement. The program also provides a direct role model and an example of how women can succeed in engineering. Students reported that one great benefit was having advice on finding internships.

It is important to note that this program was designed to be self-sustaining (Poor and Brown, 2013). In other words, mentees would pay it forward. By recognizing how helpful the program has been to them, the mentees would help future female engineers at WSU succeed (Poor and Brown, 2013).

Despite the positive results of this study, there is some reason for caution. Although the student retention rate data is useful, this statistic alone does not show the entire picture of how students can be helped by mentoring: like a student's satisfaction in engineering. For instance, how many of the female students who remained in engineering at WSU enjoyed engineering. Although, the students who were

interviewed consistently gave positive feedback about the engineering program, there is no way of knowing student satisfaction of all the mentees. Also, the study did not mention how many students were interviewed.

1.3 What Motivates a Mentor to Pursue a Leadership Role?

The benefits that peer mentoring can have on mentors were also looked at in this literature review. This is a key part of WPI's EDGE Program, because if mentors are satisfied and motivated by their role, they will be more helpful in guiding mentees.

A study gathered data over three years on a university-wide peer-mentoring program. Data from 858 mentors was gathered, and the study examined the benefits that peer mentoring had on mentors. (Beltman and Schaeben, 2012).

Mentoring is a unique relationship that requires cooperation between the mentee and the mentor. A definition of mentoring found in the literature states the following: "mentoring requires a reciprocal relationship, involving mutuality of social exchange as opposed to a one-way relationship" (Beltman and Schaeben, 2012). In other words both the mentor and mentee contribute to and benefit from the relationship. This study has shown that mentors display personal outcomes such as a sense of satisfaction and achievement through helping others, as well as increased self-awareness and confidence (Beltman and Schaeben, 2012). Moreover, social outcomes included an enhanced sense of connectedness and the formation of inter-cultural friendships (Beltman and Schaeben, 2012).

Before meeting with their mentee, mentors participate in a workshop prior to freshmen orientation week (Beltman and Schaeben, 2012). Mentors are provided with information about their role as a mentor, and are given insights into student development and the transition process (Beltman and Schaeben, 2012). Mentors are also familiarized with key sources of help for new students and they learn how to communicate with mentees during the workshops (Beltman and Schaeben, 2012).

The program involves a meeting with mentees during orientation week and a second meeting in the first week of the semester. It is then left to the mentees if they want to schedule one-on-one meetings.

The research aimed to answer the following question: *What benefits do mentors of first year students report from their participation in this program*? A survey was used to assess mentor satisfaction (Beltman and Schaeben, 2012). For instance, one question asked: "Comment about the things you have enjoyed or found beneficial about being a student mentor. What have you gained and/or found really satisfying from this role?" Based on the survey, 47% of all responses fell into the Altruistic category, which included responses that mentioned enjoyment and satisfaction from helping people (Beltman and Schaeben, 2012). An example of a response that a female humanities student wrote was: "It is genuinely rewarding to know that someone feels more able to appreciate an experience because of the support you have offered" (Beltman and Schaeben, 2012).

The second most frequent group of all responses was cognitive and it included acquiring new skills (such as communication skills). A total of 17.8% of all students reported benefits in this area (Beltman and Schaeben, 2012). For instance, a female pharmacy student wrote: "The mentor program has helped define myself as a leader, and I look forward to taking part in many other leadership and mentoring roles in my immediate future and during my career" (Beltman and Schaeben, 2012).

The third most frequent category was social, which contained 14.7% of all responses (Beltman and Schaeben, 2012). Many mentors reported developing friendships with mentees. A male physiotherapy student wrote: "It has been extremely fun just to socialize with the mentees" (Beltman and Schaeben, 2012). Finally, the last major group of benefits was personal growth (14.0% of all responses) (Beltman and Schaeben, 2012). Mentors reported developing confidence, a sense of responsibility, and empathy. For example, a female education student wrote: "It has made me think back to when I first started university and the emotions that I felt back then, as well as my journey from then to now" (Beltman and Schaeben, 2012).

To summarize the results, mentors mainly reported a sense of satisfaction in assisting fellow students (Beltman and Schaeben, 2012). By far the most common benefits reported by mentors were altruistic. Mentors enjoyed passing on their experience to new students and they greatly appreciated the positive feedback from mentees. It is important to note that mentors also developed lasting relationships with people they otherwise would not have met. Some students formed "their first real intercultural friendship" through the program (Beltman and Schaeben, 2012). The study adds to the literature, which shows that mentoring programs benefit not only first year students (mentees) but also the peer mentors.

1.4 Navigating the Transition from High School to College for Students with Disabilities

Six-year graduation rates for students with disabilities are 69.5%, in comparison to 79.7% for students without disabilities (Hudson, 2013). Due to the nature of their disability, students with learning disabilities are particularly vulnerable in making the high school-to-college transition (Hudson, 2013). In the social realm, students with disabilities must create new friendships in an environment in which individuals can be highly conscious of social status (Hudson, 2013). Additionally, there is a carry-over effect in which falling behind academically can severely impact notions of self-esteem (Hudson, 2013). In addition to academic and social concerns, students have to manage their emotional and personal wellbeing (Hudson, 2013).

To identify difficulties in transitioning from high school to college for students with learning disabilities, research took place at an urban university of over 20,000 students in the eastern part of the United States (Connor, 2011). Two students with learning disabilities were interviewed multiple times. The first student, named Amber, had a learning disability and attention-deficit disorder (ADD). In transitioning to college, she has found that using a calendar to plan assignments was very helpful for her academic success (Connor, 2011). Moreover, Amber is a successful student (with a 3.5 GPA), and is highly organized. However, she had some difficulty in the social realm. For instance, Amber had a few close friends in high school but students in her college form large cliques (Connor, 2011). Thus, it is difficult for her to develop close friendships, which she prefers to have (Connor, 2011).

Another student, named David, had Asperger's syndrome. David was extremely intelligent, however he struggled more with social interactions (Connor, 2011). For instance, he had close to a 4.0 GPA in college, however he describes how he is unable to tune into social cues. Moreover, David explained that in his dormitory, students would think he was odd, and he would sometimes say hello to a room full of people and not get a single response (Connor, 2011). He also described how students with learning disabilities were isolated in residence life. David's social isolation led him to feel depressed and emotionally drained (Connor, 2011). Luckily, he developed a network of friends and family to support him (Connor, 2011).

Additionally, David befriended mature and older students and joined a group on campus that works with the college administration on issues of access for students with disabilities.

Through this literature review, it is clear that students with disabilities are highly individualized (Hudson, 2013). When designing an app for the EDGE mentors to help mentees, these facts need to be considered. For instance, some mentees may be content in the academic realm but may be struggling more in the social and wellness realm similar to David. Thus, these mentees need features that encompass social and wellness tools. These resources will help them meet the challenges they are facing.

1.5 Social support, stress, sense of coherence, and academic success of university students with learning disabilities

In a study conducted at a university in Israel, the perceived social support, stress, and sense of coherence for students with learning disabilities was compared to students without learning disabilities (Heinman, 2006). The study also examined student's perceived levels of academic success. In the study, 191 undergraduates with learning disabilities were compared to 190 undergraduates without a disability (Heinman, 2006). Research indicates that social support of parents and peers is associated with increased academic achievement and increased psychological wellbeing (Heinman, 2006). Moreover, students who perceive their academic life as stressful and demanding are more predisposed to psychological

difficulties, such as anxiety (Heinman, 2006). Also, a sense of coherence indicates whether a person is able to confidently cope with pressures inherent in daily life (Heinman, 2006).

To assess these variables, researchers designed a survey for social support, perceived stress, sense of coherence, and academic success (Heinman, 2006). In the survey, the researchers used a likert response scale. The results from the study indicated that students without learning disabilities perceived greater support from friends and family (Heinman, 2006). Moreover, students with disabilities reported higher stress levels in both daily and academic life (Heinman, 2006). However, both groups had high levels of a sense of coherence (Heinman, 2006). In other words, they were conscious of the difficulties they face and were confident that they can cope with the pressures of daily life. Finally, students without learning disabilities considered themselves as having better study skills and as being more organized (Heinman, 2006). Meanwhile, students with learning disabilities tended to attribute academic success to external factors, such as an examination being too easy or too difficult (Heinman, 2006).

A drawback of this study is that it was performed at Open University in Israel, which is a distance-learning institution (Heinman, 2006). Here, students take classes at their own pace, and have an option to either attend live classes or take online classes (Heinman, 2006). Thus, further research is needed to provide a broader generalization of difficulties for students with disabilities at traditional universities. A reason this study was included in the literature review is because it was difficult to find literature, which compared students with and without disabilities at a traditional university (non-distance learning university).

1.6 Engaging Incoming Students with a Mobile App

At Texas A&M University at Galveston, a mobile app was implemented on campus (Hoff, 2013). The app was designed to support students in all aspects of their collegiate life. Although the app was integrated at Texas A&M, this college did not develop the app. The app was designed by a company called OOHLALA, and the app includes features, such as a student timetable, a schedule planner, a to-do list, and an upcoming assignment list (Hoff, 2013). Furthermore, the mobile app included a study timer

for building effective time-management habits and a feature to view course schedules (Hoff, 2013). It also included a campus wall where students can post a question about university life (Hoff, 2013). Finally, the app has a feature that wakes students up for class and guides them to their classrooms via a GPS, and private networks that allow students to post and respond to questions from peers (Hoff, 2013).

In a student engagement survey, it was found that in Fall 2014, 91.7% of students actively used the app (Hoff, 2013). Moreover, 83% of incoming students who were surveyed felt that the platform helped them get off to a good start at the university. Similarly, 96% of students agreed that the app helped them feel like they belonged on the university campus (Hoff, 2013). The app was also monitored by college administration, which helped the university. For instance, the administration can look at posts on the community wall and assess whether a student might be stressed or depressed (Hoff, 2013). This feature helps students receive early interventional support (Hoff, 2013).

1.7 Health and Fitness App Use in College Students

Smartphone apps also play a role in helping college students meet their fitness goals (Hoff, 2013). College students are at a particularly high risk of excessive weight gain (Gowin, Cheney, Gwin, and Wann, 2015). In a study published in the American Journal of Education, students used health apps to develop an exercise routine and to improve eating habits. Twenty-seven participants in the study were recruited at a large public university in the Southwestern U.S. (Gowin, Cheney, Gwin, and Wann, 2015).

The participants were then asked to complete a survey, which asked questions about their physical activity and diet (for instance, one question asked about the number of times per week they exercise) (Gowin, Cheney, Gwin, and Wann, 2015). The questions also dealt with features the participants would want to see in an app.

In the survey it was found that approximately half of the participants said they would not consider downloading an app that cost any amount of money (Gowin, Cheney, Gwin, and Wann, 2015). Moreover, participants indicated that apps with excessive data entry to sign up, complicated operating procedures, or features that required instructions were unacceptable (Gowin, Cheney, Gwin, and Wann, 2015). Finally,

half of the participants in the study said that they would not use social media in a health app because they felt it was not appropriate to mix their health behaviors with social media activities (Gowin, Cheney, Gwin, and Wann, 2015).

After completing the survey, participants then used health apps for a while and were interviewed by a researcher. The participants explained how they felt that health apps provided encouragement via visual and auditory cues (Gowin, Cheney, Gwin, and Wann, 2015). For instance, a visual cue was seeing the number of calories left for the day go from red to green when participants exercised and burned calories, while an auditory cue included hearing the app tell them they were almost done with a run (Gowin, Cheney, Gwin, and Wann, 2015). Overall, participants described the health apps as being like a game or a challenge and they enjoyed the competitive elements in the health apps (Gowin, Cheney, Gwin, and Wann, 2015). This technique of applying elements of game playing (such as scoring users with points) to an app is known as gamification (Gowin, Cheney, Gwin, and Wann, 2015).

However, about a quarter of the participants reported negative feelings related to their app use (Gowin, Cheney, Gwin, and Wann, 2015). For instance, these participants reported becoming pre-occupied with their health (Gowin, Cheney, Gwin, and Wann, 2015). Several subjects talked about feeling as if they needed to eat less due to the app (Gowin, Cheney, Gwin, and Wann, 2015). Other participants reported logging activity to the point where it became an obsession (Gowin, Cheney, Gwin, and Wann, 2015).

It is important to note that in this study, participants reported strong feelings regarding the need for apps to be free and easy to use (Gowin, Cheney, Gwin, and Wann, 2015). Moreover, participants greatly appreciated game like rewards in an app as well as visual and auditory cues (Gowin, Cheney, Gwin, and Wann, 2015). However, there are limitations with this study. For instance, subjects reported using a variety of apps instead of a single app (Gowin, Cheney, Gwin, and Wann, 2015). Although health apps feature similar components and tools, using multiple apps limits the ability of the study to recommend specific fitness/health apps. Moreover, like the University of Pittsburgh study, there was no

control group, such as a group that did not use the app. This study could have utilized a control group to compare the levels in health and fitness for both groups.

1.8 BeWell+ App: Sensing Sleep, Physical Activities, and Social Interactions to Promote Wellbeing

It is found that sleep, socialization, and exercise patterns are connected to overall happiness and wellbeing (Lane et al., 2004). However, people typically are not exposed to health measures as they go about their daily lives and thus unhealthy lifestyles are commonly present in the general population. This study evaluated the effectiveness of the BeWell+ app by utilizing twenty-seven participants in a nineteen-day field trial (Lane et al., 2004). The BeWell+ app tracks physical, social, and sleep dimensions by monitoring key behavioral patterns and by providing a user with behavioral feedback (Lane et al., 2004). The feedback is based on the community the user is associated with, which is known as their peer group. For instance, a physician who is regularly on call would not have the same goal for hours of sleep as a high school student. Moreover, within each peer group, positive and negative role models are identified.

The BeWell+ app also allows users to join more healthy communities as their health improves (Lane et al., 2004). In this study, subjects were aged 21-37, and 9% were faculty or graduate students in computer science, 33% were doctors or medical researchers, and the remaining 58% were students in the arts and life sciences graduate program (Lane et al., 2004).

The BeWell+ app also features an energy saving tool (Lane et al., 2004). For example, user behaviors that are close to healthy norms are monitored less closely and feedback is provided less often (Lane et al., 2004).

The app is also able to track sleep based on phone usage patterns (Lane et al., 2004). Additionally, an accelerometer measures a user's physical activity while a microphone measures social interaction (Lane et al., 2004). Then a well-being score is assigned for each category (Lane et al., 2004). It is interesting to note the app's user display. In Figure 1.1, the app displays an aquatic ecosystem (Lane et al., 2004). A clown fish measures a user's physical activity. As the user increases his or hers physical

activity, the fish swims more vigorously (Lane et al., 2004). Moreover, as a user increases his or hers amount of social interaction, a school of fish swim closely with the clown fish (Lane et al., 2004). Finally, as a user's sleep level increases, the ocean becomes brighter (Lane et al., 2004). This study found that users really liked the feature of having an aquatic animal (i.e. a clown fish) motivate behavior change (Lane et al., 2004).

Figure 1.1 Image of the aquatic display in BeWell+ app

In this study, participants were also split into two groups: a baseline group and a multi-dimensional group. The baseline group did not have the ambient display, which imaged the aquatic ecosystem while the multi-dimensional group did have this display (Lane et al., 2004). The study found that having an aquatic ecosystem display resulted in a statistically significant difference for users. For example, the multi-dimensional group outperformed the baseline group in physical activity by 105%, in social interaction by 88%, and in sleep by 507% (Lane et al., 2004).

In addition to positive effects of the ambient display, 70% of subjects believed that the BeWell+ app was helpful and enjoyable (Lane et al., 2004). However, a limitation of this study is that it was conducted over a nineteen-day time frame. Thus, long-term behavioral changes were not collected. It is possible that the novelty and thus usage of the app may dissipate over time.

1.9 Costs and steps in developing an app

Developing a mobile app is a substantial economic investment. OpenXcell is a mobile app development company in India and the U.S and their company provides a cost estimate for developing an app. The cost of producing an app varies based upon the category it falls under. Four app categories exist and these include simple apps, moderate, complex, and highly complex apps (How much does an app cost?, 2015). A simple app does not store any data about the user and only serves basic functions (How much does an app cost?, 2015). Meanwhile, a moderate app requires information to be stored on a user's device or on a remote server (How much does an app cost?, 2015). Finally, complex and highly complex apps allow for a more immersive user experience (How much does an app cost?, 2015). For instance, a highly complex app could act as a navigation system (i.e. waze), as a file storage app (i.e. icloud), or as a finance based app (i.e. Bank of America's app) (How much does an app cost?, 2015).

1.9.1 Five Key Stages in the App Development Process:

The first stage in the app development process is strategy formation and conceptualization (How much does an app cost?, 2015). In this phase, the goal is to evaluate what type of app should be developed. For example, is the company looking to develop a complex or a simple app.

The next stage is finalizing the user experience. Understanding how all parts of the app will interact with each other and defining the app's functionality is integral in this step (How much does an app cost?, 2015). This step involves going through each menu and asking the following question: If I press this button, what happens?

The third phase is the visual design phase, which entails creating icons, splash screens, tab icons, and making the app look appealing (How much does an app cost?, 2015). In the literature it is found that visual design can make or break an app (How much does an app cost?, 2015). The fourth step is the development phase, which includes programming the app (How much does an app cost?, 2015).

Additionally, the final step includes quality assurance. In this phase, designers actually test the mobile app to ensure that it is free of bugs and glitches (How much does an app cost?, 2015). Then the designers can publish the app to iOS or Android.

In the app development process, there are also hidden costs to consider. For example, Apple receives 30% for each app sale that is made, and charges $99 per year to have an app in the App Store (How much does an app cost?, 2015). A similar pricing structure of 70/30 is followed by Google Play (Android's App Store) (How much does an app cost?, 2015). However, Android's App Store only requires a one-time fee of $25 (How much does an app cost?, 2015). All other costs will be in development, design, maintenance, and IT architecture. Another key consideration is determining the time it takes to develop an app. Simple apps require around 300 hours to develop (How much does an app cost?, 2015). Meanwhile, moderate apps require 400-600 hours, complex apps require approximately 600-900 hours, while highly complex apps require more than 900 hours to develop (How much does an app cost?, 2015).

Although this IQP team will not hire a Dev Shop (an organization that codes the app for a client), the approximate hourly cost of hiring a Dev Shop in the U.S. is $100 per hour (How much does an app cost?, 2015). Thus, if it took 900 hours to develop an app, and you hired a Dev Shop, the total development cost would be roughly $90,000 (How much does an app cost?, 2015).

1.10 Summary of the Literature Review

The background literature highlights important points for the EDGE Mentoring App project. For instance, the literature discussed the challenges that incoming students face in transitioning into college and the challenges for college students with disabilities. The literature also mentioned how students with disabilities are unique and can have distinct needs. For instance, while one student may struggle more in the personal wellness category, another student could struggle in the academic category. Additionally, the literature highlighted mentoring programs for College Freshmen, such as the program that the University

of Pittsburgh implemented. The literature on mentoring programs illustrated how mentoring can provide benefits for both the first year mentee and for the peer mentor.

The team also found literature on mobile apps that are used at the college level. For instance, a mobile app that was designed by OOHLALA includes academic and social features for college students, such as a campus map, a student planner, and a study timer. Additionally, there are mobile apps for personal wellness. For instance, Section 1.7 (Health and Fitness App Use in College Students) of the literature review discussed how smartphone apps have helped college students meet their health and fitness goals. Similarly, the BeWell+ app promotes wellbeing by tracking sleep patterns, physical activity, and social interactions. Finally, the team researched the costs and steps in developing a mobile app.

The literature that is summarized above was employed into the methodology section. For instance, the literature on the obstacles that students with disabilities face, the transition into college for incoming freshmen, and mentoring programs helped the team to form a good understanding the EDGE Program. Additionally, the literature that discussed mobile apps that are used for academic, social, and personal wellness helped in identifying features that can be utilized in a mobile app.

2. Methodology

Before beginning the project the team came up with a timeline for how we wanted the project to progress over the next two terms (A and B Term). Figure 2.1 above shows the five steps that the team had divided the two terms into; for A-term the team would focus on researching and surveying. These two elements would allow us gather information on the design and development of the app. It also gave us a path in which to take the project in order to please our project sponsors. In B-term the technical aspect of the project began. Using the information gathered in the previous term the team would then be able to design and develop the EDGE Mentoring App. The final step was to implement the app so that the ODS, and the mentors and mentees could place the app on their phone. The mentors and mentees along with the ODS could then offer suggestions to improve on for the next iteration of this project. In the following methodology sections the team will go more into the five steps and the challenges we faced.

Figure 2.1 : Five steps that the team followed in this project

2.1 Effective Project Management Skills

In order to develop a successful app for the EDGE mentors it was important to set tangible project goals, to document the progress that was made in the project, to develop effective communication between team members, and to communicate with the clients and faculty advisors. In order to finish the project successfully, team meetings were held on a regular basis, two to three times per week outside of faculty advisor and client meetings. During team meetings, tasks that needed to be completed and ideas that were relevant for the project were discussed. For instance, during the fourth IQP group meeting, the project objective was written (see Appendix K).

Moreover, minutes for each meeting were taken to document the team's goals and tasks to be completed. Additionally, in order to ensure smooth communication between group members, minutes

from meetings and all the information collected from the literature were posted on Trello (a project management tool). For example, the team posted the minutes of the client meetings with Laura Rosen, who is a Director at WPI's ODS, and Jessica Szivos, who is an Assistant Director at WPI's ODS. The team also posted ideas for the mobile app, as well as the project timeline and literature.

Additionally, once a week, meetings with the project advisors and clients were held. During these team meetings, a brief presentation was given to the faculty advisors and clients, and the team had an opportunity to receive feedback. Moreover, the once a week meeting was a great opportunity to see whether project expectations were being met. A different group member documented notes from each weekly meeting while another team member led the presentation each meeting. By rotating who took minutes and who presented, team members had a chance to practice note-taking and presentation skills.

In addition to group meetings, meetings with Professors Loiacono and Wang, and posting notes on Trello, meetings with the clients (Laura Rosen, Jessica Szivos, and Aaron Ferguson) were regularly held. Ms. Rosen, Ms. Szivos, and Mr. Ferguson played an integral role in the progress of the EDGE Mentoring App. During A-term, meetings with Ms. Rosen and Ms. Szivos were held four times to receive project suggestions. For instance, in one meeting with Ms. Rosen, the team learned about tools and handouts that the ODS provides to EDGE mentors. Additionally, through this meeting, the scope of the project was defined, and the scope focused on developing a mobile app for the EDGE mentors.

Another key tool that helped the team was the project timeline, which is shown in Figure 2.2 The timeline was used to assess whether the project was remaining on track, and whether tasks were being completed on time.

2.1.1 Project Timeline:

As you can see in Figure 2.2, in the first week of the project (9/7-9/13), the team aimed to talk with the clients, write an objective for the project, and develop an outline of the paper. As week two approached (9/14-9/18), the goals included gathering literature and background research, developing survey and interview questions to distribute to EDGE mentors and mentees, and submitting the IRB form (WPI's Institutional Review Board form for Social Science Research) to Professors Loiacono and Wang. Additionally, in week two, the team aimed to send out a survey to ask about the types of phones (i.e. iPhone or Android) that students use on campus. Furthermore, on week three (9/21-9/25), the goal was to continue to write an initial draft of the paper, research additional literature, and present the initial project proposal. A proposal presentation describes the team's plans for the project and it is used to convince the clients that the project is a worthwhile endeavor.

A-Term

Week 1 (9/7-9/13):	1. Write a project objective and outline
Week 2 (9/14 -9/20):	1. Gather literature and background research 2. Develop the survey, focus group, and interview questions and submit IRB to the faculty advisors
Week 3 (9/21 - 9/27):	1. Continue to research literature and app elements 2. Write the initial draft of the Paper and present initial proposal for the project
Week 4 (9/28 – 10/4):	1. Talk with clients (Check-In) 2. Write the background and methodology section of the paper
Week 5 (10/5 – 10/11):	1. Hand out survey to mentors and mentees 2. Pin point app ideas and review what has been written at this point 3. Begin and complete mentor focus groups
Week 6 (10/12 – 10/15):	1. Final Proposal Presentation 2. Begin analyzing data gathered from the mentor surveys

Figure 2.2 A-Term Timeline

As week four approached (9/28-10/4), the plan was to finish writing the background section of the paper and to continue writing the methodology section. Additionally, the objective during this week was to have an idea of what the app will feature, talk with the clients in order to gain more feedback, and have the IRB form approved by WPI's Institutional Review Board (IRB). During week five of A-term (10/5-10/11) our team's aim was to hand out a survey to EDGE mentors and mentees, to more precisely

pin point ideas for the mobile app, to review what had been written at that point, and to review the proposal power point presentation with the clients and faculty advisors. Finally, the objectives on week six (10/12-10/15) were to analyze all the data gathered from the mentor and mentee surveys, and to deliver the final proposal presentation to the faculty advisors and clients.

Overall, the team was able to stay on track but did have some trouble in keeping up with the proposed timeline. For instance, the project objective was written during week one (as planned in the timeline) on Group Meeting #4 (see Appendix K). Also, the outline for the paper was written in week two and was posted on Trello on September 15th, which was two days behind the proposed plan. The team also had two client meetings during week one: one was on September 10th with Jessica Szivos and another meeting was on September 11th with Laura Rosen (see Appendix J). As mentioned above, the plan was to talk with the clients during week one. During these two meetings the clients provided the team with a detailed description of the EDGE Program and helpful tools and tip sheets that the EDGE Program uses.

During week two, the team found research articles on mentoring programs, obstacles that incoming students face in transitioning to college, challenges for students with disabilities, and proper ways to conduct surveys to gather data. These articles were posted on Trello on September 17th. Also, the survey to determine what type of phones that students use (iPhone or Android) was distributed on September 9th (during week one), which was one week ahead of schedule.

However, the team was somewhat behind in designing the survey questions to distribute to EDGE mentors and mentees. For example, the team showed the initial copy of the surveys to one of the clients, Jessica Szivos, during a meeting on September 22nd (see Appendix J). She provided helpful feedback, such as using a likert scale (a scale from one to five) for the answer choices in the survey. After making the adjustments to the survey and completing the IRB form, the team submitted the IRB for the survey on September 26th, which was near the end of week three. This was one week later than the team had planned for.

During week three, the team also found a research article on the benefits that peer mentoring can have on mentors. Finally, during week three the team wrote and delivered the initial proposal presentation to the clients and faculty advisors during a weekly team meeting on September 17th (see Appendix I). The initial project proposal included the project objective, timeline, and outline of the paper. Thus, the team was on track with the proposal presentation and with the IQP paper.

Additional background literature was found on week 4. For instance, the team found articles on mobile apps for college students, health apps, the time and steps required to develop an app, and the transition into college for students with disabilities; all of these articles were found by October 3rd. It is important to note that the original plan was to find most of the background literature by week three (9/21-9/27) rather than by week four (9/28-10/4).

Furthermore, the IRB form was approved on September 30th, which was during week four. Also, the team started writing the paper's methodology section on September 29th and sent the faculty advisors a copy of the initial proposal on October 4th (during the end of week four). In terms of writing the paper the team was on track with the proposed timeline. However, sending out the survey on time was a key obstacle, as mentioned above. On October 8th, which was on week five, the survey was sent to out to the EDGE mentors but not to the mentees. Although the EDGE mentee survey was ready to be distributed, the team along with the clients felt that it would not be a good idea to distribute the survey because first year mentees would be more occupied with final term exams and project deadlines. Thus, the team planned to distribute the mentee survey during the first week of B-term.

Finally, the team was unable to begin analyzing the data for the mentor surveys. Instead, attention was allocated toward the final proposal presentation and the initial proposal report. The team submitted the final project proposal paper to Professor Loiacono on October 15th, and the proposal included the literature review, the methodology section, and the timeline. Additionally, the final proposal presentation was delivered to the faculty advisors on October 15th; this would allow the team to gain feedback before the presentation was delivered to the clients. For instance, as seen in the minutes of Team Meeting #7, the

team found that using more visual aids in the power point (i.e. images) can draw an audience's attention (see Appendix I).

For the A-term timeline, the surveys with mentors and mentees were projected to be finished in week five, and the analysis was projected to be completed in week six However, this timeline had to be modified, and the surveys were submitted online (through qualtrics) in week six. Additionally, the team was also planning to utilize interviews and focus groups to collect data from the Mentees and Mentors. The initial plan was that the interviews and focus groups would be completed by week five. However, interviews and focus groups could not be conducted in A-term because the team did not gain IRB approval until the first week of B-term.

Additionally, a detailed timeline for B-term is given in Figure 2.3. In developing an app, there were key phases the team planned. For instance, one phase was the design phase, in which the team identified what features to include in the app and how the menu screens would appear. The next phase was when the app was prototyped, and in this step, the EDGE Mentoring App was coded and written by using a coding language. This step involved coding the app's functionality, visual effects, and user interface. The prototype phase also involved testing the app for bugs and glitches. Finally, the last step was implementation, and in this phase the team planned to implement the design by distributing the prototype to EDGE mentors and mentees so that they can test the app's functionality.

During week one of B-term (10/27-11/1), the team projected that the focus groups with EDGE mentors, the interviews and surveys for EDGE mentees would be conducted. Also, the goal was to begin the app's design phase and design how the different screens (i.e. home screen, log in page, and landing page) would appear. Additionally, the team hoped to identify how information would be stored in a database during week one. Finally, the initial projection was that the surveys, mentor focus groups and mentee interviews would be completed by week two (11/2-11/8). On week two, the team also aimed to ensure that navigation through the app was simple and fluid by mapping out everything the EDGE mentor can do with the app before the coding began. Finally, during this week, the objective was to meet with

clients so that they could help in identifying a finalized list of features to include based on the surveys, interviews, and focus groups.

B-Term

Week 1 (10/27–11/1):	*Planning*	1. Begin conducting mentor focus groups, mentee interviews, and mentee surveys 2. Plan how the different screens will appear (i.e. the home screen), and identify how to store information in a database
Week 2 (11/2–11/8):	*Planning & Design*	1. The team will map out everything the EDGE mentor can do with the app before the coding begins 2. A finalized list of features will be developed by meeting with clients
Week 3 (11/9–11/15)	*Design Prototype*	1. The team will continue to code the app's main page, menus, and submenus. 2. Drop down menus and a navigation bar will be coded into the app
Week 4 (11/16-11/22):	*Design App*	1. The main features in the app will be added and visual effects in the app will be coded 2. The clients will be shown the initial prototype
Week 5 (11/23-11/29):	*Test/Implementation*	1. Testing the app: the app will be tested on an iPhone, and any errors will be debugged
Week 6 (11/30–12/06):	*Implementation*	1. Feedback from the clients will be received. The team will determine if there is anything in the app that needs to be fixed, and will make these adjustments
Week 7 (12/07–12/09):	*Implementation*	1. The IQP Project will be presented to the clients and faculty advisors (including Professor Wang, Laura Rosen, Jessica Szivos, Aaron Ferguson, and Professor Loiacono)

Figure 2.3 B-Term Timeline

Similarly, on week three of B-term (11/9-11/15), the goal was to continue building the prototype by coding the app's main page, menus and submenus. Additionally, the team projected that the drop down menus and a navigation bar would be coded so that a user could move seamlessly from one menu to a different menu. Week four (11/16-11/22) was another week in which the prototype would continue to be built. For instance, the app's main features and visual effects would be coded, and a software, such as iOS simulator, would be used to complete the prototype. The clients would also be shown the prototype so that they could provide valuable feedback.

Finally, on week five (11/23-11/29), the timeline shows that the plan was to test the app, and debug errors by using a tool, such as the debugging console. This would mark the completion of the prototype phase, and then during week six (11/30-12/06), the team planned to receive feedback from the clients in order to determine if anything in the app needed to be fixed; these final adjustments would be made, and on week seven (12/07-12/09), the IQP Project would be presented to the clients and faculty advisors.

As planned, the responses for the mentee survey were completed by the second week of B-term (11/2-11/8) on November 3rd. The team also developed a sketch of the app's main on November 2nd and finished coding the main screen on November 11th. In addition to developing a sketch of the app's main screen close to week one of B-term (10/27-11/1), sketches of the app's user interface were developed by November 12th. The team started coding the app on November 12th and finished the coding on December 6th.

A step that the team was a little behind on was in drawing sketches of the mobile app. Initially, computer and written sketches were planned to be completed by the end of week two (11/2-11/8), however these sketches were completed by November 12th. Although, the team was somewhat behind in the app development process, we reassessed the timeline. For example, the team decided to communicate to the clients that because of the time constraints, that the best course of action would be to focus on the app's user interface (menus and submenus in the app), on a landing page for the app, and on links and tools that EDGE mentors can access and provide to mentees. A landing page is simply a page that describes the features in the app and how to use the app (see Glossary).

The team communicated to the clients that focusing on the user interface, a landing page, and external tools would be best in a client meeting on November 11th (see Appendix J). The team also told the clients that it would be more feasible to add external tools to the mobile app instead of coding new features. By focusing on the user interface and by adding external tools and a landing page, future IQP

teams can pick up where we left off, and can start coding features for the app. The user interface also serves as a base of a mobile app, which future IQP teams can build off of.

Overall, the team finished the coding a little later than the proposed timeline. For example, the initial projection was that the prototype would be completed by November 29th. However, the prototype was completed towards the beginning of week seven on December 8h. By December 8h, the team finished the landing page and added external tools (such as links to useful apps or resources) to the EDGE Mentoring App. A reason that this took than projected was because the team was having some trouble with setting up the app's database.

Thus, the team reassessed the timeline again. For example, the initial goal was to show the completed prototype to the clients and EDGE mentors on week six (11/30-12/06). Then, the team would be able to receive feedback on adjustments/improvements that could be made and we would make these final improvements by December 9th.

Instead of showing the clients and EDGE mentors a completed prototype, the team showed the clients parts of the mobile app that were completed. For example, the mobile app's user interface and main icons were shown to the clients in a meeting on December 2nd (see Appendix J). This way, the team received feedback on how the mobile app was in terms of the user interface and feedback on the app's main icon. However, the team unable to receive feedback on the landing page. Additionally, the IQP team was unable to show the finished prototype to the EDGE mentors because the mentors had busy schedules towards the end of the term and thus the team was unable to have mentors test the prototype.

2.2 Research Methodology

The previous section focused on effective project management techniques that the team employed (such as using a timeline, documenting the progress made in the project, taking meeting minutes, and tracking how the team was doing in terms of the timeline). This current section will go into detail on the methods that were used to collect data, and discuss how the team adapted these methods into this IQP project.

Three common tools in conducting research include surveys, focus groups, and interviews. Based on a literature review of each method and meeting with clients, the team determined that using all three research methods would be beneficial. For instance, in addition to obtaining qualitative data, quantitative data would also help to decide how to develop the app. Quantitative data allowed the team to analyze how mentees were performing in the areas of academic, social, and wellness. Quantitative data also allowed the team to determine how effective the EDGE mentors were in helping their mentees and what areas the mentees were having greater difficulty in.

2.2.1 Proper Method to Conduct a Focus Group

One research method described above is a focus group. A focus group usually consists of a small group of six to ten people in which a moderator leads the group. The moderator's goal is to nurture open discussion between the participants. Focus groups can reveal a wealth of insight and detailed qualitative information. However, conducting a focus group requires a proper plan. For example, an appropriate amount of time for a focus group is between 45 to 90 minutes, and there should be no more than twelve questions (ten questions is better amount) (Guidelines for Conducting a Focus Group, 2005). In order to produce valid research results, there should be more than one focus group conducted in a research project (usually there should be three or four groups conducted) (Guidelines for Conducting a Focus Group, 2005).

The questions that are asked during a focus group should be concise, unambiguously worded, open-ended, and non-threatening to the research participant (Guidelines for Conducting a Focus Group, 2005). There is also a format to follow when conducting the focus group. For instance, the moderator first introduces the participants to the research topic and provides the participants with an informed consent form, which allows the participants to know the terms and conditions of the focus group (Guidelines for Conducting a Focus Group, 2005). He or she then asks an engagement question, which is meant to make participants comfortable with the topic of discussion (Guidelines for Conducting a Focus Group, 2005). Next, exploration questions are asked and these questions are the core of the discussion (Guidelines for

Conducting a Focus Group, 2005). For example, in this IQP project, the team can gain deep insight into which features to develop in the EDGE Mentoring App through exploration questions. Finally, there is an exit question to check to see if anything was missed during the discussion (Guidelines for Conducting a Focus Group, 2005).

Furthermore, the researcher should offer a substantial incentive for the focus group and should conduct the group at a time that is convenient for the research subjects (i.e. in the evening or weekend for college students, who are busy during the school week). There is also an assistant moderator present in the focus group, who takes notes and uses an audio recorder while the focus group is taking place.

The moderator, who is leading the focus group, should listen actively to the group and must remain neutral in the discussion (Guidelines for Conducting a Focus Group, 2005). For instance, he or she should not agree or disagree with a comment made. The moderator should also ensure that each member has an opportunity to participate and should be respectful to all the members (Guidelines for Conducting a Focus Group, 2005). After the focus group is completed, the researchers can compile all the results in a table format or in a word document.

2.2.2 Proper Method to Conduct an Interview

Additionally, a literature review in conducting interviews was performed and it was found that an interview is similar to a conversation between the research participant and the interviewer (or the researcher). Like a focus group, an interview is a useful method in gathering qualitative data from research participants. Based on the literature, an interview should be around six to twelve well chosen and well phrased questions that are semi-structured (Kitzinger, 1995). Semi-structured questions are a combination of structured and unstructured questions. For example, a structured interview format is one in which a few questions are asked and the answers to the questions are fairly short (Rowley, 2012). A structured interview is quite similar to a questionnaire (Rowley, 2012). Meanwhile, in an unstructured interview, there are a limited number of topics asked, and the emphasis of the interview is to encourage the respondent to talk around the theme (Rowley, 2012). However, the results of unstructured interviews

can be quite difficult to compare. Thus, in the literature, it is suggested that a novice researcher should utilize a semi-structured interview (Kitzinger, 1995). In this way, the interviewer has a set of questions that he or she uses as a guide, but the interviewer may stray from these questions if he or she feels it is appropriate (Kitzinger, 1995). This interview format will allow the interviewees to express freedom in their views, however by using a set of questions to ask, interviews will also provide reliable and comparable qualitative data (Kitzinger, 1995).

Additionally, there is the question of how long an interview should be and how many interviews should a researcher conduct. Based on the literature, a good rule-of-thumb for new researchers is to aim for about thirty minutes in length and to aim for around twelve interviews (Rowley, 2012). This allows the researcher to gain insight from a sufficient number of participants and it is a feasible time commitment. For instance, an interviewer is more likely to recruit participants by using a shorter-time duration (i.e. thirty minutes instead of sixty minutes).

When conducting an interview, it is important that the questions are not too vague or general (Rowley, 2012). Also, all of the questions should be relevant to the research topic and the question order should be chosen carefully (Rowley, 2012). For example, earlier questions should set the context for later questions, and thus the order of the questions should lead naturally to the interview's conclusion (Rowley, 2012). In the literature, it is suggested to conduct at least one pilot interview with a member of the interview group you are targeting (Rowley, 2012). The purpose of the pilot interview is to ensure that the questions make sense.

As mentioned above, an interview is similar to a conversation. To start the interview, the interviewer should introduce his or her research and introduce who he or she is; the interviewer should also indicate the anticipated length of the interview, and assure the interviewee that anything he or she says will be kept confidential (Rowley, 2012). The interviewer should also hand out the consent form and remind the participant that if he or she does not wish to answer any question then he or she may decline to

do so (Rowley, 2012). Finally, the researcher should ask interviewees if it is okay to audio-record their answers (Rowley, 2012).

During the interview, there is a method the interviewer can use to keep the interviewee fully engaged (Rowley, 2012). For instance, the interviewer can use prompts such as: "is there anything else you would like to add." The interviewer could also use words such as why, what, how, and who (i.e. how did you deal with that situation? or what happened next?) (Rowley, 2012). Finally, in analyzing the data, the interviewer should listen to the audio recording, and he or she should make notes on the important points from the interview (Rowley, 2012). The interviewer can then use a word document to compile all of the interview responses.

2.2.3 Proper Method to conduct a Survey

A survey is generally used when one needs to collect quantitative data, and when questions are relatively simple and easy to respond to (Richardson, 2005). Before a researcher distributes a survey there are key steps he or she should follow. For example, the first step is to identify the objective and the purpose of the research (Richardson, 2005). The next step is to follow the ethical procedures that are required to distribute a survey. For instance, it is likely that you will be required to fill out a form to a research ethics committee. This would require the researcher to provide an informed consent form that would be given with the survey.

After these steps are completed the researcher can design the questions in the survey. He or she should ensure that all of the questions asked are relevant to the research topic (Richardson, 2005). He or she should also identify the purpose of each question asked and ensure that the questions are written by using simple and concise language (Richardson, 2005). For instance, the researcher should avoid technical language, double negatives phrases, and using vague words and phrases, such as 'fairly' or 'generally' (Richardson, 2005).

Furthermore, the layout of the survey should be neat and clear and the survey should look inviting. For a better response rate, a survey should take no longer than 5 minutes to complete

(Richardson, 2005). Usually, surveys with 10 or fewer questions fit this guideline (Richardson, 2005). Also, questions that are easy to answer should be placed at the beginning, while longer questions should appear at the end because the participant is into the flow of responding to the survey (Richardson, 2005). The survey should also be piloted with a small number of people for whom it is intended. In a pilot survey, the researcher asks the participants to complete the questionnaire and asks them about their interpretation of the questions and answers (Richardson, 2005). For instance, did the participant find any difficulties with the survey or what did he or she think about the survey's design. After receiving a participant's feedback, the researcher can make adjustments to the survey.

Once the researcher has piloted the survey, he or she can select a sample of participants from a population of people (Richardson, 2005). The sample should be representative of the target population meaning that it should share the same characteristics as the population of interest (Richardson, 2005). There are several sampling methods described below that a researcher can employ. However, a random sample is the most effective way of ensuring that the sample is representative of the target population (Richardson, 2005). Finally, once the survey data is collected, descriptive statistics are used to summarize and present the data by focusing on general trends and points that are important to the data (Richardson, 2005).

2.2.4 Literature suggestions on selecting a sample to survey

The concept of selecting a sample is intrinsic in survey research. Although selecting every subject in a given population provides highly accurate data, it is impractical and uneconomical to do so (Kelley, 2013). Therefore, a sample must be selected from the population.

There are several different sampling methods, such as simple random sampling. In this technique, each individual in the population of interest has an equally likely chance of being chosen (Kelley, 2013). A unique benefit of this method is that the results can be generalized to a larger population and statistical analysis can be performed (Kelley, 2013). Simple random samples can be collected by using a random number generator, in which each member of the population is assigned a number (Kelley, 2013). Then, based on computer software, a sample of individuals is selected.

Additionally, there are alternative random sampling techniques (Kelley, 2013). For example, in a systematic sample, individuals to be included in the sample are chosen at equal intervals from the population (Kelley, 2013). For instance, say that a researcher wants to conduct a survey of 1000 patients who have been discharged in the previous month. The researcher could select every fifth patient discharged from the hospital to be included in the sample (Kelley, 2013). Above and beyond systematic sampling, there is also stratified sampling. In stratified sampling, a specific group is selected, and then a random sample is selected from that group (Kelley, 2013). It is important to note that random sampling techniques are effective when a researcher wants to obtain quantitative data.

Additionally, there are non-random sampling techniques. These techniques are commonly used to collect qualitative data, or data used for exploratory work (Kelley, 2013). A non-random sample deliberately targets individuals within a population (Kelley, 2013). One non-random sampling technique is purposive sampling (Kelley, 2013). In this technique, a specific population is identified, and only its members are included in the sample (Kelley, 2013). For instance, a hospital may decide to survey only patients with a certain condition (such as osteoporosis) (Kelley, 2013). Finally, another non-random sampling technique is a convenience sample; a convenience sample involves selecting individuals who are easiest to recruit (Kelley, 2013).

Another consideration in designing a research study is the sample size. For instance, when a researcher is collecting qualitative data a smaller sample size is sufficient (Kelley, 2013). On the other hand, if a researcher is obtaining quantitative data, a larger sample size that is performed using a rigorous random sampling technique will yield better quality results (Kelley, 2013).

2.2.5 How the IQP Team Adapted and Applied the Above Research Methods

Based on a literature review of each method and meeting with clients, the team determined that using all three research methods would be beneficial. For instance, in addition to obtaining qualitative data through focus groups and interviews, quantitative data through surveys would help to decide how to develop the app. For instance, quantitative data allowed the team to analyze how mentees were

performing in the areas of academic, social, and wellness. Quantitative data also allowed the team to determine how effective the EDGE mentors were in helping their mentees and what areas the mentees were having greater difficulty in.

In this IQP project, the research methodology was modified and differed from suggestions from the literature. For instance, in determining the percentage of students who had an iPhone versus an Android, a simple random sample was not used. On the other hand, a convenience sample was selected. In other words, each WPI student did not have an equal chance of being included in the survey. The team only surveyed WPI students that were on their contact list.

Additionally, the method to survey EDGE mentors and mentees differed from literature recommendations. For instance, mostly quantitative data was collected from the mentee and mentor surveys. Thus, it would be best practice to select a random sample to survey (Kelley, 2013). However, this IQP team was interested only on the EDGE mentors and mentees. Thus, it was reasonable and logical to plan to design the survey only for the EDGE mentors and mentees. The sample for the survey was a purposive non-random sample because only members from a specific population (the EDGE Mentoring Program) were included in the survey (Kelley, 2013).

2.2.6 Mentor and Mentee Surveys

In order to obtain quantitative data, surveys needed to be distributed to EDGE mentors and mentees. Surveys would allow the team to collect data in a simple and efficient manner and would probably yield a higher response rate (Kelley, 2013). This is because the subjects would remain anonymous as opposed to a one-to-one interview or a focus group (Kelley, 2013). Thus, they are also more likely to deliver honest responses to questions asked.

The mentee and mentor surveys were twelve questions in length, and the team used a likert scale (with answers choices in a range from one to five). This scale was implemented because it is a common technique to gather quantitative data in marketing settings. Moreover, by using likert scale questions, the survey becomes very quick and easy to answer because all the answer choices are similar. A likert scale

allows students to be neutral in an area and does not force students to select an either-or opinion. A sample likert scale is shown in Figure 2.4.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(1)	(2)	(3)	(4)	(5)

Figure 2.4: Sample likert scale

Additionally, in designing the surveys, the team ensured that they were short enough in length so that they could be completed in 10 minutes or less. By making the surveys more concise, a higher response rate can be generated (Kelley, 2013).

2.2.7 Surveys to the EDGE Mentors

The survey for mentors was used to assess their ability to mentor students and to determine what features they would like to see in a mobile app. The final version of the mentor survey contained twelve questions (see Appendix B). One question in the survey assessed a mentor's relationship with their mentees, and another question assesses a mentor's relationship with other mentors. As the EDGE Program now involves mentors collaborating with each other, it is important to assess how their relationship is with other mentors. For example, if mentors are struggling to form a good relationship with other mentors, then this is a problem that can be focused on in the app.

Additionally, the survey asked two questions to assess what areas (out of social, wellness, and academic) the mentors felt their mentees were the strongest in, and what area was especially challenging for mentees. Also, two questions assessed how the mentors were in guiding students. For instance, there was a question in the survey that asked: "how would you rate your ability to mentor students". There were also two questions to assess the effectiveness of the EDGE Mentoring Program, and one question to determine whether mentors felt that mentees were satisfied with their academic performance. Finally, there was one question to assess how mentors felt their mentees personal wellness has been since entering WPI.

2.2.8 Surveys to the EDGE Mentees

In addition to surveying the EDGE mentors, the team planned to survey mentees in order to quantify their satisfaction in three areas: academic, social, and wellness. The mentee surveys dealt with questions on how satisfied mentees were in these three areas.

The team ensured the anonymity of mentees who were completing the survey. The final version of the mentee survey contained twelve questions (see Appendix C). Respondents were free in answering questions that they were comfortable with, and no respondent was obliged to answer a specific question if they felt it was unimportant, or if they did not want to spend the time answering a question.

The survey asked two questions to assess a student's personal wellness, three questions to assess social satisfaction, three questions to assess academic satisfaction, and one question to assess a student's relationship with their peer mentor.

Also, there was one question to determine how mentees would rate the EDGE Program and another question to assess what area (out of academic, social, and wellness) do the mentees feel that they are the strongest in. Finally, the last question was an open response answer in which students were asked to describe a feature that they would like to see in a mobile app. This question allowed mentees to provide additional feedback and insights they may have, which can then help the team in the app's design. Finally, to gain feedback from EDGE mentees, one of the team's client's, Laura Rosen, sent an email advertisement on October 30th (See Appendix A).

2.2.9 Focus Groups for the EDGE Mentors

Although surveys provide useful quantitative data, surveys are weaker in the area of asking qualitative questions such as how and why or in gaining a key insight (Kelley, 2013). For instance, in a survey, the team might find that mentees are struggling in the area of wellness. But in an interview or focus group, the team can determine information on what tools could help mentees in this area (Kelley, 2013). By conducting qualitative research the thoughts and opinions of EDGE mentors and mentees can be determined.

For this reason, the team planned to perform focus groups and interviews in this IQP. For example, focus groups allow for a great deal of qualitative information to be collected in a short-time period (Kitzinger, 1995). Moreover, in a focus group, a facilitator asks a question and has the research participants talk with each other to develop a response. In this setting, subjects can gain a response that they otherwise would not have considered by sharing with other group members (Kitzinger, 1995). Through a facilitated discussion, participants can build on each other's ideas. However, a weakness of a focus group is that talkative individuals may dominate a discussion, which leaves less data to be collected from quieter participants.

Additionally, there were twelve mentors in the EDGE Mentoring Program. The team planned to collect qualitative data on all twelve mentors by conducting two focus groups, and each focus group would consist of six mentors. The reason for using focus groups with the mentors is because they are accustomed to being in a group setting. Much of their role as mentors involves guiding students in the three areas of academic, social, and wellness. Additionally, they are likely to be more comfortable in collaborating with each other because their role involves sharing information with each other on best approaches to mentor students.

Based on background research, it was determined that the ideal number of questions asked during a focus group is eight (Kitzinger, 1995). It was also found that having more focus groups leads to a higher level of accuracy and validity in the results (Kitzinger, 1995). However, due to a time constraint in this project, the team planned to conduct only two focus groups rather than three or four.

During the focus groups with mentors, the team planned to have two researchers present (one would ask questions to the group and another would record notes and use an audio device to record mentor responses).

Additionally, the team planned to ask seven questions in the mentor focus group. These questions would concentrate on tools and resources that mentors would find helpful, and tools that they would like to see in an app. The focus group would also ask about the challenges that mentors face in helping

mentees and what can be done to improve the EDGE Program. For instance, one question would ask: how can mentors improve their relationship their mentee.

Moreover, one of our sponsors, Laura Rosen, sent the EDGE mentors an email advertisement about a focus group opportunity (see Appendix A). The email was sent during the start of B-term on Friday, October 30th, and it also reminded peer-mentors to complete the mentor survey. After sending the advertisement, one mentor signed up for the focus group. The team decided that an effective method to receive more participation from mentors would be to include an incentive. The reward for participating in the focus group would include a $10 gift card to Dunkin Donuts and munchkins. On Wednesday, November 4, Laura sent another email, which reminded EDGE mentors about the focus group (see Appendix A).

Despite the incentive, only one mentor was able to sign up. Thus, a focus group could not be conducted because there were not enough participants but an interview would still help in designing a mobile app. Therefore, the team reasoned that it would be best to conduct an interview with one EDGE mentor and ask the same questions as the focus group.

2.2.10 EDGE Mentee Interviews

Although focus groups allow researchers to collect qualitative data in a short time period, there is also a key disadvantage in using focus groups to collect data from the mentees. For instance, mentees might not know the other mentees in the program or they might be shy in sharing the challenges they face with other students. Mentees may also feel hesitant to share resources that are helpful for them or suggestions that they have for an app. Thus, it was expected that fewer mentees would sign-up for the focus groups. On the other hand, interviews would reduce the anxiety a student may face of being in a group setting (Kitzinger, 1995).

There were twelve mentees in the EDGE Program and the plan was to interview as many mentees as possible. The team planned to make the interviews conversational and relaxed in nature. During the interview, one researcher would be present who would ask questions and take notes. Based on a meeting on September 22nd with one of our clients, Jessica Szivos (see Appendix J), the team decided that it would

not be a good idea to record the answers in the interviews by using an audio device because mentees might not feel comfortable in this setting.

Additionally, based on the literature above, it was found that the mentee interview should be around six to twelve well chosen and well phrased questions that are semi-structured (Kitzinger, 1995). In this way, the interviewer has a set of questions that he or she will use as a guide, but the interviewer may stray from these questions if he or she feels it is appropriate (Kitzinger, 1995). This interview format would allow the mentees to express freedom in their views, however by using a set of questions to ask, the interviews would also provide reliable and comparable qualitative data (Kitzinger, 1995).

A couple areas of interest for the interview were in determining a mentee's relationship with their peer mentor and in determining what academic, social, and wellness challenges the mentees face. Additionally, the team wanted to find out what tools and resources would be helpful to include in a mobile app. The team also wanted to find out what tools the mentors and mentees would like to see more of even if the IQP team could not integrate all of the tools in the app. This is because future projects can address these tools or the ODS can use this information to improve the EDGE Program.

2.2.11 Plans to distribute surveys and to conduct interviews and focus groups

To distribute the survey, approval from WPI's Institutional Review Board was obtained. The IRB form's file number for this project was 00007374. As mentioned in Section 2.1 of the paper, the mentor and mentee surveys were approved on September 30th. After gaining permission from the Institutional Review Board, two of our clients, Laura Rosen and Jessica Szivos, referred EDGE mentors and mentees to complete the surveys. Additionally, approval to conduct the mentor focus groups and mentee interviews was obtained on October 28th. However, as mentioned in Section 2.2.9, the team decided to conduct a mentor interview because only one mentor was available. Additionally, the team decided not to conduct mentee interviews due to time constraints. Thus, the team submitted one more IRB form for the mentor interview and this form was approved on November 9th.

2.3 Technical Methodology

In addition to designing research questions to ask the EDGE mentors and mentees, the team also had to prepare for the mobile app development process. Initially, the team was mostly unaware of the challenges that could arise in mobile app development. Furthermore, the team was unsure whether the mobile app should be designed for the Android or the iOS operating system. Literature review helped to elucidate the challenges and guide the selection process in terms of what operating system to develop the app for. The literature review also helped guide the team on the steps that are involved in designing a mobile app.

The first question to consider was the one with the farthest-reaching implications: What platform to develop for? In mobile app development there are three main, competing platforms: Android, which is Google's open-source operating system (OS), iOS (which is Apple's proprietary OS), and Windows Phone 8 (which is windows proprietary OS). Each of the three platforms are developed in different languages and present different challenges and benefits.

2.3.1 Platforms:

I - Android

Android has the benefit of being open source; in other words, all of its source code is freely available so there are never any questions about how something works. It is also the most familiar to the team; Eclipse, an integrated development environment (IDE), is widely used and many languages such as Java, JavaScript, and Python may be used. The biggest downside in developing for Android is the large number of hardware configurations that may be present. There are hundreds of Android OS hardware configurations that are running on hundreds of different Android devices and it can be near impossible to make an app that functions flawlessly with identical user experience (UX) across the board.

II - iOS

iOS's greatest strength is the opposite of Android's greatest weakness: There is only hardware configuration of iOS (with multiple versions, but that is much less of an issue) that runs on one family of

phones. The technology in Apple's devices is usually top-of-the-line and thus performance is almost never an issue, especially for apps that are not three dimensional or computation-intensive. The UX for iOS devices is always top-notch, which can be a high bar to reach. iOS apps are developed either in Objective-C or Swift by using the Xcode IDE, which would present a small challenge because the team is not familiar with these languages. Furthermore, iOS is also closed source, which means that all of its source code is not freely available. The fact that iOS is closed-source means that the team would have to work entirely within the app program interface (API) provided by Apple. This can be constraining because the team may not be able to develop all of the functionality for the EDGE Mentoring App.

III - Windows Phone 8

Windows Phone 8 is Microsoft's answer to the dominance of Android and iOS, and unfortunately it still falls short. While it is a good platform to develop for, using familiar languages and a very good IDE (Microsoft Visual Studio), its market share is less than 3%. This is its weakness because if an app is developed for Windows Phone then few are going to see it and fewer will actually use it.

Taking into consideration all of the above factors, the choice was narrowed down to simply Android or iOS. Together they make up 96.3% of the total smartphone market share, split neatly down the middle between them. Since they are both so huge, the team initially considered developing for both. However, this would take too long to complete.

Of the challenges experienced by app developers universally, developing for different platforms is one of the greatest. Code is not portable between platforms; one must develop from the ground up for each. Platforms differ in everything, from the hardware and the way images are stored to the design paradigms and structure of the languages used to create the apps. This doubles (or triples, if developing for all 3) the time and effort put into design, development, testing, and release. Given the scope of this IQP project (being the first iteration of the EDGE Mentoring App), it seemed to make the most sense to focus on one platform and expand later if necessary. A simple survey of the EDGE mentors ultimately

helped the team in selecting a platform. A significant portion of EDGE Mentors, about 66.7% percent or two-thirds, possessed an iPhone. Thus, as our target audience was the EDGE mentors for this first iteration, it was decided to focus on iOS as the platform of choice.

2.3.2 Steps in App Development:

In addition to selecting a platform, developing the mobile app for the EDGE mentors was an extensive process that required careful planning. The first step of the app development process was to brainstorm ideas. For instance, the team needed to answer questions about the app, its design, and its functionality (A Practical Guide to Design and Develop an iPhone App, 2014).

For instance, brainstorming sessions needed to be conducted to figure out a basic idea of the app's functionality. The mobile app's functionality included content, such as the overall layout and design of the app, and the number of menu screens that would be placed in the app (A Practical Guide to Design and Develop an iPhone App, 2014). Additionally, the design of the menu screens, icon placement, and button size were all considerations that needed to be taken into account. For example, the app must allow for plenty of room for users to tap buttons or controls in the app as this will result in a better user interface (A Practical Guide to Design and Develop an iPhone App, 2014).

All of the app's functionality and layout was enlightened through background literature, mentor and mentee surveys, and meetings with clients to gain feedback. For instance, the team did not select features that we thought were helpful but selected features and the layout for the app based upon client meetings, literature, and the data collected from mentors and mentees. For example, if the clients and EDGE mentors wanted the team to include a time-management tool into the app then this tool would be implemented if it was feasible to develop.

After performing brainstorming sessions, sketches of the app's design needed to be drawn in detail (A Practical Guide to Design and Develop an iPhone App, 2014). This can be done by including a rough sketch for each screen in the app (A Practical Guide to Design and Develop an iPhone App, 2014). It is important to note that the sketches for the mobile app were shown to the clients and faculty advisors,

and the team was able to gain feedback through the weekly client meetings in B-term. However, it was difficult to arrange a time to meet with EDGE mentors to see what they think about the sketches of the mobile app. Thus, the team decided to use feedback gained from the clients. The team did, however, incorporate some user information by using the results of the mentor survey.

In addition to sketching each screen in the app, a key step was to determine how the user will get from one screen to another (A Practical Guide to Design and Develop an iPhone App, 2014). In other words, determining how the app will flow was an essential question as well as figuring out how large each icon should be on each screen. Screen real estate is essential because users desire a right balance of usability and visibility (A Practical Guide to Design and Develop an iPhone App, 2014). By sketching the app in detail, "a skeleton" would be generated that would greatly aid in completing project (A Practical Guide to Design and Develop an iPhone App, 2014).

Above sketching the design, there were also hardware and software considerations that needed to be taken into account. To develop the EDGE Mentoring App on the iPhone, the team needed a Mac computer with the latest version of Apple's operating system (A Practical Guide to Design and Develop an iPhone App, 2014). Additionally, the team needed to download Xcode, which is Apple's IDE (A Practical Guide to Design and Develop an iPhone App, 2014). Also an interface builder, an iOS software developer kit (SDK), and a solution for frameworks was required to develop the app (A Practical Guide to Design and Develop an iPhone App, 2014).

The next step in the app development process was coding the app. A key question to settle was whether to code the app by using Objective C or Swift. Swift is a programming language that was developed by Apple on June 2nd, 2014. It is used to code and develop mobile apps for the Apple operating systems (iOS and OS X). Similarly, Objective C is another programming language that was developed by Apple for the OS X and iOS operating systems. It was released in 1983, which is around 32 years ago.

2.3.3 Pros of the Swift Programming Language and Cons of Objective C

Swift offers distinct advantages in comparison to Objective C. For example, Swift offers increased performance over Objective C because the LLVM compiler, which compiles and tests code that is written, is faster in Swift compared to Objective C (Kolenc, 2014). Speed test results by Apple Analytics indicate that Swift is approximately 1.40 times faster compared to Objective C when performing a complex object sort (Kolenc, 2014). In addition, Swift requires a lower amount of syntax compared to Objective C and this decrease in syntax lowers the app development time (Kolenc, 2014). Objective C also requires a less intuitive syntax compared to Swift, and an example of code written in both languages is shown in Figure 2.5 (Thomas, 2015).

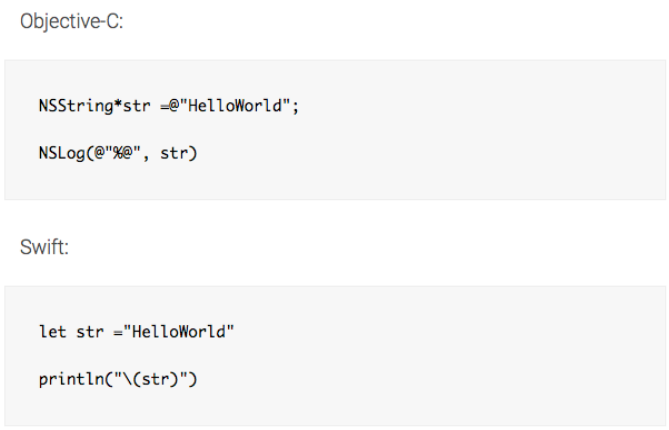


Figure 2.5: Code that is needed to print the phrase "Hello World"

Furthermore, Swift is considered to be the future of iOS programming because it is a more approachable programming language and this makes it easier for beginners to write code for iOS apps (Thomas, 2015). It is also considered more enjoyable to write code in the Swift language because the programming language is intuitive (Thomas, 2015).

2.3.4 Pros of the Objective C Language and Cons of the Swift Language

However, there are some cons with the Swift programming language. For instance, a disadvantage of Swift and an advantage of Objective C is stability (Thomas, 2015). Since Swift is a recently created programming language there are still many bugs and glitches that are getting fixed by software updates (Thomas, 2015). However, Objective C first appeared in the market in 1983, and there

are fewer bugs in Objective C than in Swift. For example, if you are building a mobile app from scratch, you could experience lots of errors when using Swift and you may have to constantly change the code to match new changes in the Swift programming language (Thomas, 2015). Thus, while the Swift language is easier to write code on (because of more concise syntax), maintaining the code would probably be more difficult compared to Objective C (Thomas, 2015).

2.3.5 Decision to use Swift or Objective C

In deciding whether to use Swift versus Objective C, these pros and cons from the literature were considered. During the end of A-term, the team decided that it would be best to code the app in Swift. Although Objective C does have the advantage of stability (i.e. it is easier to maintain the code), Swift offers unique benefits. For instance, the team liked how Swift is an intuitive programming language and that it offers a faster performance.

2.3.6 Additional Steps in App Development

In addition to selecting a programming language, there were additional steps from the literature on how to develop an app. After drawing each screen of the app and selecting the programming language, it was time to start the design process (A Practical Guide to Design and Develop an iPhone App, 2014). In designing the app, there were three steps that needed to be followed. These include 1) information architecture, 2) interaction design, and 3) visual design (A Practical Guide to Design and Develop an iPhone App, 2014).

For the information architecture step, the app's content needed to be organized in a certain way (A Practical Guide to Design and Develop an iPhone App, 2014). In other words, the right content needed to be associated with the right screens to ensure user satisfaction. The next step, called interaction design, deals with how the users will interact with the app. The EDGE Mentoring App should allow the users to get from one screen to the next without requiring any mobile app training. Users should seamlessly be able to navigate though the app to get where they want to. Finally, visual design simply refers to the app's appearance beginning from the start screen (A Practical Guide to Design and Develop an iPhone App, 2014).

It is also important to note that the app development process is supposed to be iterative in nature and it was iterative in this project (A Practical Guide to Design and Develop an iPhone App, 2014). For example, after obtaining research results from the mentors and mentees, the team produced a list of features to place into the app. Then the app's prototype was continually shown to the clients throughout B-term.

Although it would have been ideal to show sketches and screens of the app to the EDGE mentors, the team did not have the opportunity to do this because of the busy schedules of EDGE mentors. Thus, feedback from the clients played an invaluable role in the mobile app development process. Each week starting in B-term, the team showed the clients sketches and screenshots of the app, and the clients provided feedback on what modifications should be made. The clients had a good understanding of how the content should be set up in the app for the EDGE mentors and the tools to include in the mobile app.

2.3.7 Version Control

One of the first steps to begin programming the EDGE Mentoring App is deciding what type of version control to use. Version control is defined as a system to record the changes, delegations, or additions that are made to files over time. In computer science, version control is defined as the task of keeping a mobile app (or a software system), which is edited by multiple people, well organized. This aspect is crucial for programming projects because a large file may be edited by multiple sources at the same time. However, version control prevents people, who are working on the same file, from over writing each other's changes in memory. Version control is also fundamental in programming because a person may be writing 'buggy code' that results in errors in the EDGE Mentoring App. With version control, that person can keep their 'buggy' work to themselves and not burden the other users with their work until the mobile app is finished. Version control works by preventing bad code from crashing the project when you are testing a specific feature of the app. Thus, you do not have to worry if another group member is writing code that results in errors or glitches in the software program.

For this project, the team used GitHub as a version control system. The first part of GitHub is called 'Git', which is an open source version control system that uses a command-line. Git is similar to other version control software's, but it is considered a developer's favorite because Git is the most efficient version control software in terms of storing file changes (Brown, 2014). Finally, github.com is a free website where multiple users can use the same Git (version control) in one central location (or repository).

It is important to note that when you are by yourself, there is little need for version control except for good record keeping of the work as the project is worked on for large periods of time. Version control also allows one to recover a database that was deleted by performing a rollback operation, which restores the database to a previous state. Since this team had only two programmers, it was questionable whether version control was needed but it is considered a good practice to use it. Thus, the team did use version control but decided not to use it in its full robust form. In its full form, version control can be an unproductive use of time if only two programmers are working on a project.

2.3.8 Linking to Outside Resources

When the app development process began in early B-term, the team envisioned that the app would contain social, academic, and wellness tools that are easy to find and access. The next step was to take these tools and incorporate them into the mobile app. There were three basic types of tools and resources that the ODS wanted the team to put into the app: webpages, .pdf documents, and other mobile apps.

The webpages contain information on different social, academic, and wellness strategies. The idea behind incorporating webpages into the mobile app was to provide easy access to the vast amount of resources that already existed on the Internet. By doing this, the team would not have to develop new features. In order to include webpages into the mobile app, the team had a simple plan, which was to have the app's database contain a URL or a uniform reassure locator (the URL is how the mobile app can locate a webpage). Next, when a user wanted to check out a web resource the team would use a delegate

to transition into a web view. A delegate helps unrelated variables in programming language to communicate with each other. In this project, the team used a delegate to allow the mobile app to transition into a web view and open the web page that is on the internet.

Portable document format (.pdf) uses a very similar style as web pages to present the information. Like a web page, a .pdf file is online. Thus, as long as a user's iPhone can handle a .pdf file format, then he or she can open the file in a similar manner as a webpage. The user would be able to open the .pdf file in a web view through the internet. The team used the same method of movement between .pdf as above with webpages, to provide easy movement between external resources and the EDGE Mentoring App. This method makes it simple for users to go back and forth between the external resource (the .pdf file or the webpage) and the EDGE Mentoring App.

The last type of resource that the team had to include in app was external mobile apps (such as the Promodoro timer). Providing links to external mobile apps was not as easy as providing links to the other two types of resources. In the beginning, the team assumed there would have to be some way that allows users to open up an external app that is installed on their device. The team also assumed that if the external app was not installed on a user's device, then there was a way that a user could be redirected to the App Store, so that he or she could purchase and download the app. The team knew from past knowledge that it is possible to open up other apps on the same device in Android. Additionally, we knew that Siri, which is a built-in "intelligent assistant" for the iPhone, remotely opens up other apps by using voice commands; finally, the team knew that users can directly open apps from the App Store. Thus, the team thought that opening an external mobile app would not be that hard of a task to accomplish. However, when we started to do some research, the team stumbled upon the first obstruction, which were deep links (How to Programmatically check and open an existing app in iOS 8?, 2015).

The team found out that it was possible to open up another mobile app from the EDGE Mentoring App, but that iPhone's operating system, iOS, does not allow one to use delegates and segues to directly open another app. A segue is an object that is used to define the flow of a mobile app's interface.

The external apps have to have a deep link set up and one needs to know their deep link; otherwise, users would be unable to open the external app. As mentioned in the glossary, mobile deep links work by making parts of a mobile app easily accessible.

Another option for providing links to external apps was to have user download the external app from the App Store. However, this would make it so that the external mobile apps, which the mentor can access, are not all contained in the EDGE Mentoring App. Therefore, we dove into deep links, but this did not work out because deep links were difficult to find, and needed a bit of technical knowledge to sift through the internet to extract out the URL. However, the team found a way to solve this problem: there is a suggested schema on how to write deep links (Mobile Deep Linking, 2014). This schema is 'applicationName://page/subpage', and this was reasonably easy enough to follow and made it possible to open an external app (Patil, 2014).

However, there was a problem that the team found out about after further investigation. The suggested schema on how to write deep links did not apply to all mobile apps. In other words, mobile apps could use a different method to write a deep link (Mobile Deep Linking, 2014). For instance, while looking at deep-links the team found some from very well-known mobile apps. For instance, for YouTube's mobile app, it was found that their deep link was YouTube://. Additionally, for Twitter and Facebook, the team found that the deep links were twitter:// and fb://. It was important to note that none of these deep links followed the same convention because the first letter in twitter's deep link was not capitalized and Facebook only had two letters in its deep link.

The only information that the team had available in order to figure out the deep link was the name of the mobile app (as it was stated in the App Store). The problem was that the deep links do not follow a specific convention. For instance, it would be impossible to predict the deep link for Facebook because it only contains two letters: f and b. The problem with the other two deep links (for YouTube and Facebook) could easily be resolved. For instance, twitter did not follow the schema (in which the first letter is capitalized), however, capitalization does not make a huge difference in URLs (Smarty, 2009).

To summarize the problems with deep links, most apps do not actually use them, and the mobile apps that do, do not conform to an established schema. The only way that the team would be able to solve these problems was to make a lot of guesses with the deep links. After making these guesses, the code that was written could retrieve information from each guess until it found the proper deep link. Even in this situation, the team could have guessed a deep link for a different app. This would have wasted time and data in order to type so many queries (or guesses) in the hope of guessing the correct deep link. Thus, the team did not think it would be worth it.

In summary, linking into webpages and .pdf was easier to perform in the EDGE Mentoring App because they have been around longer and because they provide easier access. Meanwhile, deep linking is fairly new and still has issues that it needs to fix. Despite the challenges with deep links, using shared resources, instead of trying to develop new features, reduced the work needed for this mobile app tremendously and was the right choice.

2.3.9 Parse

In order to store data on a database, the team decided to use a software package called parse because this software allows programmers to easily add a cloud database into the EDGE Mentoring App. A cloud database is a database that runs on cloud computing platform, which is a platform that uses a network of remote servers in order to manage data.

Parse works by handling most of the fundamental details of the database and it allows programmers to be focused more on creating better user experience. With the ease of parse the team made a localized database that syncs with a master database by using a background process to keep it running seamlessly. The team added this localized database so that the app could still appear like it was acting quickly even with a slow internet connection. This way the user was removed from technical difficulties in the app.

Setting up parse was a three-step process. First, the team downloaded and imported the software development kit (SDK) that is used for the Swift programming language; this SDK was downloaded from

parse.com. Then the team added dependencies, which are needed for the Software Development Kit, into the project. Next, the app was programmatically connected to parse by using specific server and client keys that allowed the team to use parses' wide variety of prebuilt functions.

All of the data in this project was contained in the parse database. Finally, by using the parse software, future IQP teams can more easily add data to the mobile app.

3. Data and Analysis

An important component of this project was analyzing data in order to design a mobile app that EDGE mentors and mentees will find helpful.

As mentioned in Section 2.2 of the paper, the team planned to conduct surveys for both mentors and mentees. The team also planned to conduct mentee interviews and mentor focus groups. However, the team was unable to conduct focus groups because only a few mentors were able to sign up. Instead, an interview was conducted with an EDGE mentor who was available to participate. Also, the mentee interviews were not conducted due to time constraints. After speaking with Jessica Szivos and Laura Rosen, the team realized that mentees would be more hesitant to participate in research compared to mentors.

3.1 Data and Analysis for the EDGE Mentor Survey Results

The mentor survey helped the team to determine helpful features for the EDGE Mentoring App. For instance, one question asked peer-mentors: "what features would you like to see in a mobile application." The survey results indicated that mentors selected somewhat different tools and features. One EDGE mentor described that he or she would want "a way for them (mentees) to log how much time they spend in each of the three categories. This would help them be self-aware about their habits". Meanwhile, another mentor stated how he or she would like to see a "student support resources map and info." This tool would display on-campus student support resources on a map and would provide information on each resource.

Moreover, another mentor mentioned that a social feature, which "updates us (the EDGE mentors) about events on campus", as being helpful. Finally, three other mentors answered how they would like to see "regular meeting reminders (for the EDGE Program events)", a messaging interface (between mentors and mentees), and a "personal scheduling tool that links up with calendars". While the suggested features were somewhat different, the tools mostly encompassed time-management resources, resources to help mentees with the social transition into WPI, and tools that make it easier for the EDGE mentors to stay organized (i.e. meeting reminders).

Additionally, most mentors believed that mentees struggled more in the academic category. For instance, a question asked: "what is the greatest challenge (or challenges) for first year mentees:" One mentor answered that academic and personal wellness were the most challenging areas, and explained how "Balancing between all 3 categories equally is a specific challenge. Work seems to take precedence forgoing social/sleep." Meanwhile, a second mentor answered how the social and academic areas are the greatest challenges, and explained that "managing time and focusing on homework assignments" is a challenge for their mentee. Finally, a third mentor mentioned how the social transition is a hurdle, and the mentor explained that a challenge for their mentee is "being social and having a solid group of friends."

In going through the data it seems that each first-year EDGE mentee faces unique challenges. For instance, the fourth survey response from an EDGE mentor is that their mentee has difficulty in making the academic transition into college, and the mentor explained "my mentee has a hard time balancing everything and tends to let club activities go to the way side."

Additionally, a fifth mentor response is that "my mentee has trouble keeping up with the fast paced curriculum." Finally, a sixth mentor explained how his or her mentee has difficulty "adjusting to college life" and an obstacle is the academic transition into WPI. Based on these survey results, which are located in Appendix E, it seems that EDGE mentees usually face the challenge of making the academic transition into WPI. For example, five out of the six EDGE mentors explained how the academic transition into college was particularly challenging for their mentees.

What is interesting about the mentor survey is how wellness seems to be the strongest category for mentees. For example, three out of six mentors believed that their mentee was strongest in the personal wellness category, and mentors rated satisfaction in personal wellness as an above average rating (likert scale reading of 3.83 out of 5). Meanwhile, mentors rated academic satisfaction for mentees as an average rating (3.33 out of 5 on the likert scale).

Furthermore, mentors provided positive ratings on the effectiveness of the EDGE Program (3.5 out of 5 on the likert scale) and for their relationship with their first year mentee (3.33 out of 5). For these questions, the team used the following likert scale in Figure 3.1. Mentors also provided good ratings for their relationship with fellow mentors (3.33 out of 5).

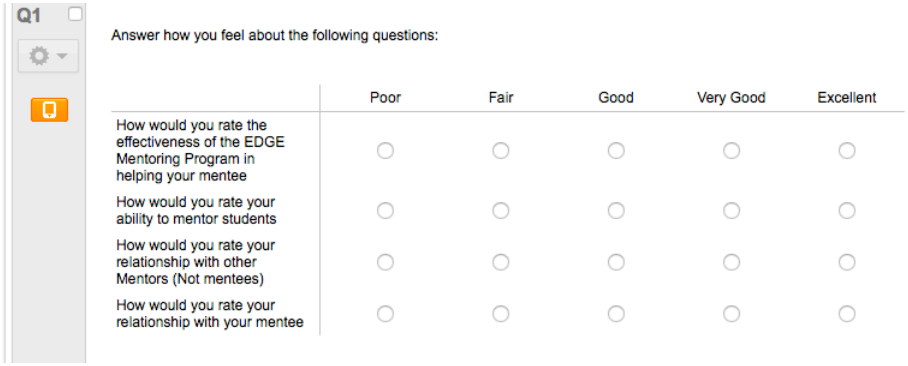


Figure 3.1: Likert scale for the effectiveness of the EDGE Program and a mentor's relationship with their mentee

3.2 Data and Analysis for the EDGE Mentee Survey Results

In addition to the mentor survey, EDGE mentees completed a survey. In the mentee survey, the team first found the following result: first year mentees tend to get lower than the recommended amount of sleep. For instance, one mentee stated that he or she obtained less than five hours per night while another selected five to six hours per night. Meanwhile, two other mentees, who answered the question, explained how they received six to seven hours per night and seven to eight hours per night. Although the sample is small (four out of twelve mentees completed the survey), the data indicates that mentees are obtaining lower than the recommended amount of sleep for college students (at least seven to eight hours).

Another question asked mentees to describe "one feature that you would like to see in an app that will allow your mentor to be more able to help you". One mentee described how he or she would like to see "a small encouragement note that is sent to both the mentor and the student (first year mentee)." Meanwhile, another EDGE mentee mentioned how he or she would like to see "some way to show me activities that I would be interested in." Finally, a third mentee would find the following feature to be

helpful: “an app feature which shows the student's current class-load to the mentor, so check up meetings can be more efficient”

In addition to describing useful app features, mentees helped the team by providing quantitative data. For instance, based on the survey, the four EDGE mentees had a good support structure in college (likert scale reading of 4.5 out of 5), and usually had a strong relationship with their EDGE mentor (4.25 out of 5 on the likert scale). Moreover, mentees felt that they were doing fairly well in the area of personal wellness.

Based on the data, it seemed that potential challenges for mentees included: time-management skills (3.0 out of 5), organization skills (3.25 out of 5), and forming connections with other students (3.0 out of 5). Overall, the mentees gave average ratings for these skills. These three areas can be particularly challenging for first-year students. For instance, WPI has a fast-paced and rigorous curriculum, which poses a unique academic hurdle for incoming freshmen. Moreover, based on the literature, the social transition into college can be quite difficult. The University of Pittsburgh Journal article explained, “freshmen can feel like strangers in a new and unfamiliar setting” (Budny, Paul, and Bon, 2006).

3.3 Data and Analysis for the Mentor Interview

The team also conducted one interview with an EDGE mentor. During the mentor interview, the team obtained helpful suggestions for the mobile app. One interview question asked: “What social and wellness tools would you like to see most in an app”. The mentor explained how she would like to see a calendar, which only displays EDGE Mentoring Events. Another question asked: “Are there any particular academic tools that you would like to see in a mobile app?” The mentor answered that she likes the idea of keeping a timetable of on-campus resources, a list of good places to study on-campus, and tip sheets for studying.

Also, the mentor explained that she thinks EDGE mentors would be motivated to use the mobile app. For example, she thought a mobile app would provide an easy way for mentors to identify information that is suited only for the EDGE Program. There were also additional interview questions the

team asked, that were not necessarily related to the app development process but that would help improve the EDGE Program (the interview questions are located in Appendix D). For instance, one question asked: "What can be done to improve your relationship with your mentee" (see Appendix G).

The results of the mentor and mentee survey, and the mentor interview set the stage for developing the mobile app. These research results are summarized in Tables 3.1-3.3

Table 3.1: Summary of the results of the mentor survey

App features the mentees suggested	• Encouragement note • A feature that shows activities they might be interested in (social feature) • A feature that shows a student's course-load to the mentor (academic feature)
Challenges that first year mentees face	• Time-management skills (3.0 out of 5) • Organization skills (3.25 out of 5) • Forming connections with other students (3.0 out of 5) • Receiving a sufficient amount of sleep each night

Table 3. 2: Summary of the results of the mentee survey

App features the mentors suggested	• Timer for the mentee (time-management tool) • Student support resources map (social tool) • Feature that updates mentors about on-campus events (Social tool/ Organization) • Regular meeting reminders (time-management/organization) • Messenger interface (social tool) • Personal Scheduling tools that link with Calendars (Time-Management) **Social, Time-Management, & Organizational Tools Suggested**

Table 3.3: Summary of the results of the mentor interview

Academic Features the mentor would like to see	• Timetable of on-campus resources • A list of good places to study on-campus • Academic tip sheets
Social and Wellness Features the mentors would like to see	• A calendar, which only displays EDGE Mentoring Events

The team utilized these findings as a framework to identify features and tools to implement and include in the mobile app. In addition, the client meetings guided the team in selecting a finalized list of

features to develop in the app. All of these features, along with how the EDGE Mentoring App appears (i.e. the user interface) will be shown in the next section.

4. User Interface Design: EDGE Mentoring App

4.1 Background Literature on User Interface Design

When designing the app's user interface, the team followed Apple's Developer Guide (iOS Developers Guide). This guide states that iOS design follows three themes, which include 1) deference, 2) clarity, and 3) depth (iOS Human Interface Guidelines: Designing for iOS, 2013). The team attempted to design the app to conform as closely to these themes as possible.

The first theme, deference, is defined as the user interface (UI) existing to help people understand and interact with content, but never competing with it (iOS Human Interface Guidelines: Designing for iOS, 2013). This essentially means the UI should be minimalistic, and not flashy with lots of transitions and slow reveals of information (iOS Human Interface Guidelines: Designing for iOS, 2013). The UI "defers" to the information contained within. As the app is based around presenting and filtering information, this principle was fairly easy to design around. The initial design of the app presented the main screen right upon load. All the information was immediately presented to the user with the option of filtering or searching from the main menu. All transitions were instant (i.e. filtering to a different category immediately displays the results in that category) and there was very little visual clutter to confuse the user. In this way the team conformed well to that theme.

The second theme, clarity, simply means that all aspects of the mobile app should have a clear and focused purpose (iOS Human Interface Guidelines: Designing for iOS, 2013). Once again the team found this theme easy to design around. Most of the app followed this theme closely because the app was entirely focused on its functionality. The largest challenge in this area was the icons representing the three different categories for the filter. The icons have to be immediately recognizable and clearly represent the functions they perform (iOS Human Interface Guidelines: Designing for iOS, 2013). Thankfully, there were some built-in icons and plenty of past apps to draw upon. Academic and wellness were the easiest two areas to create an icon for: a book and a heart were simple yet effective icons to represent the main page. On a client meeting on November 11th, the team showed these icons to the clients, and they thought these icons were effective choices for the Academic and Wellness Categories. However, the team was

unsure about an icon to use for the social category. The team decided to use a group of people to depict the social button because the clients liked this icon.

The third and final theme is depth. This theme involves making the app fun to use for the user (who is the EDGE mentor) (iOS Human Interface Guidelines: Designing for iOS, 2013). Apps like Facebook's messenger show this theme rather well; a user can move and throw the chat bubbles around and the chat bubbles will react physically as one would expect them to. This was the theme that fell to the wayside as the team was developing the app; the lack of experience plus lack of time necessitated a focus on essential features only, and the team was unable to focus on the theme of depth.

4.2 Designing the Main Page of the Mobile App

The mobile app development process began by sketching how the user interface would look like. As shown in Figure 4.1, the team started by designing the app's main page. Three letters are shown at the bottom, and they represent the three categories that EDGE mentors focus on with their mentees (A is for academic, S is for social, and W is for wellness). The team selected these three categories because these are the areas that the EDGE Program focuses on with first year mentees.

The team also developed an alternative sketch of the app's main page. For instance, rather than placing the three buttons (that represent academic, social, and wellness) at the bottom, the team considered placing the buttons as shown in Figure 4.2. In order to make a sound decision on the app's main page, the team showed both sketches to the clients.

There are key differences with the main page on the left and the main page on the right. For instance, in the sketch in Figure 4.2, there is no search bar and the three categories (social, academic, and wellness) are in the middle screen. Meanwhile, in the main page in Figure 4.1, there is a search bar and the user can select one of the three letters on the bottom of the screen. The team had drawn the sketch in Figure 4.1 during the second week of B-term (on November 3rd), and had drawn the sketch in Figure 4.2 on November 2nd.

After showing the clients both of the sketches during a meeting on November 5th, the team found

that the clients liked the sketch in Figure 4.1 better (see Appendix J). The clients liked the idea of placing the three categories on the bottom of the page. Additionally, Apple's Developer Guide states that most of the app's functionality should be on the main page (iOS Human Interface Guidelines: Starting and Stopping, 2013). The main screen on the right meets this criteria because upon opening the app, the user is provided with a list of all the tools that are in the app.

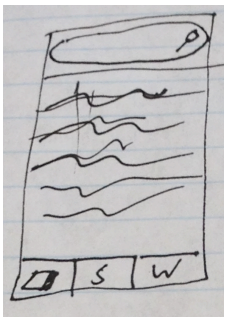


Figure 4.1: Sketch of the mobile app's main screen

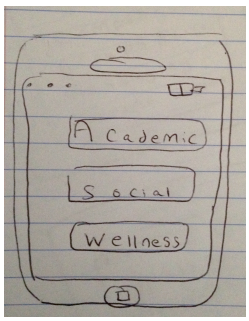


Figure 4.2: Second sketch of the mobile app's main screen

The completed main page of the app is shown in Figure 4.3. In Figure 4.3, a search bar is shown on the top; this search bar allows an EDGE mentor to search for a tool (such as a time-management tool) that he or she can provide to their first year mentee. The team included a search bar because the clients recommended this feature. Additionally, the team placed the search bar at the top (rather than on the bottom of the screen) because this was recommended by Apple's Developer Guide (iOS Human Interface Guidelines: Navigation, 2013).

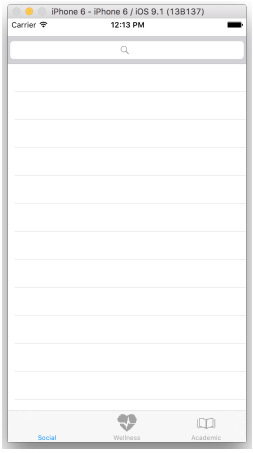


Figure 4.3: Computer version of the EDGE Mentoring App's main screen

4.3 Designing the Submenus of the Mobile App

The next step in the app development process was identifying how the submenus would appear. For instance, if the user presses the social button at the bottom of the main menu then what screen will appear next?

The next screen, which would appear after selecting the social button, would identify a list of helpful social tools that EDGE mentors can give to first year mentees. After pressing one of the buttons on the main screen (academic, social, and wellness), the next menu that would appear would provide a list of helpful tools.

The team first developed a sketch of how the submenus would appear in a group meeting on November 2nd (see Appendix K). A sketch of this submenu is provided in Figure 4.4. As shown in the figure, there is a timer feature, a feature for a map, and a messaging interface. Below the timer, there is a favorites category in which EDGE peer mentors can place tools that they find the most useful. It is important to note that this was just an initial sketch of a submenu of the mobile app. The team was unsure which features were going to be developed at this stage in the project because more insight needed to be gained from the clients.

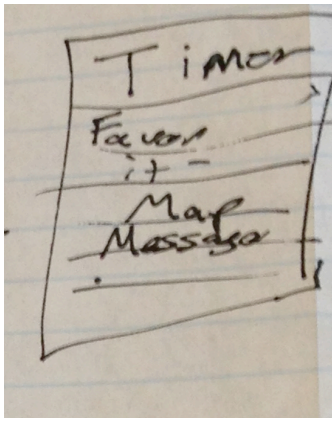


Figure 4.4: Initial sketch of a submenu in the mobile app

4.3.1 The Social Submenu

There was also a question of how the submenus would appear if the user (the EDGE mentor) selects the social or wellness buttons on the main page. The initial submenu that the team designed if the

EDGE mentor selects the social button is shown in Figure 4.5 (on the left). There are five tools that were included in the sketch: a campus map, a list of campus events, a list of on-campus groups and clubs, a messaging interface, and a list of on-campus student support resources. The team included these features in the sketch because they were recommended as being useful based on data collected from mentors and mentees. However, the team still needed to consult with the clients on which social resources they think would be the most helpful. As shown in the left of Figure 4.5, there are icons next to the name of the resource. The team decided not to use this design, which includes icons next to the name of the feature, because too many icons would make the app more difficult to understand.

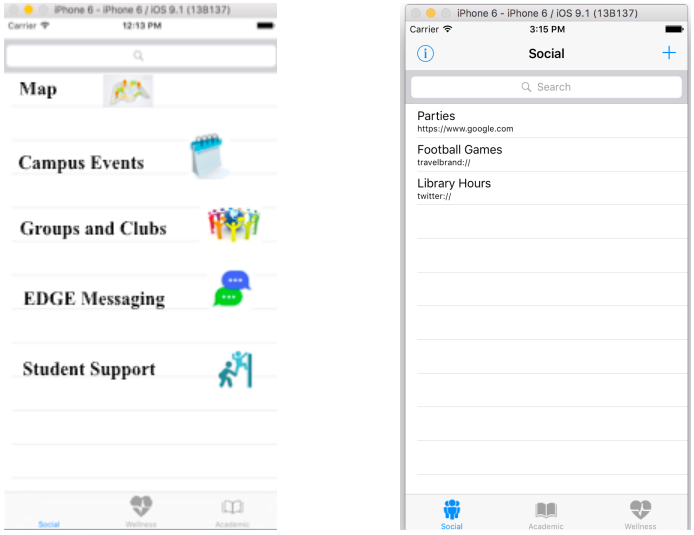


Figure 4.5: Computer sketches of the 'Social' submenu

The team also developed more sketches that would accurately depict the iOS user interface. The team finished coding the screen that is shown on the right of Figure 4.5 by using the Swift Coding language. This screen was finished on December 2nd (about one week until the project's end date). As shown on the right of Figure 4.5, if a user selects the social button then a list of tools are provided. Additionally, there is a heading titled 'Social' at the top of the social submenu. The team included the title at the top of the screen based on suggestions from the iOS Developer Guide; the guide explained that every word in a mobile app should be used to provide clarity to the user (iOS Human Interface

Guidelines: Terminology and Wording, 2013). The title allows EDGE mentors to more clearly understand that they are on the social submenu.

The social tools shown on the right screen, which include Parties, Football Games, and Library Hours, were not actual tools that the team would use. They were simply 'test tools/resources' that the team added because feedback from the clients need to be gained in order to determine which tools they think would be the most helpful. For instance, the clients use a vast number of social resources in the form of videos, articles, and external apps that are designed to help first-year students. Because the EDGE Program uses such a high quantity of external tools it was important to not only use the survey and interview data collected from EDGE mentors and mentees but also to gain feedback from the clients.

As mentioned in the data and analysis section, the team obtained data on challenges that first year mentees face and data on suggested academic, time-management, social, and organizational tools that would be helpful to include. The team presented all of the data to the clients in a meeting on November 18th (see Appendix J). Based on the data, the clients suggested four tools for the social category. Two of the four tools include videos, while the two other resources include articles. The final version of the Social submenu is shown in Figure 4.6.

Figure 4.6: Final version of the 'Social' submenu

The first social resource is a tool for EDGE mentors and it is called TedxOU: Mentoring the Next Generation. This tool is a video that describes how mentors can help high school students. In this video, the speaker, Michael Benko, also identifies the inefficiency of the current high school mentoring program in America. This tool can allow EDGE mentors to increase their ability in mentoring first year students. The second social tool is a video called sympathy versus empathy. This tool is again for EDGE peer mentors, and it is a video that demonstrates how mentors can create a genuine empathetic connection with another person. In addition to these two videos, there is an article called "10 Easy Ways to Build Rapport". This article is a resource that EDGE mentors can view and it describes ways in which peer mentors can develop a harmonious relationship with their first-year mentee in which both the mentor and mentee communicate well with each other. Finally, the fourth tool is an article called: "The Best Way to Change Your Habits". This is a tool that falls into all three categories: social, academic, and personal wellness. This is because the article allows first year mentees to change habits in any of the three categories.

In addition to displaying a list of social tools in the submenu of the social category, there is also another feature in the social submenu. On the top right of Figure 4.6, there is a "+" button. This button allows EDGE mentors to add external tools that they find helpful. If a user wishes to add a resource, he or she can simply press the "+" (add) button. When pressing the "+" (add) button, the user is directed to the add screen which enables them to provide the information needed to add a resource, such as a website or an external app.

A screenshot of the 'Add Social Tool' Submenu is shown in Figure 4.7. The team included a title on the top of this submenu because the title provides greater clarity for users as they are navigating through the EDGE Mentoring App. It is important to note that the Add Social Tool submenu in Figure 4.7 was just an initial prototype; this prototype would allow EDGE mentors to add key information, such as what they would like to name the tool and what is the URL (or the website link to the tool). As shown in Figure 4.7, there is also a subheading called 'TAGS'. In the 'TAGS' subheading, the EDGE mentors can

add what category they would like to name the resource. For instance, is the resource a study tool, a mentoring tool, or a time-management tool.

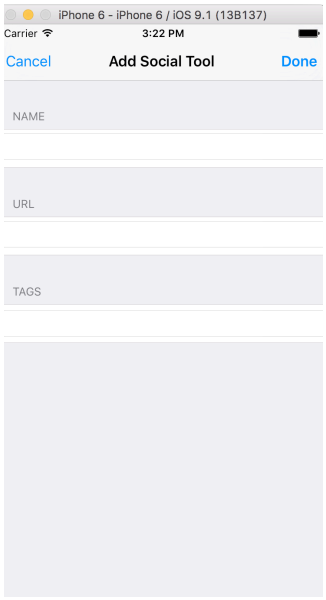


Figure 4.7: Initial version of the 'Add Social Tool' submenu

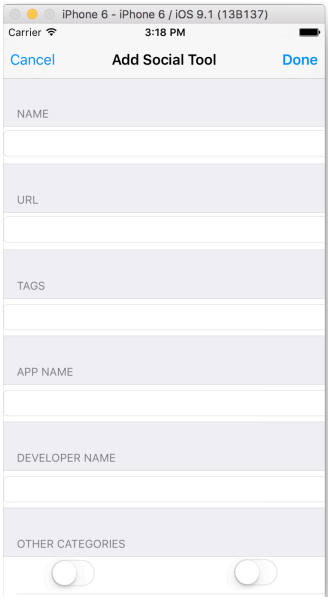


Figure 4.8: Screenshot of the completed 'Add Social Tool' menu

The prototype of the 'Add Social Tool' would work if the user was entering the URL of a video or article. However, there is additional information that is important if the EDGE mentor wanted to add an external app (on Apple's App Store). This information includes the name of the external app and the name of the developer. Thus, the team updated the 'Add Social Tool' submenu, and this revised submenu is shown in Figure 4.8.

There is also another feature in this updated menu, which is called 'Other Categories'; in this feature, EDGE mentors can slide a button to indicate whether the social feature belongs to the category of academic or wellness. During a client meeting on November 5th, Ms. Szivos and Ms. Rosen mentioned that external tools could belong to more than one category. For instance, an external app that provides first-year EDGE mentees with a calendar can be classified as an academic tool (it provides students with their class schedule) and a social tool (it provides students with a schedule of social events).

Finally, there is one last feature in the social submenu that is shown in Figure 4.9: this is the search feature. This feature allows the EDGE mentors to search for a specific tool that is under the social category. The team implemented the search feature because the clients recommended it during a meeting on November 18th (see Appendix J). The search feature is particularly useful if there are a large number of tools to sort through. For example, future IQP teams may add more external tools to the social submenu. Thus, a search feature would be useful because it allows mentors to quickly find tools that they are interested in. The search feature provides mentors with greater ease of use.

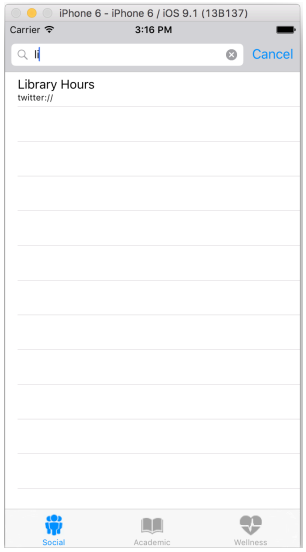


Figure 4.9: Screenshot of the EDGE Mentoring App's search bar

4.3.2 The Academic Submenu

The team also had drawn sketches to depict the academic submenus. The initial academic submenu is on the left in Figure 4.10 and this submenu depicts what will happen if a user selects the academic button on the app's main menu. As shown in the figure, there were three academic tools that the team was planning to include: a timer, a planner, and academic tip sheets. The team was planning to include a timer because this was a recommended feature in the mentor surveys. Moreover, in the mentee surveys, it was found that first year mentees have difficulty in time-management. Thus, a planner could help them with their time-management skills. Finally, the team was planning to include academic tip sheets that the EDGE Program utilizes.

As one can see in the initial sketch, the team was planning to place icons next to each feature, which is similar to the initial social submenu above. The team planned to do this because the clients suggested that it would be helpful to use icons to represent each feature.

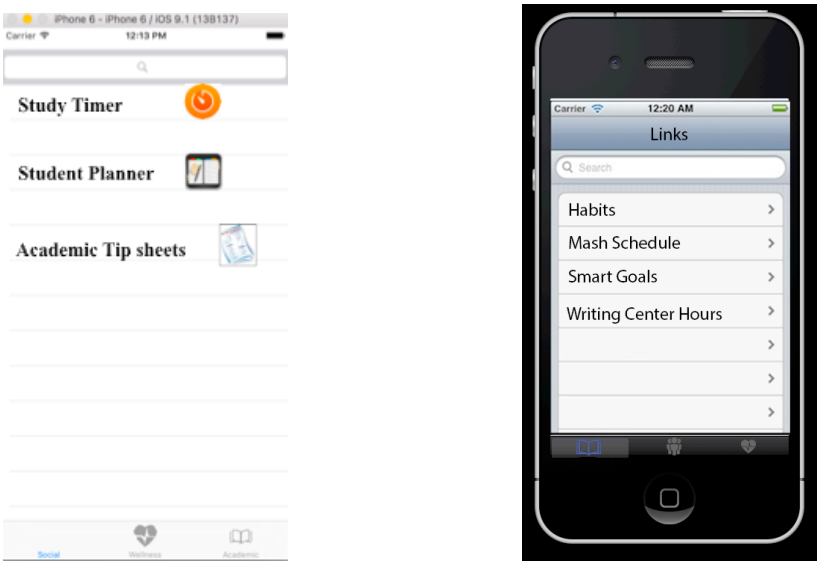


Figure 4.10: Computer sketches of the 'Academic' submenu

In addition to the sketch on the left of Figure 4.10, the team developed more computer sketches during the prototype phase. For instance, the team developed the computer sketch that is on the right of Figure 4.10, and presented the sketch during a weekly advisor meeting on November 12th. If EDGE mentors press the academic button on the app's main page then they are brought to tools and resources that are helpful.

As one can see from the sketch, the team included different tools in the academic submenu, including resources called Habits, MASH Schedule, Smart Goals, and Writing Center Hours. The team decided to include these tools in the submenu because they would be more feasible to implement in the EDGE Mentoring App compared to the Study Timer and the Student Planner. Additionally, based on the data collected, the team thought these tools would be useful to include in the mobile app. It is important to note that this sketch was not the completed academic submenu because the team needed to meet with the clients in order to finalize a list of tools to include.

Also, in the screenshot on the right of Figure 4.10, there were no icons next to the external links. Although the clients suggested that the team should include icons in the submenus, the team used Apple's Developer Guide to aid in this decision. The Developer Guide indicated that using too many icons on a screen can make an app more difficult to decipher (iOS Human Interface Guidelines: Icons and Graphics, 2013). The team also showed this submenu to the clients in a client meeting on November 11th and they liked the appearance of the updated submenu.

The final version of the academic submenu is shown in Figure 4.11.

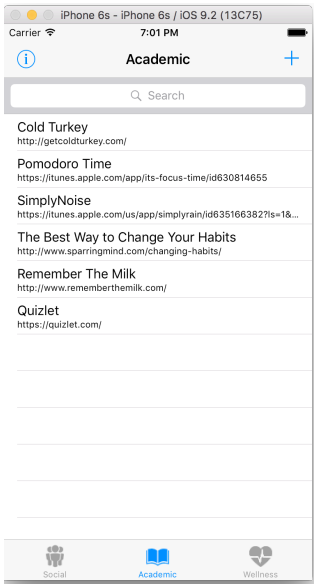


Figure 4.11: Final version of the 'Academic' submenu

As shown in Figure 4.11, six tools were included in the app: five of these tools were external mobile apps and one tool was an article. The weekly client meetings helped the team determine which mobile apps should be added to the EDGE Mentoring App. For instance, on a client meeting on November 11th (see Appendix J), Laura Rosen and Jessica Szivos suggested that a good list of mobile apps include: Simply Noise, Remember the Milk, Promodoro Time, Quizlet, and Cold Turkey.

The first academic resource that the team included is called Cold Turkey, which is shown on the left of Figure 4.12. Cold Turkey is a productivity app that blocks distracting websites such as Facebook. Furthermore, the clients suggested that the Promodoro Timer should be included. The Pomodoro Timer is

shown on the right of Figure 4.12 and it is a time-management tool. This app uses a timer to break down work-related activities into intervals that are twenty-five minutes in length, separated by five minute breaks. The timer is based on the idea that short, frequent breaks can improve mental agility.

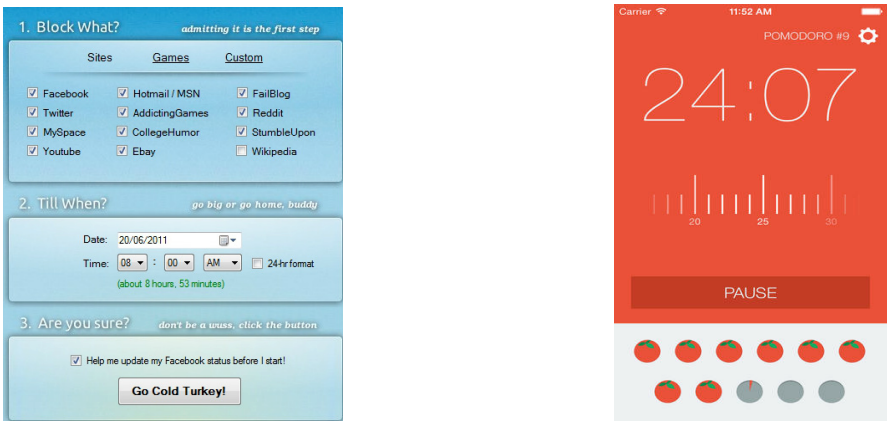


Figure 4.12: Screenshot of the Cold Turkey app (on the left) and the Promodoro Time app (on the right)

The next external app that the team included is called Simply Noise and it is shown in Figure 4.13. Simply Noise is a white noise generator that helps drown out background noise. It is particularly helpful for students who are studying in a noisy setting.

Figure 4.13: Screenshot of the Simply Noise app

The team also included an article that is titled "The Best Way to Change Your Habits". As mentioned above, this is a tool that falls into all three categories: social, academic, and personal wellness. The fifth tool that the team implemented is called Remember the Milk and it is shown in Figure 4.14. It is a time-management and to-do list app. This app allows users to arrange tasks that need to be completed by daily, weekly, and monthly categories. This tool also allows mentees to keep track of academic tasks that need to be completed.

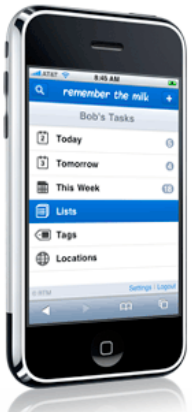


Figure 4.14: Screenshot of Remember the Milk

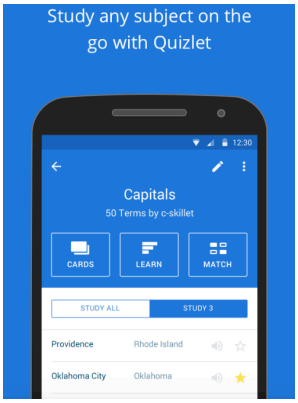


Figure 4.15: Screenshot of the Quizlet app

Finally, the clients suggested that quizlet should be included in the EDGE Mentoring App. Quizlet is shown in Figure 4.15 and it is a study tool that allows users to study material that they have created or that another user has created.

4.3.3 The Wellness Submenu

Additionally, the team developed the wellness submenu and an initial sketch of this submenu is shown on the left of Figure 4.16. In this initial submenu, the team first decided to include sleeping tips because first-year mentees seem to be receiving lower than the recommended amount of sleep based on the data collected. The team also included other personal wellness tips that would be helpful for first year mentees. These wellness tips could include articles or videos that are used in the EDGE Program.

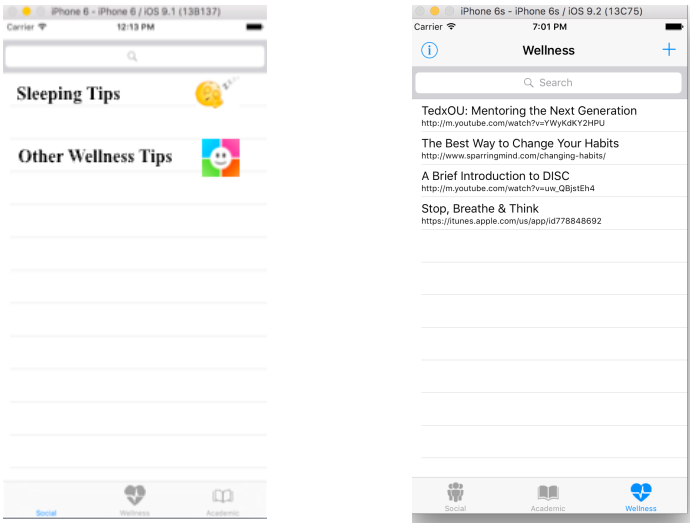


Figure 4.16: Screenshot of the initial 'Wellness' submenu (on the left) and the final 'Wellness' submenu (on the right)

However, after meeting with clients the team modified the wellness tools that would be included in the mobile app. The team also finished the final wellness submenu, which is shown on the right of Figure 4.16. In this submenu, there were four tools the team incorporated: two were YouTube videos, one tool was an article, and the fourth tool was an external mobile app.

One of the videos in the wellness submenu is called TedxOU: Mentoring the next Generation. This tool, as mentioned above, is a resource that EDGE mentors can use to increase their ability to mentor students. The team placed this resource in the wellness submenu because this video can also be used to help mentees in the area of personal wellness. The team also included an article, which is titled "The Best Way to Change Your Habits". As mentioned above, this is a tool that falls into all three categories: social, academic, and wellness. For example, this article allows first year mentees to change habits in the wellness category. Additionally, the team included a second video, which is called "A Brief Introduction to DISC". The video allows first year mentees to learn about DISC, which is tool that allows students to identify their personality type and enhance their communication skills with others. The DISC tool also gives mentees valuable information on how they prefer to communicate with others.

Finally, the team included an app called Stop, Think, and Breathe, which is a mindfulness app shown in Figure 4.17. This app allows users to select how they are doing with their emotional wellbeing. For instance, users can select whether they are feeling content, encouraged, or excited.

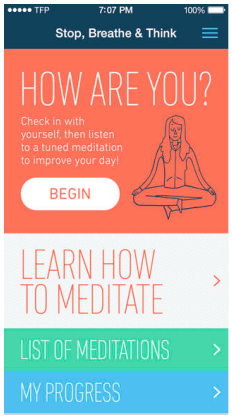


Figure 4.17: Screenshot of Stop, Breathe, and Think (mindfulness app)

Users can also learn how to meditate and can track their progress. The clients recommended that the team include this app on a client meeting on November 18th (see Appendix J).

4.4 Designing the Landing Page of the Mobile App

The main page of the EDGE Mentoring App was completed on November 11th and the submenus of the mobile app were completed on December 5th.

The last step of the app development process was adding a landing page into the mobile app. On a client meeting on December 2nd, the sponsors of this IQP project (Jessica Szivos, Laura Rosen, and Aaron Ferguson) recommended that the team should include a landing page, which is a page that describes how to use the mobile app.

In the EDGE Mentoring App, the user (the EDGE mentor) has to follow key steps to use the mobile app properly. For instance, on the main menu, he or she can tap on one of the three icons to select an area to focus on. After selecting an icon, users can then use the search bar to filter out tools and resources that they are looking for. Finally, the user can press the "+" button on one of the submenus and this allows the EDGE mentor to add more helpful resources. The team began developing the landing page on December 3rd and finished the page on December 8th. However, the team was unable to develop multiple designs of the landing page because of the time constraints in the project. Additionally, the team used suggestions from the project sponsors and from Apple's Developer Guide.

As mentioned in the Glossary, a landing page is a page in a mobile app that describes how to use the app. A landing page also incorporates visual effects, such as an image of the app's icon. The team developed the landing page by identifying the ways in which the user can properly navigate through the mobile app and this landing page is shown in Figure 4.18.

On the left of Figure 4.18, the team developed a sketch of the content that would be placed in the landing page, including a welcome message ("Welcome to EDGE") and directions on how to use the EDGE Mentoring App (i.e. Tap the +icon to share more apps). As one can see on the right of Figure 4.18,

the landing page of the mobile app included the content from the initial sketch. In terms of the visual design, the team used the logo of the EDGE Mentoring Program, which is a mountain with a background horizon. The team also used the colors yellow, green, and blue because they are apart of the logo of the EDGE Program.

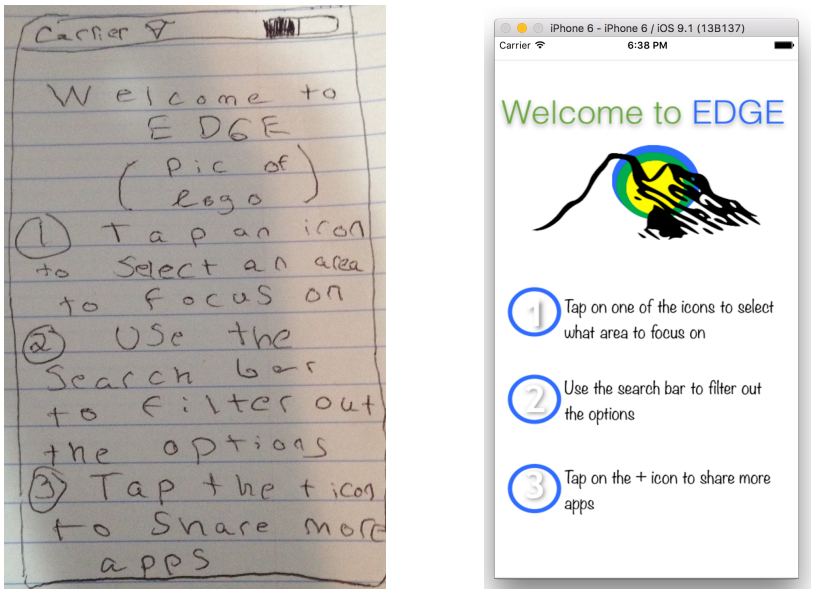


Figure 4.18: A sketch and a screenshot of the EDGE Mentoring App's landing page.

On a client meeting on November 5th, the clients suggested that the team should implement the EDGE logo as the main icon and as part of the landing page of the mobile app (see Appendix J). The team also had a reasoning behind the color scheme and for selecting the font types in the landing page. For instance, the team used one font type for the title of the app and a different font type for the directions on how to use the mobile app. Although the team was unable to show the landing page to the clients, suggestions from Apple's Developer Guide were utilized. For instance, the team did not use more than two types of fonts and tried to keep the landing page readable by selecting simple font types (iOS Human Interface Guidelines: Color and Typography, 2013).

The team also used the colors in the landing page by following more guidelines from the iOS Developer Guide. For instance, the team limited the number of colors used to four (we used green, blue,

yellow, and black) because using too many colors can complicate the visual design of the app (iOS Human Interface Guidelines: Color and Typography, 2013). The team used the colors green and blue in the title because we wanted to use the colors that are apart of the logo of the EDGE Program (green, yellow, and blue). The team did not use yellow as part of the title because it is more difficult to read for the user. Instead, the colors green and blue were used because these colors work well together based on Apple's Human Interface Guidelines (iOS Human Interface Guidelines: Color and Typography, 2013). Also, the team used the color blue around the numbers because this color provides a high contrast and good readability with white.

It is also important to note that the landing page would also appear if a user presses the help ("i") button, which is located on the top left of Figure 4.19.

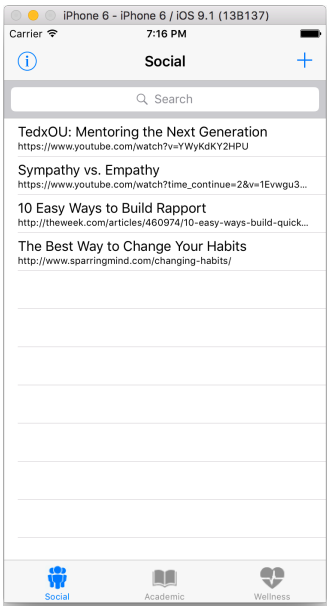


Figure 4.19: A screenshot of a submenu in the app with the help button located on the top left

4.5 Designing the Landing Page of the Mobile App and Designing the App's Icon

The team next designed a splash screen, which causes a logo to appear while the mobile app is loading. It is important to note that in Apple's Developer Guide it was recommended to avoid displaying a splash screen or other startup experience as much as possible (iOS Human Interface Guidelines: Starting and Stopping, 2013). This is because it is said that users spend no more than a minute or two evaluating a

new app (iOS Human Interface Guidelines: Starting and Stopping, 2013). While it is best to present useful content immediately, the team decided to implement a splash screen because the clients recommended this feature. For the EDGE Mentoring App, the team developed the splash screen, which is shown in Figure 4.20. The logo that is used is the same logo that the EDGE Program uses.

Figure 4.20: Screenshot of the EDGE Mentoring App's splash screen

The team also designed the mobile app's main icon, which is shown in Figure 4.21. In the icon, the team titled the app as the 'EDGE App' because this title is more concise than the 'EDGE Mentoring App'. Additionally, Apple's Developer Guide suggested that the best app icons are engaging, unique, and memorable (iOS Human Interface Guidelines: Icons and Graphics, 2013). However, due to time constraints, the team was unable to allocate a lot of attention toward designing a more engaging icon.

Figure 4.21:Screenshot of the EDGE Mentoring App's main icon

5. Additional Features

After developing the EDGE Mentoring App, the team developed a list of features that a future IQP team can work on. Our IQP team was unable to work on these features due to time constraints. For instance, the team was unable to develop a tool that provides a way for mentees to log how much time they spend in each category (of social, personal wellness, and academic). Additionally, a feature that updates mentors about events on campus and a student support feature, which displays student support resources on a campus map, were unable to be developed. The team was also unable to develop a meeting reminder for mentors, a messaging interface, and a personal scheduling tool. These features were mentioned as being helpful in the mentor survey.

Moreover, there are other features that were unable to be developed. For example, the IQP team could not develop a feature that would show mentees which club and on-campus activities they might be interested in. This is because this feature is more complex compared to the others, and the team would not be able to code this feature in the project's time window. Finally, the team could not develop an encouragement note and a feature that shows a mentee's current class load to the mentor.

Additionally, the clients suggested that the team should add a scheduling feature, which is shown in Figure 5.1, that would provide mentees with a list of tasks that need to be completed. The tasks would be separated in the following manner: items that need to be competed today, items that need to be completed for the week, and items that need to be finished for the month.

Figure 5.1: Screenshot of the scheduling feature that a Future IQP team can develop

First-year mentees would simply have to enter the tasks and this feature would help them manage their time effectively. However, the team was unable to develop this feature due to time constraints; for instance, this feature requires substantial time to code because it is more complex. Thus, the team decided to not develop this feature but rather to allocate more attention on the app's user interface.

In addition to focusing on developing individual features in the EDGE Mentoring App, a future IQP team can direct more attention towards machine learning. Machine learning is a computer science term and it means that a mobile app is able to learn from and make predictions based on data. In essence, machine learning uses algorithms and it allows a mobile app to make predictions based on a user's usage patterns. A future IQP team could develop a machine learning feature, which provides suggestions of tools that an EDGE mentor should look at based on the tools that he or she has accessed. For example, if the EDGE mentor looks at a lot of academic resources in the app, the machine learning feature might suggest that he or she should look at similar academic resources (such as time-management resources).

In this IQP project, the team concentrated on developing the user interface, a landing page, a splash screen, and a feature that would allow users to add and remove external mobile applications.

6. Cost Benefit Analysis

This next section will focus on the costs versus the benefits of the EDGE Program and of the EDGE Mentoring App. Performing a cost benefit analysis is crucial for this project because it evaluates the overall economic impact of the EDGE Program and in designing and implementing the EDGE Mentoring App. For instance, will the mobile app have a positive economic impact? This is one question to consider for this IQP project.

The first part of the cost benefit analysis section focuses on background literature that was found. The literature helped the team greatly in determining how to perform a cost benefit analysis of both the EDGE Program and of the EDGE Mentoring App. For instance, prior to performing the literature review, the team was not completely sure about how to quantify whether the EDGE Mentoring App will have a positive economic impact. However, by reviewing background literature the team developed a good understanding of how to evaluate whether the EDGE Mentoring App would result in a positive monetary impact.

6.1 Literature Review on Cost Benefit Analysis

6.1.1 Replacing Ambulatory Surgical Follow-Up Visits with Mobile App Home Monitoring: Modeling Cost-Effective Scenarios (J Med Internet Res Journal of Medical Internet Research, 2014)

In Canada, Women's College Hospital offers an ambulatory breast reconstruction surgery in post-mastectomy breast cancer patients (Armstrong, Semple, and Coyte, 2014). Following this surgery, patients receive a follow-up appointment but have to travel an average of 76 kilometers to the hospital (Armstrong, Semple, and Coyte, 2014). Women's College Hospital completed a study to illustrate the benefits of using a mobile app (Armstrong, Semple, and Coyte, 2014). The main cost to consider for the app were costs incurred by the medical system. For instance, the health care system had to pay to train hospital staff and to design procedure protocols for the app (Armstrong, Semple, and Coyte, 2014). Moreover, the health system had to pay a platform licensing fee, an infrastructure hosting fee, and a surgeon fee. Despite these costs, the health care system paid $136 Canadian (CAD) for a mobile app

follow-up appointment but paid a higher amount for in-person follow-up care (they paid $174 CAD for in-person appointments) (Armstrong, Semple, and Coyte, 2014).

Additionally, the in-person appointment costs the patient approximately $207 CAD but the mobile app has a negligible patient cost (Armstrong, Semple, and Coyte, 2014). The patients were also highly satisfied with the program and the mobile app allowed for ease of data collection (Armstrong, Semple, and Coyte, 2014). For instance, patients in this study submitted a questionnaire and post-surgical pictures on a weekly basis, which provides richer data compared to in-person follow-up appointment (Armstrong, Semple, and Coyte, 2014). Despite the reported success of the app, there are drawbacks with the study. For example, a randomized control group was not utilized, in order to demonstrate the effectiveness between the mobile app and in-person follow up care. Moreover, the cost of producing the app and the cost to purchase the app were not mentioned in the study. Thus, it is difficult to determine the break-even point of the number of apps the hospital would have to sell in order to start realizing a profit.

The team utilized this journal article in the IQP project because it describes a list of benefits that result from implementing the mobile app for post-mastectomy cancer patients. For example, the mobile app resulted in a cost savings of $38 for the health care system, and a savings of $207 for the patient. This resulted in a total savings of approximately $245 per patient.[1] In addition to monetary savings, the mobile app allows the patient to save travel time and the app allows for more accurate data because patients can submit a follow-up questionnaire on a weekly basis. Similarly, when this IQP team performs a cost benefit analysis of the EDGE Program and the EDGE Mentoring App, all of the benefits will be described.

6.1.2 Benefits of Monitoring Patients with Mobile Cardiac Telemetry (MCT) compared with the Event or Holter monitors (MDER Medical Devices: Evidence and Research, 2014)

The second article examined the costs versus the benefits of using mobile cardiac telemetry (MCT), which is a sensor that monitors a patient's cardiac health. This device has been identified as

[1] The total cost for the mobile app was $136 per patient while the total cost for an in-person appointment was $381 per patient.

offering superior ability to analyze the morphology of the electrocardiogram (ECG/EKG). However, several research studies examined whether MCT leads to better clinical outcomes. Unfortunately, these studies ran into challenges and could not demonstrate this correlation (Tsang and Mohan, 2014). Additionally, patients continue to use the Holter and Event monitors, which are also portable cardiac health sensors.

This research study tried to examine whether mobile cardiac telemetry (MCT) leads to better clinical results and reduced cardiovascular costs. One metric that the researchers tried to determine is the diagnostic yield of arrhythmia, which is the likelihood that the cardiac monitor will provide the information needed to establish a diagnosis. The research team found that 61% of patients, who used the MCT, were diagnosed with arrhythmia following the use of the Holter (Tsang and Mohan, 2014). This is compared with 23% for patients that use the Event monitor and 24% for patients that use the Holter monitor (Tsang and Mohan, 2014). A Z-test for the difference between two sample proportions revealed that the proportion of patients diagnosed with Arrhythmia was statistically higher when patients use MCT compared to the Event or Holter monitor (Tsang and Mohan, 2014).

Additionally, to determine whether MCT would lead to cost savings, the study was designed in a certain way. The patients were only allowed to use one cardiac monitoring device and the researchers controlled for key variables. For example, the patients that were compared belonged to the same age group (Tsang and Mohan, 2014). The patients also belonged to the same consumer price index (CPI) geography (Tsang and Mohan, 2014). Controlling for CPI geography is important because if MCT patient costs are low compared to other monitoring devices, it may be because the MCT patient is from a lower consumer price index (CPI) geography.

To determine cost savings, the research team studied data when patients used MCT instead of the Event or Holter monitor when undergoing different types of surgeries. The four procedures that were analyzed included cardiac ablation, CABG (coronary artery bypass graft), heart/ pericardium procedures, and valve/septa procedures. This study found that there were statistically significant savings when the

patient used the MCT monitor. Those savings were calculated in the 12 months that followed the use of the cardiac-monitoring device. For example, in the case of ablation, MCT led to savings of $35,114 in inpatient cardiovascular costs over the 12 months that followed the use of the device in comparison with the Event monitor (Tsang and Mohan, 2014). This resulted in a p-value of less than 0.0001, which indicates that there is a statistically significant difference (Tsang and Mohan, 2014). Similarly, MCT led to savings of $36,115 when compared to the Holter monitor for the condition of ablation (Tsang and Mohan, 2014).

Table 6.1: Table of cost savings for mobile cardiac telemetry

Savings when using MCT: ablation, CABG, heart/pericardium, and valve/septa procedures

	MCT vs Event			MCT vs Holter		
	Savings (US$)	**n**	***P*-value**	**Savings (US$)**	**n**	***P*-value**
Ablation	35,114	54	<0.0001	36,115	45	<0.0001
CABG				41,700	32	0.0003
Heart/pericardium	17,131	43	0.0281	8,606	54	0.0003
Valve/septa	58,362	35	0.0422	55,390	46	0.0003

Abbreviations: MCT, mobile cardiac telemetry; CABG, coronary artery bypass graft; vs, versus.

Additional data in the Table 6.1 indicates that MCT results in statistically significant savings when compared to the Event and Holter monitors (at a level of significance of 0.05) (Tsang and Mohan, 2014). The only data that was not reported were for patients who were undergoing CABG using MCT instead of an Event monitor, and this was because the sample size was twelve. In order to use a Z-statistical test the sample size needs to be at least thirty.

Finally, based on the data, MCT leads to better outcomes regarding diagnostic yield and led to cost savings for the four procedures[2]. Thus, this study supports the benefits of adopting the MCT system.

The team included this article because it utilized a control group and an experimental group to show that the intervention (which is MCT) is effective. This study also controlled for key variables, including the patient's age group and the patient's consumer price index (CPI) geography. Finally, the study utilized a Z-test, which is a statistical significance test, to demonstrate that MCT is effective.

Similarly, in order to show that the EDGE Program is cost effective, the IQP team controlled for variables by comparing similar groups; first-year students who are in the EDGE Program were compared to first-year students with disabilities, who were not in the EDGE Program. Additionally, these two groups of students were compared based on their levels of satisfaction and their academic performance. Lastly, a statistical significance test helped quantify whether EDGE mentees have higher levels of satisfaction.

6.1.3 The Costs and Potential Savings of a Novel Telepaediatric Service in Queensland (BMC Health Services Research, 2007)

This study compared the costs of providing a telepaediatric service versus the estimated costs if patients had to travel to see a specialist in person. The telepaediatric service was to be implemented in Queensland, which is the second largest state in Australia[3] (Smith, Scuffham, and Wootton, 2007). Because of the size of the state, patients may have to drive hours by car or pay for expensive journeys by rail or air.

However, a telepaediatric service would allow patients to see medical specialists via a videoconference. The service offers a broad range of pediatric sub-specialties such as burns, cardiology, child development, pediatric surgery, psychiatry, and more. To determine the cost of providing the telepaediatric service, the researchers looked at the costs of purchasing the videoconference equipment, salaries for coordinators, salaries for clinical staff, and telecommunication charges (Smith, Scuffham, and

[2] These include ablation, CABG, heart/pericardium, and valve/septa procedures
[3] Queensland has a land area of about 1,722,000 km^2

Wootton, 2007). Additionally, in Table 6.2, the costs for patients to visit a specialist included paying for staff salaries, patient travel, and accommodation (Smith, Scuffham, and Wootton, 2007).

Table 6.2: Comparison of the costs for telepaediatrics vs. conventional outpatients

Expenditure	Telepaediatrics (A$)	Conventional outpatients (A$)
FIXED COSTS		
Equipment (5-year total annuatized cost)	128,191	0
ISDN installation	2655	0
ISDN line rental	32,400	0
Coordinators salaries	475,000	0
Sub total	***638,246***	***0***
VARIABLE COSTS		
Telecommunications *ISDN Line charges*	65,400	0
Staff salaries:		
RCH Consultants ($200 per h)	109,000	109,000
RCH Nursing/Allied Health ($50 per h)	27,250	27,250
RCH Admin Support ($30 per h)	0	16,350
Regional presenter ($150 per h)	81,750	0
Regional admin support ($30 per h)	16,350	0
Patient travel subsidy scheme:		
Travel	0	1,391,670
Accommodation	0	8,994
Project costs	18,000	0
Sub total	***317,750***	***1,553,264***
Total cost	**955,996**	**1,553,264**

The telepaediatric equipment included three videoconference systems, two computers, and one printer (Smith, Scuffham, and Wootton, 2007). The equipment was assumed to have no resale value after the 5 year period. Moreover, travel costs were provided by the hospital's patient travel department.

The research study took place over a period of 57 months and during this time 1499 patient consultations were conducted (Smith, Scuffham, and Wootton, 2007). In addition to the costs mentioned above, the costs were also broken down into fixed and variable expenditures in Table 6.2. The fixed costs included equipment, ISDN installation, ISDN line rental, and coordinators salaries[4]. However, variable

[4] ISDN stands for integrated services digital network

costs are present in the conventional outpatient column[5], and these included travel costs, and costs for staff salaries and accommodation. Variable costs are also present in the telepaediatrics column, and included ISDN line charges, staff salaries, and project costs. Table 6.2 also shows that total cost for the telepaediatrics service was $955,996, while the estimated cost if patients travelled to Brisbane was $1,553,264 (Smith, Scuffham, and Wootton, 2007).

Finally, the average cost per consultation was also included in this article. For the telepaediatric service the fixed cost per consultation was $426 and the variable cost was $212 (Smith, Scuffham, and Wootton, 2007). Thus, the average cost for the telepaediatric service was $638 per consultation. Meanwhile, the average cost for an outpatient appointment was the same as the variable cost at $1036, since there were no fixed costs (Smith, Scuffham, and Wootton, 2007). It is important to note that the telepaediatric service is cheaper then having patients travel to Brisbane, when the workload exceeds 774 consultations as shown in Figure 6.1 (Smith, Scuffham, and Wootton, 2007).

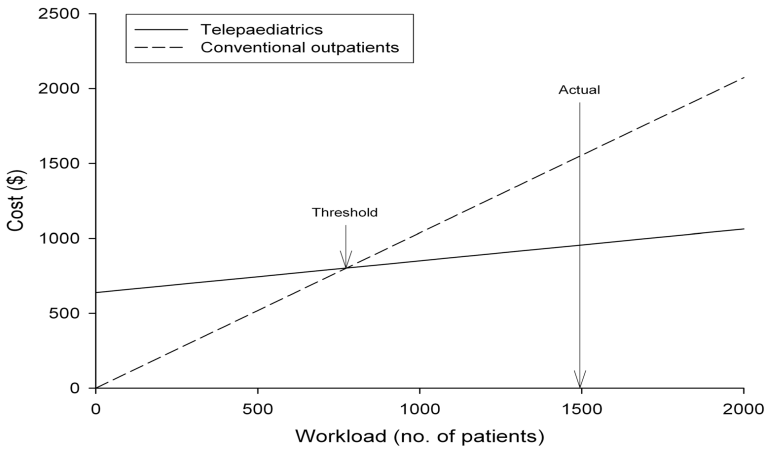


Figure 6.1: The break-even point for telepaediatrics vs. conventional outpatient (visiting a specialist)

In addition to the savings generated by the telepaediatric service, there were intangible benefits of sending patients to see a specialist. For example, the telepaediatric service has made specialist services

[5] Conventional outpatients: when patients travelled to see a specialist

more accessible. Thus, families spend less time traveling to their appointment, take less time off work, and have lower out-of-pocket expenses.

A limitation of this study is that the estimated costs of providing telepaediatric services to a group of patients were compared to the potential costs of sending patients to the main hospital to see the specialist in person. However, it is unlikely that every consultation performed by the telepaediatric service will result in a saved journey to Brisbane.

The article on the telepaediatric service was included in this IQP project because it provided a detailed list of costs of conventional outpatient versus the costs of the telepaediatric service. Furthermore, the study discussed intangible benefits that cannot be converted into a monetary value.

In the EDGE Mentoring App project, a detailed list of the costs of the EDGE Program will be provided along with the costs of developing the EDGE Mentoring App. Additionally, in the EDGE Program there are also benefits that cannot be monetized, which can be considered intangible benefits.

6.1.4 Cost-Benefit Analysis of Electronic Medical Record System at a Tertiary Care Hospital (Healthcare Informatics Research, 2013)

This study measured the total costs and benefits during an 8-year period after EMR adoption. The EMR system was adopted in Samsung Medical Center in South Korea (Choi, Lee, and Rhee, 2013). A barrier of adopting Electronic Medical Record (EMR) systems is the cost. For instance, there are conflicting results as to whether EMR systems lead to cost reductions. This study analyzed the economic effects of an EMR system by using a cost benefit analysis.

The costs of implementing an EMR system can be broken down into two categories: the system costs and the induced costs (Choi, Lee, and Rhee, 2013). The system costs include the costs to build the system infrastructure, to develop the EMR applications, and to purchase office supplies. Additionally, the

induced costs are required to smooth the EMR adoption. The first induced cost included the cost to scan paper-charts into the EMR system and a second cost was to compensate medical transcriptionists (MT's)[6].

Moreover, the benefits of EMR implementation included cost reductions and revenue generated from EMR (Choi, Lee, and Rhee, 2013). There were several types of cost reductions to consider: 1) the reduction of supplies for paper charts, 2) the disposal of storage facilities, 3) the reduction of employees for paper chart management, and 4) the reduction of supplies. Additional revenues were also generated from remodeling the paper chart storage rooms and the contribution of MT's.

As you can see in Table 6.3, 38.6% of the costs included system costs while 61.4% of the costs came from induced costs, which included compensating MT's and paper-charts scan (Choi, Lee, and Rhee, 2013). The total present value (PV) of EMR costs was $16,054,000 (Choi, Lee, and Rhee, 2013).

Table 6.3: Table for the costs versus the benefits of adopting the EMR system

Item	2006 (0)	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	Total
Cost									
System costs									
System infrastructure	1,241	-	-	-	98	93	88	84	1,604 (10.0)
System application	1,006	1,274	315	192	188	184	179	174	3,512 (21.9)
Office supply	306	286	-	105	102	98	95	91	1,084 (6.7)
Sub-total	2,554	1,560	315	296	388	375	363	348	6,199 (38.6)
Induced costs									
Paper-charts scan	-	-	724	519	-	-	-	-	1,243 (7.7)
MTs support	166	1,186	1,107	1,118	1,185	1,313	1,255	1,281	8,612 (53.6)
Sub-total	166	1,186	1,831	1,636	1,185	1,313	1,255	1,281	9,854 (61.4)
Total PV of annual costs	2,720	2,746	2,146	1,934	1,573	1,687	1,618	1,630	16,054 (100.0)
Benefit									
Cost reductions									
Supplies for paper-charts	11	52	258	100	248	91	231	3	1,076 (5.5)
Chart storage space	-	-	14	145	142	139	135	129	703 (3.6)
Chart management FTE	-	-	180	782	799	847	816	807	4,231 (21.5)
Clerks decreased	-	-	165	165	165	165	165	164	990 (5.0)
Supplies for MDIS	7	67	78	415	168	165	161	155	944 (4.8)
Sub-total	18	120	695	1,335	1,522	1,408	1,507	1,339	7,945 (40.4)
Additional revenues									
From remodeling storage	-	-	-	17	26	35	25	21	125 (0.6)
From temporary storage	-	-	261	300	280	275	269	262	1,646 (8.4)
From MT support	-	-	551	1,411	1,421	2,747	1,928	1,899	9,956 (50.6)
Sub-total	-	-	811	1,728	1,727	3,056	2,223	2,182	11,727 (59.6)
Total PV of annual benefits	18	120	1,506	3,063	3,249	4,465	3,731	3,521	19,672 (100.0)
Accumulated NPV	(2,702)	(5,329)	(5,969)	(4,839)	(3,163)	(385)	1,726	3,617	
Benefit-cost ratio									1.23
Discounted payback period									6.18

[6] Medical Transcriptionists (MTs) are typists who enter medical records into the EMR system

Moreover, the benefits of adopting an EMR system were also converted to a monetary value. For example, cost reductions were converted into a monetary value by determining the number of pieces of paper and the number of supplies that were saved. Additionally, after adopting the EMR system, the number of full time employees (FTE's) greatly decreased as well as the number of clerks; these two reductions resulted in cost-savings. The cost reductions represent 40.4% of the total benefits.

There were also benefits in the form of additional revenues. For instance, the paper-storage areas were remodeled into clinic rooms for outpatient examinations and this represents 9.0% of additional revenues. Moreover, there was also additional revenue from support from MT's, which represents 50.6% of the total present value (PV) of annual benefits. Finally, the total value of benefits was $19,672,000. In this study, the cumulative NPV (or net present value), which is equal to the benefits minus the costs, was $3,617,000. Moreover, the BCR (benefit cost ratio) was 1.23, while the DPP (discounted payback period) was 6.18 years [7].

The total personnel costs for MT support were $8,612,000, which represented 53.6% of the total cost. Moreover, the direct costs for EMR applications and system infrastructure were 21.9% and 10.0%[8]. The largest total of benefits came from MT support, which represented $9,956,000 in benefits. The reduction of FTE's also contributed 21.5% of the total benefits. It is also important to note that both the costs and benefits are largely influenced by support from MT's.

As mentioned above, the time period to break-even on this investment was 6.18 years and the BCR was 1.23. This makes EMR adoption not so appealing to management because the discounted DPP is longer than 5 years and the BCR is near 1. However, this study did include any qualitative effects of implementing an EMR system, such as the improvement in the quality of care and medical error

[7] DPP is the time duration required to break even on an investment
[8] These three items represented 85.5% of total costs

prevention. Thus, EMR can be a worthwhile investment, especially considering that the net present value (NPV) was greater than zero[9] (Choi, Lee, and Rhee, 2013).

Lastly, included this article because it listed not only the costs but also the benefits of adopting an EMR system. Similarly, for the EDGE Program and for the EDGE Mentoring App it is important to list all the costs and benefits in order to determine the cost-effectiveness.

6.2 Cost Benefit Analysis of the EDGE Program

After performing the literature review, the team was now ready to perform a cost benefit analysis for the EDGE Program. Based on the background literature above, the cost benefit analysis of the EDGE Program should be performed in a certain method. For instance, the team should list all of the benefits and costs even if these benefits and costs cannot be converted to a monetary value. Then, the team should provide an estimate for the costs and benefits.

Additionally, the team should compare first year mentees who are in the EDGE Program versus first year students with disabilities who are not in the EDGE Program. In this way, the team can compare a control group (first year students with disabilities who are not in the EDGE Program) with a treatment group (first year mentees who are in the EDGE Program). There should also be data on how satisfied students are in the three categories of social, academic, and personal wellness. This would allow the team to quantify whether the EDGE Program leads to better outcomes in the three categories versus the control group (students who do not participate in EDGE). However, to perform this analysis a new survey would have to be distributed and the team was under a time constraint. Thus, the team was unable to compare the control group in the categories of academic, social, and personal wellness. However, the team was able to compare the GPA of students and whether the students in the EDGE program were more satisfied at WPI.

Furthermore, it would be ideal if thirty or more students were in the EDGE Program because this would allow the team to perform a Z-test. However, there were only twelve students in the EDGE

[9] This indicates that the benefits are greater than the costs

Program. Thus, a T-Test, which is a statistical significance test for sample sizes that are less than thirty, had to be performed in order to assess whether students in the EDGE Program were significantly more satisfied with their experience at WPI.

The costs and benefits associated with the EDGE Program are given in Table 6.4. One cost includes compensating ODS staff members for allocating time toward the EDGE Program. Also, there is a cost to hold EDGE Program Events, which are mostly held during the beginning of the academic year.

In addition to these monetary costs, there are non-monetary costs. For example, peer mentors and first year mentees allocate a certain amount of time each week toward the EDGE Program.

With these costs, there are also benefits to be evaluated. One benefit that the team predicted is that the EDGE Program would improve a student's GPA. This is because the program gives incoming freshmen with and without disabilities an opportunity to develop skills that are needed to successfully transition into college. An improvement in GPA is listed as a short-term benefit in Table 6.4. Another short-term benefit is that students will be more satisfied at WPI.

The EDGE Program can also offer long-term benefits. For example, the team predicted that EDGE students develop improved social skills (i.e. greater ability to communicate with others) and improved personal wellness skills, such as a greater ability to develop effective sleeping habits. Finally, EDGE students may develop an increase in productivity or being able to work efficiently on academic and professional tasks.

The benefits mentioned above are for the first-year mentee. However, there are benefits for the EDGE peer mentor. For example, peer mentors undergo extensive training each week while they work with their first-year mentee. They also have to guide and support their mentee, who is transitioning into college. Thus, peer mentors can develop strong leadership skills.

Table 6.4: Table of the costs vs. the benefits of the EDGE Program

Cost	Benefit
Cost • ODS Staff Salaries (Jess and Laura) • EDGE Program Events	**Short-term Benefit** • Increase in student GPA • Increase in satisfaction at WPI
Other Cost • Mentor Time Commitment • Mentee Time Commitment • Total Annual Costs `	**Long-term Benefit** • Improved social skills • Increase in student Productivity • Improved Personal Wellness skills • Leadership skills developed by mentors
	Societal Benefit • Higher Skilled Job Force • Fewer College Dropouts
	Benefit at the University Level • Higher Retention Rates • Happier Parents
	• Total Annual Benefits

Furthermore, there are benefits at the societal level. Namely, the EDGE Program can produce a better skilled and more productive workforce. This is because the first year students can attend workshops, meet with professional staff, and peer-mentors to help address the skills they need to be successful. Thus, mentees have more access to resources that focus on time-management and productivity and can thus acquire these skills more easily. There may also be another societal benefit, which includes fewer college dropouts. One reason that students drop out of college is a lack of preparation; these students may feel overwhelmed by the college workload or may be falling behind their peers. However, the EDGE Program helps by providing tools that students need to be successful in their classes. For instance, the EDGE Program provides articles on how to develop good habits and links to websites on time-management.

Finally, there are benefits at the university level. One example is that the EDGE Program can lead to higher retention rates because students are more satisfied with their WPI experience. A higher retention results in more university tuition payments. Another university benefit includes happier parents; parents are happier because their children are content with their college experience. This is a benefit to the university because the parents can mention good things about the college to prospective students and parents. Thus, the university will have a better reputation.

Table 6.5: Monetary costs vs. benefits of the EDGE Program

Cost		Benefit
ODS Staff Salaries (Jess and Laura)	$8,400- $10,100 per year	**Short-term Benefit** • Increase in student GPA • Increase in satisfaction at WPI
EDGE Program Events	~ $700 per year	**Long-term Benefit** • Improved social skills • Increase in student Productivity • Improved Personal Wellness skills • Leadership skills developed by mentors
Mentor Time Commitment	1.5 - 2 hours per week	**Societal Benefit** • Higher Skilled Job Force • Fewer College Dropouts
Mentee Time Commitment	30 min – 1 hour per week	**Benefit at the University Level** • Higher Retention Rates • Happier Parents
Total Annual Cost	$9.100-$10,800	**Total Annual Benefits**

The costs mentioned above do not contain a quantitative value. In Table 6.5 there is a detailed list of monetary costs needed to fund the EDGE Program.

For example, the cost to compensate the ODS staff for allocating time toward twelve first year mentees and for instructing twelve peer mentors is between $8,400 and $10,100 per year. The team estimated this cost by determining the time that the ODS staff allocate toward the EDGE Program. For instance, Laura Rosen and Jessica Szivos each allocate 5-6 hours per week to the EDGE Program. Also, an estimated salary for the Director of Disability Services is around $65,000 per year ($31.25 per hour), while the estimated salary for an Assistant Director of Disability Services is around $60,000 per year

($28.85 per hour). Thus, the estimated compensation if Laura Rosen and Jessica Szivos spent 5 hours each on the EDGE Program is around $8,400[10]. Meanwhile, the compensation if they each spent 6 hours on the EDGE Program is around $10,100.[11]

Additionally, there are three program events and the cost to pay for these events was around $700 per year. One event is in the beginning of the school year in which first-year mentees meet with professional staff, and eat lunch and dinner in the dining hall for two days. Since the cost for lunch is around $8 and the cost for dinner is around$13, then the beginning of the year event costs around $504[12]. Also, the EDGE Program distributes T-shirts to first-year mentees at the start of the term, which accounts for around $120 in costs. Finally, there is an end of the year pizza event for mentors and mentees, which is estimated to cost around $72. The costs for the EDGE Program Events and to compensate the ODS staff was around $9,100 to $10,800 per year.

In addition, there were non-monetary costs. For example, EDGE mentors spend one and a half to two hours each week toward the program, in which they spend one hour in training sessions, and thirty minutes to on hour in mentoring students. In comparison, mentees spend around thirty minutes to one hour each week.

While the costs were easier to convert to a monetary or a quantitative value, quantifying the benefits was more difficult. One potential benefit of the EDGE Program is that students will have an increase in GPA. However, the team did not have quantitative data to support this benefit. For example, the GPA data only included data from last year. As seen in Table 6.6, non-participants actually had a slightly higher overall GPA for the year compared to EDGE students (2.914 for non-participants versus 2.848 for participants).

[10] ($31.25 + $28.85 / hour) (5 hours/week)(28 weeks/ academic year) = $8,414
[11] ($31.25 + $28.85 / hour) (6 hours/week)(28 weeks/ academic year) = $10,097

[12] [($8 for lunch/1 person * 12 people) + ($13 for dinner/ 1 person * 12 people)] * 2 days = $504

Table 6.6: Comparison in academic performance for participants (EDGE mentees) vs. non-participants (Freshmen students with disabilities who are not in EDGE)

Student GPA							
EDGE Grade Data 14/15	**A/B Term**	**C/D Term**	**Total (A-D Terms)**	**Improvement in GPA between 1st & 2nd Semester**	***n* (number of students)**	**P-Value**	**Statistically Significant**
Non-part.	2.818	2.999	2.914	0.181	51	N/A	N/A
Part	2.762	2.938	2.848	0.176	12	N/A	N/A

Furthermore, both groups did better during their second semester performance compared to their first semester. For instance, the non-participant group had a 0.181 improvement in GPA, while the EDGE participant group had a similar improvement in academic performance (second semester grades were 0.176 GPA points higher).

Despite the difference in GPA, EDGE students did have a fewer number of NRs (No records) compared to non-EDGE students as seen in Table 6.7. An NR is a grade that is lower than a C (usually lower than a 70).

Table 6.7: Comparison of number of NR's for participants vs. non-participants

Average Number of NRs Per Student						
EDGE Grade Data 14/15	**A/B Term**	**C/D Term**	**Total (A-D Term)**	***n* (Number of Students)**	**P-Value**	**Statistically Significant**
Non-part.	0.706 (36 NR's)	0.510 (26 NR's)	1.216 (62 NR's)	51	N/A	N/A
Part	0.5 (6 NR's)	0.417 (5 NR's)	0.917 (11 NR's)	12	N/A	N/A

Participants had an average of 0.917 NR's while non-participants had an average of 1.216 NR's for last year. Also, this data is for twelve EDGE students and fifty-one non-EDGE students, who worked with the ODS.

However, it would be useful to gather data from this year (2015-16) to determine whether EDGE students were performing better compared to the non-participant group. As mentioned above, the team was unable to gather this data due to time constraints.

The team was able to quantify one benefit, which is an increase in satisfaction at WPI. The survey from last year indicated that first year EDGE mentees tend to be more satisfied with their WPI experience compared to non-EDGE students. For instance, one question asked to rate how much you agree or disagree with the following statement (on a 1-5 scale): "In general, I do not like WPI." Overall, EDGE students were more likely to state that they strongly disagree compared to non-EDGE students. For instance, as shown in Table 6.8, EDGE mentees had an average rating of 1.2, while non-EDGE students had an average rating of 2.32. A T-Test indicated that the p-value was 0.0046. In other words, if you choose a level of significance of 0.05, this test indicates that EDGE participants gave a significantly lower rating compared to non-EDGE students.

Also, mentees were more likely to recommend WPI to an interested friend and the EDGE participants were more likely to enjoy being a WPI student (4.2 vs. 3.842 rating on the likert scale). However, it is important to note that only five mentees and nineteen non-EDGE participants completed the survey.

Table 6.8: Comparison of levels of satisfaction at WPI for mentees vs. non-participants

Questions	EDGE Rating	Non-EDGE Rating	P-Value	Statistically Significant	n_1 (EDGE Students)	n_2 (non-EDGE Students)
All in all, I am satisfied with my experience at WPI so far.	3.8	3.842	0.451	No	5	19
In general, I don't like WPI.	1.2	2.316	0.0046	Yes	5	19
In general, I like being a student at WPI.	4.2	3.842	0.124	No	5	19
If a good friend of mine told me that he/she was interested in attending WPI I would strongly recommend it.	4.4	3.842	0.094	No	5	19
Knowing what I know now, if I had to decide all over again whether to come to WPI, I would.	4.2	4.105	0.351	No	5	19

Additionally, EDGE participants were slightly more likely to be satisfied with the ODS.

Table 6.9: Comparison in levels of satisfaction with the ODS

Questions	EDGE Rating	Non-EDGE Rating	P-Value	Statistically Significant	n_1 (EDGE students)	n_2 (non-EDGE students)
All in all, I am satisfied with my interactions with the Office of Disability Services so far.	4.2	4.105	0.351	No	5	19
In general, I do not like the Office of Disability Services.	1.2	1.684	0.0429	Yes	5	19
If a good friend of mine told me that he/she was needed help with a disability I would recommend going to the ODS.	4	4.474	0.114	No	5	19

For instance, EDGE mentees were more likely to disagree with the statement: "In general, I do not like the Office of Disability Services." In Table 6.9, EDGE participants gave a 1.2 rating for this question while non-EDGE students gave this statement a rating of 1.684. Interestingly, non-EDGE students were more likely to strongly recommend the ODS to a friend who needed help with a disability (4.474 versus 4 on the likert scale).

A benefit that the team was unable to quantify is whether the EDGE Program leads to better social skills, an increase in productivity, and an increase in personal wellness skills. A survey needs to be distributed in order to assess these benefits but the team was unable to collect this data due to the project's deadline.

Furthermore, there are other benefits that the team was unable to quantify. For instance, there is not much data to support whether the EDGE Program leads to happier parents. This was listed as a benefit because EDGE students tend to be more satisfied at WPI. Therefore, the team reasoned that their parents were also more likely to be happier. Finally, the team does not have all the data to support whether the EDGE Program will lead to fewer college dropouts because there are other reasons why students drop out of college[13]. The team reasoned that the EDGE Program would lead to higher retention rates and fewer dropouts based on the satisfaction data.

6.3 Cost Benefit Analysis of the EDGE Mobile Application

This next section will discuss the costs and the benefits of the EDGE Mentoring App. For instance, developing a mobile app requires a substantial time commitment. It can also require a significant investment if a company is paid to develop the mobile application. Table 6.10 lists the costs and benefits of designing a mobile app for the EDGE Program.

[13] Students do not only drop out because of a lack of satisfaction or a lack of preparation; they also dropout for economic reasons (i.e. tuition is too expensive)

Table 6.10: Costs vs. the benefits of developing an app for the EDGE Program

Item	Total
Cost • Paying the App Store • Mobile App Maintenance **Other Cost** • Time to develop the app **Value Cost** • App Development	 • One-time fee of $25 • $99 per year • 400 – 600 hours • Average of $100 per hour to hire a company
Benefit • Saving in compensating ODS staff **To be Evaluated** • Increase in student GPA • Increase in student productivity • Increase in personal wellness • Increase in social satisfaction	 • $8,400 - $ 10,100
Other Benefits • Reduced time commitment for mentors • Reduced time commitment for mentees	 • 1-5 – 2 hours per week • 30 min – 1 hour per week

As shown in Table 6.10, a major cost is the time commitment to develop a mobile app, which is between 400 and 600 hours. The team estimated that 400 to 600 hours would be the time commitment because the EDGE Mentoring App is of moderate complexity[14]. Additionally, there is a one-time fee to the iOS App Store of $25, and a maintenance fee of $99 per year that the team would need to pay to the iOS App Store. Furthermore, there is an additional cost if a Dev Shop was hired to code the app. A Dev shop is a company that codes the app for the client, and they charge on average, $100 in the U.S. Thus, the estimated cost to develop a moderately complex app would be $40,000-$60,000. However, this IQP team did not hire a company to develop the app. Instead, the main costs included the time commitment and the costs to have the mobile app in the iOS App Store.

However, there are distinct benefits of developing the EDGE Mentoring App. For instance, the university saves $8,400 - $10,100 in compensating ODS staff. The team also estimated that there would be a reduced time commitment for mentors of one and a half to two hours per week. Furthermore, there is

[14] The time commitment to develop a moderately complex app is 400-600 hours

an estimated reduced time commitment for first year mentees of thirty minutes to one hour per week. In addition to these cost and time commitment reductions, there are benefits that need to be evaluated.

For instance, one benefit that needs to be quantified is whether the mobile app will help increase a student's GPA. Moreover, it is unknown whether the EDGE Mentoring App will lead to an increase in social satisfaction, an increase in personal wellness, and an improvement in student productivity. The team was unable to collect this data because the mobile app was completed toward the end of the project deadline. Thus, there was inadequate time left to evaluate whether the EDGE Mentoring App would lead to improvements in these areas.

However, a future IQP team can evaluate whether the EDGE Mentoring App leads to better results by splitting first-year students into three groups. One group includes first-year students with disabilities who will not participate in the EDGE Program (non-participants). A second group is first year mentees who are in the EDGE Program but do not use the mobile app (participant group). Finally, a third group includes mentees who use the mobile app (participant plus the mobile app). The non-participant and the participant group are both control groups. Meanwhile, the experimental group includes EDGE mentees who will use the EDGE Mentoring App.

After splitting students into three categories, a survey can be distributed to all three groups to determine their academic performance and satisfaction in the areas of academic, social, and wellness. A future IQP team can then have the participant plus mobile app group use the EDGE Mentoring App for a certain time frame (such as one month). Then, once the time frame is over, a second survey can be distributed to all three groups. The survey will again ask about a student's academic performance and their level of satisfaction in the three areas. Then, the results of the survey can be analyzed to determine whether the participant plus mobile app group had increased levels of satisfaction and had improvements in academic performance compared to the control groups. A sample survey that a future IQP team can distribute is given in Appendix H.

7. Marketing

7.1 The EDGE App Marketing Strategy

This next section focuses on marketing the EDGE Mentoring App once it has been completed. The American Marketing Association (AMA) Board of Directors defines marketing as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large." This definition makes clear the breadth of the scope of marketing, starting from creation to delivery of value. A more business-oriented definition is offered by Mark Burgess, Managing Partner of Blue Focus Marketing, "Marketing is the process by which a firm profitably translates customer needs into revenue." Within the context of an IQP at a university, revenue as such is not the end goal, but it does bring forward the stiff challenge of needing to be valuable enough to engage busy users, and become self-sustaining. Perhaps a more compelling definition is: "Marketing is creating irresistible experiences that connect with people personally and create the desire to share with others." The hope for this app is that it inspires users to frequent usage, and ultimately, to improve their personal transition to college life.

True to the breadth of the topic of marketing, this section of the IQP report covers several phases, and is intended to be used to chart a course for the future and for subsequent iterations of the app. The primary scope of the IQP was to create a strong beginning for the app with a singular focus on the population of the EDGE participants. This focus was necessary to ensure feasible completion during the duration of the IQP and to find evidence to firmly establish the basis for the product direction. Within the duration of the IQP, before the product was finished or released, marketability was the primary consideration. However, to be complete, marketing for the app must include future plans, so the scope of this section is explicitly intended to extend beyond this time period and serve as a path forward for future projects and app development.

Marketing must also deliver against the core mission of the EDGE Mentoring Program, which is to support freshman with disabilities who are more at risk for problems upon the transition to college, and to help them develop skills that will support them throughout college. Currently, the program

participation is approximately twenty-four people, including mentees and mentors. Consider that 9.5% of children in the United States between the ages of three and seventeen years old have been diagnosed with ADD/ADHD[15]. With a typical freshman class of approximately 1,000 students, the target core user base for the EDGE program would be approximately 100 students. The EDGE program would need to grow five times larger just to serve the estimated population of ADD/ADHD students. There are also many more disabilities that could use support.

Additionally, there are many students whose disabilities do not emerge until they arrive in college. Sometimes this is due to missed diagnoses, other times they may emerge due to increased pressures and stress, or the loss of a traditional support system (such as family). It would be a great outcome if the EDGE Program were to reach these students who have unidentified disabilities (or students who may have more difficulty in transitioning into college).

For these reasons the marketing strategy is to use the app to extend the scope and value of the EDGE Program in future years into the rest of the freshman population. It would serve as a virtual mentor to engage more potential users, which would provide an opportunity to market the one-on-one personal mentoring, resulting in program expansion. Ultimately, this would make WPI a more supportive community, which is central to the core values of the university.

Looking forward, and considering the second definition of marketing above, there must be a strategy for the app to become self-sustaining. The app must ultimately be of sufficient size and scope to justify continued investment and to be properly maintained to the satisfaction of the users. The marketing strategy is shown in the following graphic, and incorporates multiple versions towards a self-sustaining future.

[15] http://www.cdc.gov/nchs/fastats/adhd.htm

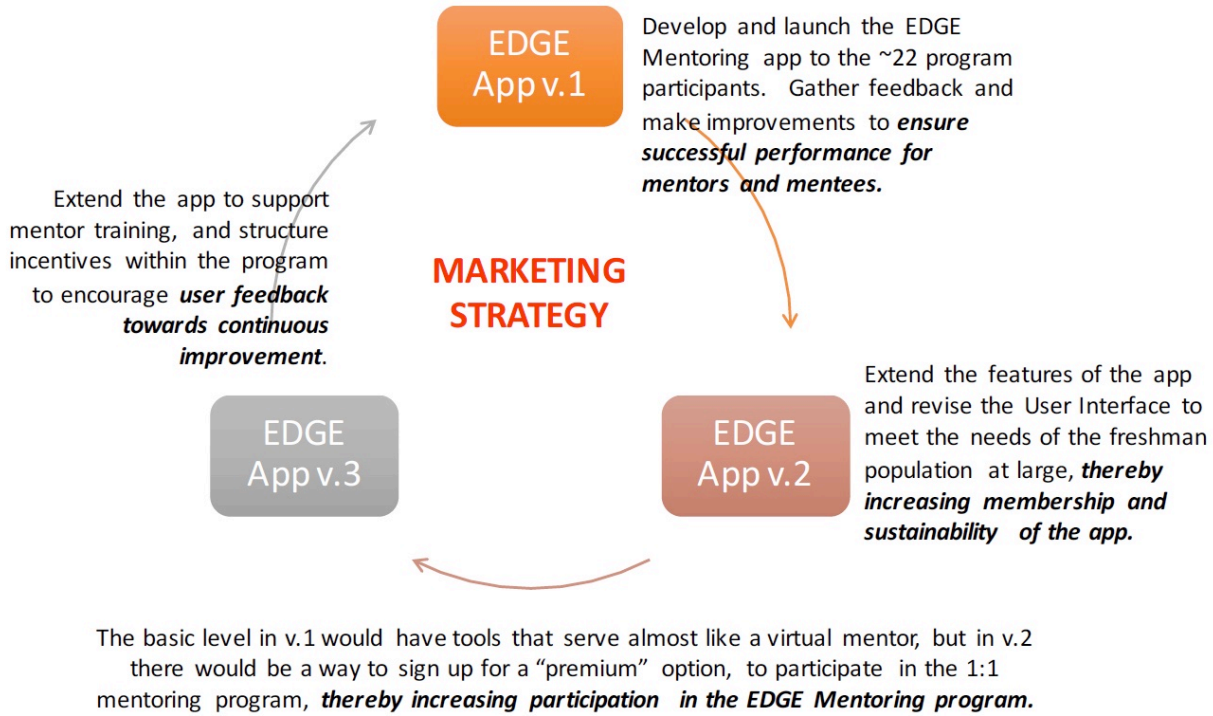


Figure 7.1. Marketing Strategy on the Path to Self-Sustainability.

To deliver against this strategy, the details were broken down into phases, collectively representing the cohesive whole for the EDGE Mentoring App. It is important to note that this IQP will deliver its findings partway through the development of v.1, with the intent that another team will finish the development and continue through these phases.

As with any product, the marketing of a mobile app requires an in-depth comprehension of the current marketplace, significant domain knowledge of mobile app development, and extensive understanding of effective marketing strategies. The marketing of a mobile app does not start once the app is complete and ready for release; it starts as soon as the idea of the app is thought of and continues all the way through the commercial launch. Therefore, a marketing timeline and plan must be created alongside the production timeline and plan to sustain a successful process.

This iteration of the EDGE marketing development followed a process as described in Table 7.1. The marketing plan can be separated into three major phases: 1) Phase 1, Development and Release of v.1, 2) Phase 2, Development and Release of v.2, and 3) Phase 3, Development and Release of v.3.

Table 7.1: The three phases in marketing

MARKETING PHASES TO REACH SELF-SUSTAINING STATUS		
Phase 1. *Development and Release of v.1*	***Phase 2.*** *Development and Release of v.2*	***Phase 3.*** *Development and Release of v.3*
• Define audience and target persona • Value Proposition Development • Marketability for EDGE Program users • Promotion/Release of v.1 including apps based marketing, App Store optimization, print based marketing, visuals, event based marketing • Networking and community marketing • EDGE Program website development	• Define expanded audience and target persona, to include all freshmen class • Value prop development for beyond-EDGE market • Marketability for expanded scope and audience, including UI changes, premium level membership, and feature extension • Expanded promotion and networking across all categories to include all freshmen class and additional university faculty	• Introduce best practices in mobile apps marketing including analytics and success metrics • Add a blog site accessible via the app to create visibility to success stories and ideas for improvement • Create a project to establish metrics for success, and measure progress, challenges, and create recommendations • If there is sufficient success, write a research paper / white paper, for publication by a peer reviewed journal as a way to increase credibility of the program and the app

7.2 Phase 1: Development and Release of V.1

7.2.1 Audience/ Target Persona

In her article, "5 Strategies to Market Your Mobile App", Ramona Neitz (YEAR) states, "You would take a very different tactic marketing a hidden jewel game to Millennials than you would marketing an

app to working moms, as these demographics would respond differently." This emphasizes the need to fully understand your audience. The team identified their audiences as EDGE mentors and mentees. However, this needed to be slightly adjusted to include other college students, both with and without disabilities, college professors, academic advisors, and university department heads. By slightly broadening the target persona the mobile app greatly increases in its marketability.

7.2.2 Define the value proposition

The value proposition correlates to reasons to believe the app will be successful. Meaning that the product in development needs to have a purpose or solve a problem in order to be successful. The field of value proposition development is very complex and has evolved over the years. To provide a flavor of the complexity, consider the following definition taken from a literature review:[16] "Customer value is 1) interactive; 2) relativistic: a) comparison of objects, b) differs between persons, c) situation dependent, 3)embodies preferences; 4) is attached not to the object itself but rather to the relevant consumption experience." So value propositions can be as complex as one wants; it cannot be an exact science. By using this framework the goal for this project was not to over analyze the value to the users, but to have a right sized definitional structure so the development of the features is well justified and understood. To that end, an older definition from the same report but which is more useful for this project's purposes is: "The five values influencing market choice behavior are functional value, social value, emotional value, epistemic value and conditional value" (Sheth, Newman, and Gross, 1991)[17] .

The team discovered through surveys that some students at WPI struggle with different aspects of college that the EDGE Mentoring App focuses on (academic, social, and personal wellness). Based on these survey results, these challenges are consistent with the five values listed by Sheth, Newman and Groos. In the Table 7.2, the problem statement is expressed as well, for context and clarity about how the

[16] "Reviewing customer value literature: Comparing and contrasting customer values perspectives," Aija Paananen, Marko Seppänen, *Center for Innovation and Technology Research (CITER), Tampere University of Technology (Finland)* 2013.

[17] Ibid. (Aija Paananen, Marko Seppänen, 2013)

value is derived. This understanding of value proposition is enough for early app development, but continued insights gathering is recommended for depth of understanding and continuous improvement of the app.

Table 7.2: Audiences that the App reaches and their value in the market

Target Audience	Problem statement	Value Proposition
College students, without disabilities	College workload and new lifestyle necessitates new organizational and academic approaches and changes to social and personal wellness habits.	Academic, social and personal wellness features in the app reduce confusion and increase time efficiency by putting the most typical needs at the finger tips of users.
College students, with disabilities	Along with the normal changes a college student faces, students with disabilities must first come to terms with the extent of their disabilities and what it means in college, and then must learn how to find and utilize assistive resources provided by the university.	High visibility outreach that offers a judgment free zone; education and resources for multiple disabilities will make these extra challenges less isolating and overwhelming.
College Professors	Students lack of organization is frequently a major factor that interferes with what would otherwise be academic success.	An organizing system to manage classwork and grading for their different classes in one digital location allows more time for learning and reduces anxiety.
Academic Support	The large number of students who need academic support in their first year is challenging.	A well-designed app providing organizational and mentoring support allows staff members to focus more on the students with less common needs.

7.2.3 Marketability

As the product is developed, decisions must be made in consideration of the marketability of the product to ensure its ultimate success. This includes understanding the voice of the customer, the product in depth including features, tools and technical development, and any underlying substantiation that can be used in the marketing effort.

The first stages of marketing happened as the team determined the needs of the EDGE Mentoring Program and conceptualized the value of the app. The literature review yielded significant independent findings about the value of the EDGE Mentoring Program, which remains at the heart of the success of the app. Next, the team developed, executed and analyzed the survey. This provided original data for use not only in developing the first phase of the app, but also for subsequent phases of the marketing effort. Marketability required analyzing the concepts that the team had come up with for the initial product design and providing feedback about prioritizing value. These concepts were used to create the identity of the mobile app. Establishing this identity required several meetings and included research on visual design, icon development and user interfaces.

The mobile app identity can be defined as a productivity enhancer focused on assisting EDGE mentors from WPI with their EDGE mentees, and eventually the freshman population as a whole. The mobile app focuses on easing the transition into life in college within three main areas of focus: academic, social, and personal wellness. This identity enabled the team to develop the mobile app, its functions and tools while ensuring its marketability.

Continued work on marketability focused on aligning features with the value propositions identified for the target users and audience. Features and external apps were brought forward for consideration by the team, and additional discussions happened with the clients before final decisions were made. A concise list of the features and external apps that were selected for the EDGE app v.1 is included in Chapter 4. There were a number of additional features that were considered but not feasible. The next IPQ team would prioritize the additional work that needs to be done prior to releasing v.1.

7.2.4 Promotion/Release of v.1

Although the first version of the EDGE Mentoring App will be limited to a small number of users, there are still many ways to promote and market its value. A marketing effort by the EDGE Program to publicize the introduction of a new app in support of the mentoring program is very important and will be addressed to all of the target audiences for whom there is an inherent value proposition.

The main goal of v.1 is to increase the value of the existing EDGE Program and to make the faculty aware of the improvements as a way to start to grow the mentoring program. The following promotional activities should occur after version 1 of the EDGE Mentoring App is released.

- **Placement in the App Store.** It is important to feature the app well within the App Store, and also to pay fees to be included and advertised in others' mobile apps. Choices must be made regarding the App Store category, software complexity, and functionality. The EDGE Mentoring App would fall under the Productivity or Education category in the App Store. The software complexity has been established as moderately complex due to the limited time allowed for this version of the app. A plan should be put in place to field comments or needs from users as soon as the app is made available, and to encourage positive reviews and resolve bad ones.
- **EDGE Program website development.** Because the app is built around the EDGE Mentoring Program, users will expect to see some consistency or at least a relationship between the app and the WPI maintained EDGE website. For v.1, the website should add some tabs to include educational content, program value, and directions on how to participate. The website should also feature the usefulness of the new app as a benefit for program members. It is recommended to start a blog at this stage because even a small amount of interactive feedback from users will be important to create credibility and a healthy dialogue before growing to v.2.
- **Digital Marketing.** Digital marketing for v.1 should be focused on adding content related to the EDGE Program and their core mission, and building the digital structure to engage users via email and text. The EDGE Mentoring App should be heavily featured on the WPI website where the mentoring program is described. Additionally, the app should be marketed via several other WPI departments including at a minimum, Admissions, Academic Support, and the Office of Disability Services. Digital marketing using other mobile platforms is a very heavy investment and learning curve; it subjects the app to heavy visibility, and is generally used when wide uptake

is desired. Therefore, Twitter, Facebook and Instagram are recommended after v.1 has received sufficient feedback to debug the features and ensure satisfaction with EDGE users.

- **Print based marketing.** Hard copy materials should be developed in a postcard and flyer format for use in orientation tours, bulletin boards, various department offices, and numerous events throughout the year. Additionally, the development and release of the EDGE Mentoring App should be featured in several relevant WPI newsletters.
- **Event based marketing.** There are a plethora of events throughout the WPI academic calendar. A systematic review should yield a list of events where the postcards and flyers would be appropriate, and distribution should be arranged. There are also likely to be multiple speaking opportunities at events such as Parent's Weekend.
- **Networking and community marketing.** Hard copy postcards and flyers should be emailed to various student clubs and professional societies that are more likely to be aligned with the value of the EDGE Mentoring App and program. Additionally, personal representation at the club meetings would make more of an impression than hard copy materials and could lead to partnerships and endorsements.

A secondary but also very important goal in the release of v.1 is the opportunity to test the value of the app with a small population and capture insights to be used in v.2 developments. This is an excellent opportunity for refinement before a widespread launch to the larger freshman student population. In marketing, this is called Voice of the Customer (VOC). The survey work that was done as part of this IQP qualifies as one of the methods of VOC, but the best marketing strategies include continued VOC activities to ensure the adaptability of the product and the opportunity to differentiate against the competition. According to one of the leading VOC firm's, Qualtrics:

> "The voice of the customer is best heard as an ongoing conversation. The key to creating an effective VoC program is to gather and use information in a timely way that helps you to improve. Organizations often have multiple touch points with the customer that occur all across the organization, including sales, support, warranty and accounting interactions."[18]

Therefore, it is essential that the marketing plan include the capture of additional VOC insights via surveys, interviews and possibly focus groups after the app v.1 is developed, to provide inputs to v.2. It is recommended as part of the marketing strategy and also as a direct input to app development, that a future team leverage the work that was done in this IQP to get additional and updated input from mentors and mentees. An interview process should be sufficient to gather input about v.1 from university faculty members that are familiar with the app. Faculty members are a critical set of stakeholders and will identify opportunities, strategies, and necessary improvements beyond what the users identify.

7.3 Phase 2: Development and Release of V.2

7.3.1 Audience/ Target Persona

The most significant thing about EDGE Mentoring App version 2 is that it will go beyond the initial audience to serve the entire freshman population. As the team has learned from the literature survey, there are many students that do not anticipate the needs and struggles they are going to have when they leave home and go to college. For students with disabilities it is even more severe of a challenge. The team has also learned that being more proactive with mentoring is proven to be more effective (see Table 1-1 in the Literature Survey section of this report). So the extension of the EDGE Mentoring App to include students that are not in the program is in keeping with evidence that reaching out through mentoring is helpful. It is certain that there are many more students that would benefit from the app and also from the mentoring program than those who are currently participating. In essence, marketing the app to a broader audience will serve to market the EDGE Mentoring Program to a larger population.

[18] http://www.qualtrics.com/research-suite/voice-of-customer/

It is important to note that the goal to expand the EDGE Mentoring Program needs to be validated by future IQP teams and their clients. For the purposes of this Marketing Strategy towards fulfillment of the scope of the IQP, it is reasonable to assume that future teams and clients would see the growth of mentoring at WPI as a good thing, but there is no guarantee of any future decisions. What is clear based on this strategy is that growth of mentoring as well as the quality of mentoring, as a direct result of the EDGE Mentoring App, is possible, and a logical substantiated path forward is described. However, it is important to be sure that the core elements of the mentoring program can be expended to accommodate the growth.

One critical example is that there must be sufficient mentors to serve roughly the same number of mentees. This means that the marketing plan should also include marketing to the target audience of mentors as well as mentees, and should include faculty personnel who may be able to identify likely mentors and engage them in the program. It is useful to refer once again to the literature survey, which indicates the motivations of mentors, and provides evidence of which aspects of mentoring they value most. (Beltman and Schaeben, 2012) This suggests that v.2 of the app, which will promote the benefits of 1:1 mentoring and will provide a path to engage in the program, should also provide testimonials of mentors and data on the positive aspects of altruism, communication skills, leadership, confidence, and social connection. Similar testimonials and evidence should be provided to attract mentees. While the marketing can support growth of the mentoring program, the faculty and staff members who support it must also be aligned with growth that should come with the increased use of the EDGE Mentoring App.

7.3.2 Marketability for Expanded Scope and Audience

Extension of apps from a basic level to a premium level is common practice, and sometimes necessary for continued development. That said, it is also well known that there is some resistance in the user base for paid apps. The Apps-builder website[19] summarizes the differences between Free and Paid apps across multiple factors in Table 7.4.

[19] http://blog.apps-builder.com/paid-vs-free-apps/

Table 7. 4: Apps Builder View of Paid vs. Free Apps

	PAID	FREE
Competition	Quality based. Done in niche markets.	Quantity based. Mostly done for bulk apps.
Value of Leads	High	Low
Expectations	Users assume the app has high value and quality	Users have not prior assumption of app (excluding screenshots and description)
Likeliness to be Downloaded	Less likely	More likely
Engagement	More like that: Downloads = Users	More like that: Downloads = Users
Download Loop	Paid acquisition loop	ASO loop

Consideration of these factors is very important as the choices are made to develop a premium level and a premium plus level for the EDGE Mentoring App. The resources available and the cost/benefit scenarios are also a primary factor. Therefore, the features and value shown in the EDGE Mentoring App's Growth Plan shown in Figure 7.2 should be reconsidered at a later stage by a future team, and wherever possible, the value in relation to cost should be investigated in VOC activities with customers, as discussed above.

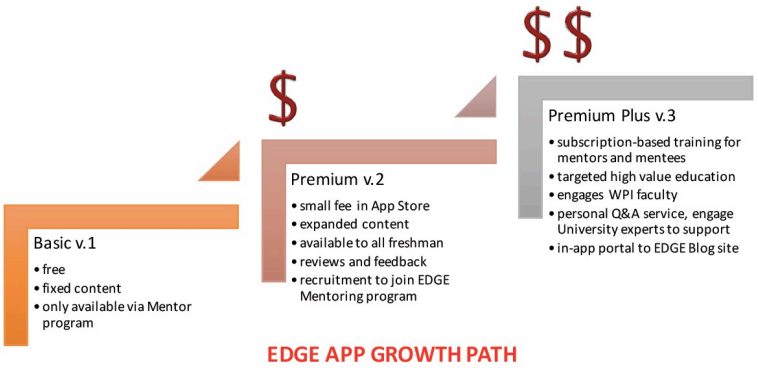


Figure 7.2: Multi-Year Growth Path of the EDGE App

Starting with a smaller scope and extending the content laterally and with more depth over time is a well-established method to ensure success in the marketplace. The second version of the app will continue to provide support for the challenging transition issues that were defined in version one (academic, social, and personal wellness), but importantly, it will also provide examples and data about the EDGE Mentoring Program as a way to encourage students to participate in the program. A premium level of membership for a slightly larger cost from the App Store would give the student access to more features, and would be an opportunity to create a dialogue about whether 1:1 mentoring would be valuable, and a place to sign up or request a personal information session. Ultimately the app could grow into a true home for a deeper mentoring program, which would likely have measurable impacts on the success of the freshman classes. The path to growth, and increased value is shown in Figure 7-2.

7.3.3 Expanded Promotion of EDGE App v.2

Extending to the larger population also means that broad-based publicity will be needed, as is typical of mobile apps that strive to have a right-sized following for ongoing success. In addition to the marketing efforts that have been described for v.1, there are multiple strategies that should be added to support and realize the growth.

There are a great number of marketing resources available. Many of them are focused on apps that require commercial success and revenue. For the purpose of this project, the team needed a plan that is enough for success but not so overwhelming as to confuse or slow progress. In "The Success Secrets of the Online Marketing Superstars" by Mitch Myerson, Chapter 3 provides a right sized structure for the EDGE Mentoring App's marketing plan (Myerson, 2015). In Chapter 3, John Jantsch offers seven essential stages for "Total Online Presence." The first stage includes a content platform with good educational content, which has already been recommended for v.1 of the app and is also reachable by way of the website. It is important in the content platform to provide independent and credible information as a means to create trust with the user base. Also important and recommended for v.1 is a blog.

7.3.4 Mobile App Marketing

Now that there is a wider audience for v.2, it is time to expand into a broader digital presence. This first IQP for the app appropriately focused primarily on building the first app and providing a strategic path forward. Assuming that this app and this topic gets taken forward into future IQP's, the second and third years will need to have dedicated resources for marketing. In addition to IQP team members doing much of what is described herein, it will be important to maintain an active presence at a staff level for this to work because IQP teams are intermittent.

One of the first priorities is to generate leads by developing a Search Engine Optimization (SEO) approach. Jantsch explains that SEO success includes content, keywords, links, social media and more. He recommends the following steps as a means to build a strong local search presence.

(1) Make your web pages scream local

(2) Claim and enhance your local search profiles

(3) Participate in the ratings and reviews game

(4) Update your listings and citations

(5) Own a social networking group

For the purposes of the EDGE Mentoring App, examples on how to follow up on this advice include providing detailed connections to opportunities on the WPI campus with WPI clubs, staff and faculty. A social networking group for Facebook should be started at this phase and actively maintained. An attempt should be made to have active participation by users of the EDGE mentoring community.

On the Search Engine Land website[20], the periodic table of SEO success factors (see Figure 7-3) breaks down the difference between on-the-page SEO and off-the-page SEO. On-the-page includes

[20] http://searchengineland.com/seotable/download-periodic-table-of-seo. Copyright, Third Door Media.

content, architecture, and HTML. Off-the-page includes trust, links, personal, and social. These descriptions could be considered as a logical way to subdivide future IQP task areas.

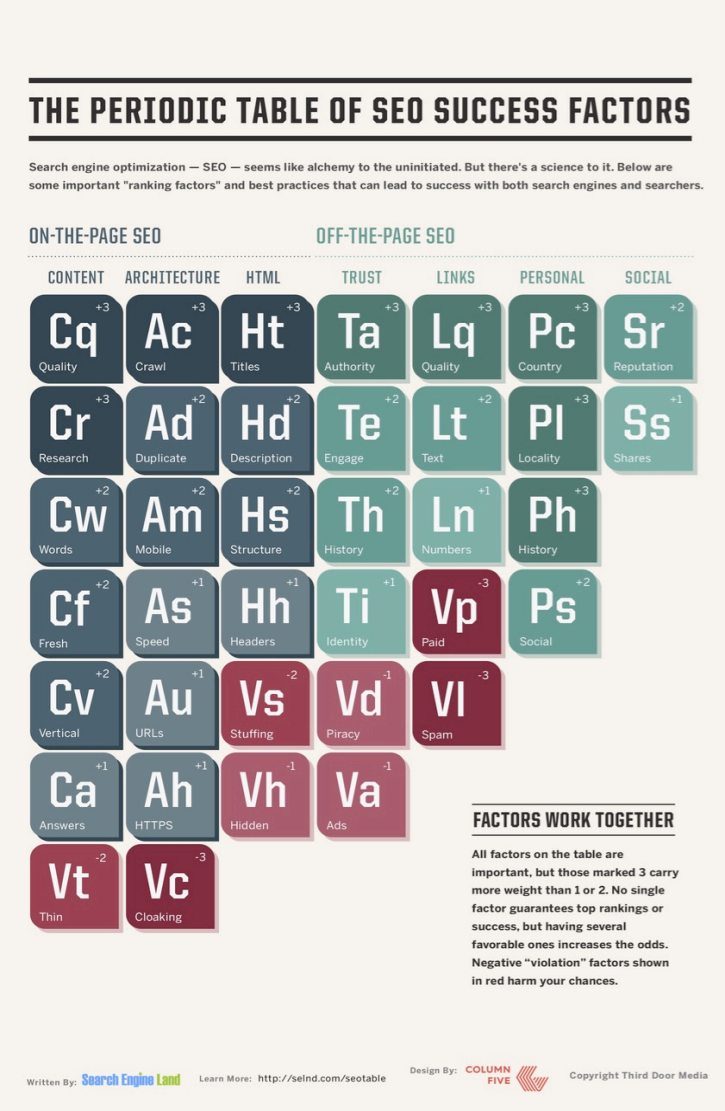


Figure 7-3. Periodic Table of SEO Success Factors.

One of the things that was emphasized throughout the marketing literature is the importance of trust. With a primary purpose of providing support to students with disabilities, trust is a make-or-break element of the EDGE Mentoring App. One way to create trust is to provide literature and evidence to support the importance of mentoring and the various strategies that are being provided by the apps and tools. It is also very important to have humans accessible behind the app. The response rate and email

and text communication is an important factor if the team wants users to have a good experience with the app and with the EDGE Program.

More importantly, it is useful to characterize an ethical and service-based culture within the mentoring program and specifically within the app. At the heart of success for any venture, are the authentic intentions of the people involved. Going back to one of the most timeless and respected authors on this topic, Dale Carnegie, describes the essentials of engagement with the following quote: "You can make more friends in two months becoming more interested in other people then you can in two years by trying to get people interested in you" (Carnegie and Associates, 2011).

The book from Dale Carnegie and Associates, "How to Win Friends and Influence People in the Digital Age, puts that quote into context: "Carnegie's assertion remains relevant, albeit counterintuitive, because it reminds us the secret to progress with people is a measure of selflessness swept under the drift of the digital age" (Carnegie and Associates, 2011).

This more recent work promotes Carnegie's original ideas and core values of caring about others, leading others a little better off, being humble, sharing credit, being positive, and magnifying improvement, to name a few. The book also acknowledges the unfortunate fact that in our current society it's very easy to get noticed with bad behavior and egregious choices. In the end, however, longstanding success cannot be separated from authentic value, and the marketing culture must reflect that. Considering this in the context of the current age, the follow quote seems apt:

> "This is the scale on which everyone of your interactions is judged every tweet, post, email, call, and tangible encounter to which side does your scale tip and each encounter – toward more value or less value? To which side does your scale tip overtime? That is perhaps the more important question because we all make mistakes." (Carnegie and Associates, 2011)

In order to effectively market v.2 and get to the goals stated above, it will be necessary to develop a Social Media Strategy. Kim Garst, internationally recognized founder and CEO of Boom!Social, provides guidance on this topic by emphasizing that the choices must be thoughtfully considered, because there are many options and it's easy to waste money without securing the rewards. She submits that the five foundational factors that should be taken into account are: (1) budgeting, (2) education, (3) allocation of work, (4) ideal client analysis, and (5) competition (Myerson, 2015). For the EDGE Mentoring App, funding will be a make or break factor. It is hoped that a grant can be secured to move forward with future iterations of the work. It will be necessary for future teams to evaluate the multiple strategies as the tool evolves, considering the cost and availability of the people. So allocations of staff must be done in a way that ensures the ongoing maintenance of the app over time, whether it includes students, staff or faculty.

The details of the Social Media Strategy are best left to future teams, and they must consider the way that features continue to develop and the continued insights that are gathered. That said, of all the many digital marketing opportunities, there are some that are necessities. In "Twitter Power 3.0" the authors Joel Comm and Dave Taylor describe how to build a following on Twitter, how to leverage Twitter for team communication, and most importantly, how to leverage Twitter to drive follower behavior. Building a following is not as simple as just trying to get bigger numbers. What is more important is getting the right kind of follower.

> "The balance that you create between a highly targeted group of enthused, engaged Twitter followers in a more general, less involved crowd will often end up based on instinct, the feeling that you have about your chances of bringing in people with only a slight interest in the topic. That feeling comes from experience from understanding of your subject it and its audience" (Comm and Taylor, 2015).

Clearly, the metrics for success using Twitter are not as simple as quantity. The evaluation of success must include the depth of interest in mentoring, disability, EDGE, and other closely related

topics. Getting followers beyond the WPI campus who are experts in these fields would be a great goal, because those experts are what will make the local work more relevant and accepted, and will bring some excitement into the community.

7.4 Phase 3: Development and Release of V.3

- Introduce best practices in mobile apps marketing including analytics and success metrics
- Add a blog site accessible via the app to create visibility to success stories and ideas for improvement
- Create a project to establish metrics for success, and measure progress, challenges, and create recommendations
- If there is sufficient success, write a research paper / white paper, for publication by a peer reviewed journal as a way to increase credibility of the program and the app

For example, one of the highest priority strategies is Social Media. Today's society spends massive amounts of time every day on social media and according to the Pew Research Center, 82% of online adults ages eighteen to nineteen use Facebook, and 70% of Facebook users visit the site on a daily basis (The Demographics of Social Media Users, 2015). This being said, it would be extremely useful to utilize the advertising tools available through social media outlets in order to attract more publicity. Once this publicity is gained though, potential users will need to be convinced to use the EDGE Mentoring App.

This can be achieved through many approaches including one technique that Steve Olenski of Forbes.com calls, "ASO: App Store Optimization." ASO focuses on catching potential users attention by using crisp icons, clean and professional preview photos, effective search tags, and categorizing (Olenski, 2015).

The majority of the work involved for expanded promotion, including strategies such as marketing retention, updates and press releases, will be handled by future teams.

8. Conclusion

8.1 A Summary of the Findings in this IQP Project

In this IQP project, the team designed the initial iteration of EDGE Mentoring App. This app can be used by mentors to easily assist first year mentees with resources in areas of academic, social, and personal wellness. Through developing the "skeleton" for the EDGE Mentoring App future project teams will be able to build off of it. For the final prototype of the mobile app, the team developed a splash screen, a landing page that describes how to use the mobile app, and the user interface that includes the main menu and the submenus to add and search for resources. The team also included social, academic, and personal wellness tools into the mobile app. Nevertheless, the features that were included in this iteration can be expanded upon.

In developing the EDGE Mentoring App and in completing this project, the team went through a series of steps. For instance, the team identified the project's objective and researched literature that would aid us in designing an app for EDGE mentors. The literature that was gathered included information on mentoring programs, the transition from high school to college, mobile apps that are used by college students, and steps that are required in mobile app development. The team also performed a literature review on the Android and iOS operating systems, on Swift versus the Objective-C programming languages, and on guidelines for designing an app on an iPhone (Apple's Developer Guide). After performing the literature review, the team then set out to identify features that EDGE mentors would like to see in an app and features that would be most useful for first year mentees. To achieve this task, the team collected research data on the EDGE mentors and mentees.

Based on the research data, the team identified a list of features that would helpful to include in the mobile app. We also presented these features to the clients and the clients recommended that the team should include specific features into the mobile app. The team then focused on developing the user interface for the mobile app, and created hand written and computer sketches of how the app would look like. These sketches were presented to the clients and they provided the team with feedback. In designing

the user interface for the mobile app the team was unable to show these sketches to the users (the EDGE mentors) but recommendations from the clients and from the background literature were used.

After designing the user interface, two of the team members coded and developed the mobile app. They added a main menu along with submenus in the EDGE Mentoring App. Additionally, they added a splash screen (which displays a logo while the app is loading) and a landing page to the app. The team also implemented a list of tools and resources (such as videos, articles, and external mobile apps) into the EDGE Mentoring App. In this IQP project, the team was able to provide future teams with a foundation in which they can build off of. For instance, a future team can add more features to the app or they can take the app in whatever direction they see fit.

In addition to identifying the project objective, researching literature, gathering and analyzing data, and working through the app development process, the team also sought out to determine the costs versus the benefits of the EDGE Mentoring App and of the EDGE Program. For instance, the team listed all of the costs and benefits of the EDGE Program and the EDGE Mentoring App. Then, the team tried to place a monetary value to each of the benefits and the costs and tried to provide as much quantitative data to support each benefit and cost. However, there is further work that a future IQP team can focus on to more completely quantify the costs and benefits of both the EDGE Mentoring Program and the EDGE Mentoring App.

Lastly, the team performed a literature review on the marketing aspect of the project. The marketing aspect will help future IQP teams to draw a broader range of users who will use the mobile app. For instance, before the final version of the EDGE Mentoring App is completed a marketing plan needs to be set in place. An effective marketing strategy will allow for wider adoption of the EDGE Mentoring App. In this project, the team identified steps that are associated with a marketing plan such as defining a value proposition.

8.2 Recommendations for Future work

One recommendation that the team has for future IQP teams is to begin the process of collecting data earlier. For example, Laura Rosen sent an email advertisement for the mentor survey on October 7th, which was toward the end of A-term. The team also provided Ms. Rosen with an email advertisement to send to EDGE mentees on October 30th (during the beginning of B-term). However, gathering data earlier would have allowed the mobile app development process to begin sooner. For example, the team developed the survey and submitted the IRB for approval on Saturday, September 26th. The team then obtained approval on Wednesday, September 30th for the mentee and mentor surveys. However, by designing the survey and completing the IRB form during the first week of A-term, future IQP teams can gather data sooner.

Moreover, there is also a method to increase the response rates for the mentor and mentee surveys[21]. For example, the team should have provided an incentive, such as a $5 gift card to each survey participant. Similarly, instead of a gift card, the team could have provided one participant with a raffle prize (i.e. a $25 gift card to the campus bookstore) for participating in the survey. In conducting the surveys, the team was unsure whether to give a raffle prize or gift card because the surveys were designed to be anonymous.

Another option to receive responses from both mentors and mentees is to have them fill out a survey in the initial and/or final few weeks of the EDGE Program. The ODS staff would hand out these surveys when the whole group is together. For instance, there is a time in the program when the mentees write a letter to their future selves about the expectations they have for their freshmen year. This would be a great opportunity to use that time for decision of any struggles that the mentee is facing within the categories of academic, social, and personal wellness. It also is a chance to receive feedback and suggestions for improvement.

[21] Six out of twelve mentors responded to the mentor survey, and four out of twelve mentees completed the mentee survey.

A third recommendation that the IQP team has is to begin the app development process sooner in the project. For instance, the team began designing the mobile app in the beginning of B-term, and the coding began during the second week of B-term. However, in this project the team only had two computer science majors and thus it was a challenge for them to finish coding the mobile app under a very tight time window. After completing this project, the team recommends that a future IQP team should begin designing the main page of the app and coding the app towards the end of A-term (during the fifth or sixth week of A-term). Additionally, much of the literature that was important for mobile app development (such as the steps in developing an app) was found during the middle and end of A-term (during weeks five through seven). However, this IQP team suggests that future teams should collect this literature during the beginning and middle of A-term (during weeks one through five) if they plan to finish the project over a two term time frame. This would allow a future team to begin coding the mobile app earlier in the process.

A fourth recommendation that the team has is to assess the benefits versus the costs of adopting the EDGE Mentoring App. For instance, will the EDGE Mentoring App lead to an improved performance in student satisfaction or will it lead to better outcomes in the areas of social, academic, and personal wellness. A future team can assess this by distributing the mobile app to a group of EDGE mentors for a specific time frame (i.e. 2 months). Then, a future team can assess whether the mentees (of the EDGE mentors who use the mobile app) have better outcomes compared to a control group (which does not use the app).

A future team can also perform more detailed work on the costs versus the benefits of the EDGE Program. In this IQP project, the team quantified one of the benefits of the EDGE Program, which was an increase in student satisfaction. However, a future team can assess whether the EDGE Program leads to benefits in the categories of social, academic, and personal wellness by distributing a survey. The survey, as mentioned in the cost benefit analysis section, can be for first year students with disabilities who are not in the EDGE Program versus first year EDGE mentees.

A sixth recommendation that the team has is to incorporate more concepts in visual design into the mobile app. In this project, the team was unable to incorporate aspects of visual design, such as animations and graphics. The team was also unable to read through all of the Human Interface Guidelines that Apple has developed in the iOS library. We recommend that if a future team continues completing the app on the iOS platform that they should read through all of the iOS Human Interface Guidelines. These guidelines provide viable tips on how to design a mobile app that users will find accessible and easy to use.

The last recommendation that the team has is to show the mobile app to the users (the EDGE mentors). In this project, while the team did show sketches to the clients and faculty advisors, we were unable to show the user interface, the splash screen, or the landing page to the EDGE mentors. This is because peer mentors had busy schedules and it was difficult to arrange a time to meet with them. However, gaining feedback from users is an important step in developing a mobile app because it allows programmers to make adjustments and improvements to the app.

8.3 Reflection

There were important lessons to be learned during this project. For instance, the team never realized that it could be difficult to research data from students, especially in the form of focus groups and interviews. As the project progressed, collecting data turned out to become a major obstacle. Once the project progressed during the middle of B-term, the team realized why students were not able to participate in the research. A reason is that WPI's curriculum is fast-paced and rigorous. Additionally, students have commitments, such as athletic teams, work-study, and research projects that are outside of the classroom. Therefore, they may have little time to participate in research, even if it takes thirty to forty minutes to collect data.

Additionally, the team learned how to work effectively in a group setting. For example, the team learned how to handle a situation in which a group member was unable to attend some of the meetings. Initially, the IQP group was unsure how to approach this problem. However, through communication, the

team learned that the team member had a health condition. The group member apologized for not being able to attend some meetings, and explained his health problem. By setting up a different meeting location and by finding a way to distribute the work, this obstacle was solved. Through this situation, the team learned the importance of addressing conflict in group projects in a respectful and direct way.

There were also some lessons in the technical development of the app. For example, the team had conflicting views on the style of coding which needed to be worked out. The team ended up with a compromise between the two styles. We tried not branching much and used a master branch and a development branch. This caused less than ideal sync in working in the development process together. It ended up working out fine but most of the time when one person would work on the app another person would not because the two developers had very different schedules. Although this worked out fine in this project, it is not a recommended tactic.

A fourth takeaway from this project was learning about each group member's role in a team of five. With five group members it was difficult in the beginning to figure out who was going to do what. At some points in the initial stages of this project it felt like some group members were doing more work than others. This might have been because group members were stronger in certain aspects such as research or writing.

An additional lesson that the team learned from the project is that time went by fairly quickly during this project. For instance, the team had around two terms to develop a mobile app for mentors. Meanwhile, most on-campus IQP projects at WPI are three terms long, which allows the work to be spread out more. However, since this IQP project was two terms the team had to work on writing the paper and developing the mobile app in a tighter time frame. Thus, the team had to sometimes work on coding the app and on writing the paper for long time durations because of the project deadline. Looking back on this project, having an IQP project that was two terms long was somewhat more challenging. For instance, in a three term IQP project, the team would be able to take more breaks in writing the paper and in coding the mobile app.

A sixth area that the team wanted to reflect on was the scope of the project. During the beginning of the IQP project in A-term, the team spent a lot of time in trying to determine the scope of the project and in who we were going to develop the app for. For instance, the team did not know if the app was going to be for mentors or mentees. The scope of the project seemed to be more open-ended because the mobile app could also be for all incoming freshmen at WPI, and not just students in the EDGE Program. However, once the team defined the scope during the third week of A-term, the project seemed to go more smoothly.

Another piece that the team wanted to reflect on was the issue of tasks that needed to be completed. For instance, in the IQP project, the team had an idea of who would be developing the mobile app and who would be working on the paper. Overall, the team felt that we were able to communicate with each other on who would complete a certain task. However, sometimes it was unclear on who would finish an action item, such as writing a section in the paper or developing a feature in the mobile app. In these cases, a team member would complete the action item. Looking back on the project, it was a little challenging in delegating tasks between team members but the team was able to get better at this as the project progressed.

The last piece of reflection that the team would like to add is that all the group members had a vision for how the app would turn out. For instance, the team wanted the app to have an impressive visual design and extensive functionality. Overall, the team did feel that the app turned out well. Although we hoped that the app would contain more features, the team feels that the app provides a solid foundation for future projects. Additionally, as mentioned in the recommendations for future work, the team felt the app development process should have began during the end of A-term (rather than the beginning of B-term). This would have helped the team greatly by providing a longer time span. However, we do feel that the finished prototype turned out well especially considering the time constraints in the project.

Works Cited

A Practical Guide to Design and Develop an iPhone App. (2014, February 4). Retrieved October 15, 2015.

Android vs. iOS: Mobile App Development. (2014, April 18). Retrieved October 1, 2015.

Armstrong, K., Semple, J., & Coyte, P. (2014). Replacing Ambulatory Surgical Follow-Up Visits With Mobile App Home Monitoring: Modeling Cost-Effective Scenarios. *J Med Internet Res Journal of Medical Internet Research*. Retrieved October 8, 2015.

Beltman, S., & Schaeben, M. (2012). Institution-wide peer mentoring: Benefits for mentors. *The International Journal of the First Year in Higher Education, 3*(2), 33-44. Retrieved September 21, 2015.

Brown, K. (2014, February 4). HTG Explains: What Is GitHub and What Do Geeks Use It For? Retrieved November 25, 2015, from http://www.howtogeek.com/180167/htg-explains-what-is-github-and-what-do-geeks-use-it-for/

Budny, D., Paul, C., & Bon, L. (2006). The Impact Peer Mentoring Can have on Freshmen Students. doi:10.1109/FIE.2006.322596

Bulygo, Z. (n.d.). Master Mobile Marketing: 35 Resources to Help You Maximize Your Apps Visibility. Retrieved December 17, 2015, from https://blog.kissmetrics.com/master-mobile-marketing/

Choi, J., Lee, W., & Rhee, P. (2013). Cost-Benefit Analysis of Electronic Medical Record System at a Tertiary Care Hospital. *Healthcare Informatics Research, 19*(3), 205-214. Retrieved November 2, 2015.

Comm, J., & Taylor, D. (2015). *Twitter Power 3.0, How to Dominate Your Market One Tweet at a Time*.

Hoboken, NJ: John Wiley and Sons.

Connor, D. (2011). Actively navigating the transition into college: Narratives of students with learning disabilities. *International Journal of Qualitative Studies in Education, 25*(8), 1005-1036. doi:10.1080/09518398.2011.590158

Dholakiya, P. (2015, May 5). 3 Essentials for Marketing Your Mobile App. Retrieved December 17, 2015, from http://www.entrepreneur.com/article/245780

Duggan, M. (2015, August 19). The Demographics of Social Media Users. Retrieved December 17, 2015, from http://www.pewinternet.org/2015/08/19/the-demographics-of-social-media-users/?beta=true&utm_expid=53098246-2.Lly4CFSVQG2lphsg-KopIg.1&utm_referrer=https://www.google.com/

Getzel, E., & Thoma, C. (2008). Experiences of College Students With Disabilities and the Importance of Self-Determination in Higher Education Settings. *Career Development and Transition for Exceptional Individuals,* 77-84.

Gowin, M., Cheney, M., Gwin, S., & Wann, T. (2015). Health and Fitness App Use in College Students: A Qualitative Study. *American Journal of Health Education, 46*(4), 223-230. doi:10.1080/19325037.2015.1044140

Guidelines for Conducting a Focus Group. (2005). Retrieved September 12, 2015, from http://assessment.aas.duke.edu/documents/How_to_Conduct_a_Focus_Group.pdf

Heiman, T. (2006). Social support networks, stress, sense of coherence and academic success of university students with learning disabilities. *Social Psychology of Education, 9*(4), 461-478. doi:10.1007/s11218-006-9007-6

Hermann, C., & Burbary, K. (2013). *Digital Marketing Analytics, Making Sense of Consumer Data in a Digital World*. Indianapolis, IN: Que Publishing.

Hines, K. (n.d.). How to Market Your Mobile App. Retrieved December 17, 2015, from https://blog.kissmetrics.com/how-to-market-your-mobile-app/

Hoff, J. (2013, March 30). Engaging Students with a Mobile App. Retrieved September 27, 2015.

How much does an app cost? (2014, April 12). Retrieved October 15, 2015.

How to Programmatically check and open an existing app in iOS 8? (2015, May 21). Retrieved November 25, 2015, from http://stackoverflow.com/questions/30365526/how-to-programmatically-check-and-open-an-existing-app-in-ios-8

iOS Human Interface Guidelines: Color and Typography. (2013, September 18). Retrieved November 6, 2015, from https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/ColorImagesText.html#//apple_ref/doc/uid/TP40006556-CH58-SW1

iOS Human Interface Guidelines: Designing for iOS. (2013, September 18). Retrieved November 5, 2015, from https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/index.html#//apple_ref/doc/uid/TP40006556-CH66-SW1

iOS Human Interface Guidelines: Icons and Graphics. (2013, September 18). Retrieved November 6, 2015, from https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/Iconography.html#//apple_ref/doc/uid/TP40006556-CH59-SW1

iOS Human Interface Guidelines: Navigation. (2013, September 18). Retrieved November 7, 2015, from https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/Navigation.html#//apple_ref/doc/uid/TP40006556-CH53-SW1

iOS Human Interface Guidelines: Starting and Stopping. (2013, September 18). Retrieved November 5, 2015, from https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/StartingStopping.html#//apple_ref/doc/uid/TP40006556-CH52-SW1

iOS Human Interface Guidelines: Terminology and Wording. (2013, September 18). Retrieved November 6, 2015, from https://developer.apple.com/library/ios/documentation/UserExperience/Conceptual/MobileHIG/FeedbackCommunication.html#//apple_ref/doc/uid/TP40006556-CH56-SW1

Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good practice in the conduct and reporting of survey research. *International Journal for Quality in Health Care, 15*(3), 261-266. Retrieved September 14, 2015.

Kimbrell, G. (2014, July 18). Five Killer Marketing And Distribution Strategies For Your App. Retrieved December 17, 2015, from http://www.forbes.com/sites/theyec/2014/07/18/five-killer-marketing-and-distribution-strategies-for-your-app/

Kitzinger, J. (1995). Qualitative Research: Introducing focus groups. *BMJ, 311*, 299-302. Retrieved September 12, 2015.

Kolenc, G. (2015, April 29). An iOS Developer's Struggle – Swift or Objective-C. Retrieved December 12, 2015, from http://news.erento.com/projectphoenix/swift-or-objective-c-ios-developers-

struggle

Lane, N., Lin, M., Mohammod, M., Yang, X., Lu, H., Cardone, G., . . . Choudhury, T. (2014). BeWell: Sensing Sleep, Physical Activities and Social Interactions to Promote Wellbeing. *Mobile Networks and Applications, 19*(3), 345-359.

Miles, J. (2014). *Instagram Power*. McGraw Hill Education.

Mobile Deep Linking. (2014). Retrieved December 1, 2015, from http://mobiledeeplinking.org

Myers, M. (2015). *Success Secrets of the Online Marketing Superstars*. Entrepreneur Press.

Neitz, R. (2014, April 2). 5 Strategies to Market Your Mobile App | Trademob Blog. Retrieved December 17, 2015, from http://www.trademob.com/5-strategies-market-mobile-app/

Olenski, S. (2015, January 29). 11 Things CMOs Need To Know About Mobile Marketing Strategy And App Development. Retrieved December 17, 2015, from http://www.forbes.com/sites/steveolenski/2015/01/29/11-things-cmos-need-to-know-about-mobile-marketing-strategy-and-app-development/2/

Patil, V. (2014, April 22). Deep linking in iOS. Retrieved December 1, 2015, from http://blog.originate.com/blog/2014/04/22/deeplinking-in-ios/

Poor, C., & Brown, S. (2013). Increasing retention of women in engineering at WSU: A model for a women's mentoring program. *College Student Journal, 47*(3). Retrieved September 16, 2015.

Richardson, J. (2005). Design and conduct a survey. *Complementary Therapies in Medicine, 13*, 47-53. Retrieved September 12, 2015.

Rowley, J. (2012). Conducting research interviews. *Management Research Review, 35*, 260-271.

doi:10.1108/01409171211210154

Smarty, A. (2009, August 26). URL Capitalization and SEO: How Much Does It Matter? Retrieved December 1, 2015, from http://www.searchenginejournal.com/url-capitalization-and-seo/12667/

Smith, A., Scuffham, P., & Wootton, R. (2007). The costs and potential savings of a novel telepaediatric service in Queensland. *BMC Health Services Research, 7*(35). Retrieved November 2, 2015.

The Demographics of Social Media Users. (2015, August 19). Retrieved December 3, 2015, from http://www.pewinternet.org/2015/08/19/the-demographics-of-social-media-users/?

Thomas, K. (2015, June 16). Getting Started with iOS: Objective-C vs. Swift. Retrieved December 1, 2015, from http://www.codenewbie.org/blogs/getting-started-with-ios-objective-c-vs-swift

Tsang, J., & Mohan, S. (2014). Benefits of monitoring patients with mobile cardiac telemetry (MCT) compared with the Event or Holter monitors. *MDER Medical Devices: Evidence and Research, 7*, 1-5. Retrieved October 30, 2015.

Glossary

Term	Definition
App Store	An **app store** (or **app** marketplace) is a type of digital distribution platform for computer software, often in a mobile context. **Apps** provide a specific set of functions which, by **definition**, do not include the running of the computer itself.
Benefit Cost Ratio (BCR)	The ratio of the benefits of a project, expressed in monetary terms, relative to the costs of the project.
Branch	Copying a repository as in order to have separate instances where changes will not over lap.
Break-Even Point	The point at which the costs (or expenses) and the revenue are equal..
Cloud database	A database that typically runs on a cloud computing platform. A cloud database allows users to store, manage, and retrieve data from a cloud platform
Command-line	The space to the right of the **command prompt** on an all-text display mode on a computer monitor (usually a CRT or LCD panel) in which a user enters **commands** and data. It provides a means of communication between a user and a computer that is based solely on textual input and output.
Cost Benefit Analysis	The process of quantifying the costs and benefits of a project versus those of an alternative project over a certain period.
Discounted Payback Period (DPP)	The number of years required to break even on an investment.
EDGE Program	The EDGE Program assists new WPI students with and without disabilities. Freshman in the EDGE Program have the opportunity to meet with professional staff and peer-mentors and attend workshops. The EDGE Program is designed to address the technical and adaptive skill development students need to be successful.
Facebook	A popular free social networking website that allows registered users to create profiles, upload photos and video, send messages and keep in touch with friends, family and colleagues.
Gamification	The process of applying elements of game-design and of game playing (e.g. point scoring, competition with others, rules of play) in non-game contexts (such as in a mobile app).

Git	An open-source version control system that was started by Linus Trovalds.
GitHub	A Web-based Git repository hosting service. It offers all of the distributed revision control and source code management (SCM) functionality of Git as well as adding its own features.
Human Computer Interaction (HCI)	HCI is the study of how people interact with computers. Researchers in the field of HCI observe the ways in which human beings interact with computers and design technologies that let humans interact with computers in innovative ways.
Integrated Development Environment (IDE)	An IDE is a software application that provides comprehensive tools to computer programmers for software development. An IDE normally consists of a source code editor and a debugging tool.
Landing screen	A mobile app page that describes how to use the app.
Mobile Application (app)	A type of application software that is designed to run on a mobile device, such as a smartphone
Mobile deep link	The use of URIs (uniform resource Identifier) to make specific parts of **mobile** applications addressable so that those elements can be accessed directly by **mobile** users.
Net Present Value (NPV)	The difference between the present value of cash inflows and the present value of cash outflows. The Net Present Value is the benefits of a project minus the costs of the projects.
Objective-C	A programming language for the iOS operating system that was released by Apple in 1983.
Office of Disability Services (ODS)	The ODS provides support and advocacy to assist students with documented physical, learning, sensory, and other disabilities achieve their full potential. The ODS also coordinates the EDGE Program for first year students.
Programmatically	Resembling or having the nature of or accordance to a program, schedule, or method.
Query	A request for information from a database.
Repository	A central location in which data is stored and managed.
Rollback	The process of restoring a database or program to a previously defined state, typically to recover from an error.
Schema	A representation of a plan or theory in the form of an outline or model.
SDK	SDK stands for a software development kit. An SDK is a set of software development tools that enables a programmer to develop a mobile application for the iOS or Android operating systems.
Self-determination	The ability to advocate for what you need, to have self-confidence, and to be independent.
Siri	A built-in "intelligent assistant" that enables users of Apple iPhone 4S to speak natural language voice commands in order to operate the mobile device and its

	apps.
Splash Screen	A graphical control element consisting of a window containing an image or a logo of the software. A splash screen appears while the mobile app is loading.
Swift	A programming language for the iOS operating system that was developed by Apple in June 2014.
T-Test	A statistical significance test that examines whether the averages of two samples are significantly different. A t-test is used when the sample size is small (less than thirty).
Twitter	A free social networking micro blogging service that allows registered members to broadcast short posts called *tweets*. Twitter members can broadcast tweets and follow other users' tweets by using multiple platforms and devices. Tweets and replies to tweets can be sent by cell phone text message, desktop client or by posting at the Twitter.com website.
URL	Stands for Uniform Resource Locator. The URL is the address of a web page.
User Interface	The means by which the user and a computer system interact; the user interface (UI) is the way in which the user interacts with the computer (or in this project: the EDGE Mentoring App).
YouTube	YouTube is a free video-hosting website that allows members to store and serve video content. YouTube members and website visitors can share YouTube videos on a variety of web platforms by using a link or by embedding HTML code.
Version control	The task of keeping a software system consisting of many versions and configurations well organized.
Z-test	A statistical test that is used to determine whether two population means are significantly different. A Z-test can only be performed when the sample size is thirty or greater.

Appendix

A. Emails to Distribute Survey

To gain feedback from the EDGE mentees, Laura sent an email advertisement on October 30th.

Good afternoon EDGE students!

I am writing on behalf of an IQP group who is researching ways in which the EDGE Program can be improved. As students who met with a mentor this year, we want your feedback! Please see the announcement below for more information.

If you have any questions, please respond to the IQP group directly at odsapp@wpi.edu.

Many thanks and happy Friday!

Laura

Dear Mentee in the EDGE Mentoring Program,

The Office of Disability services invites you to participate in a survey to assess ways in which the EDGE mentoring program can be improved. The survey is 5-10 minutes in length, and consists of mostly likert scale questions with 1 open response question. The surveys are anonymous, and the results will help the EDGE Mentoring App IQP team design an effective mobile application. The app will be designed for mentors and mentees, and will allow mentors to better guide first year mentees.

A link to survey is given below:

http://wpi.qualtrics.com/SE/?SID=SV_0j4UFV94CyhxWC1

Thank you very much for your time and consideration, and we greatly appreciate your feedback.

On Wednesday, November 4, Laura sent the following email, which reminded the EDGE Mentors about the focus group opportunity:

Hi Everyone,

Just a reminder, our IQP group is looking to run a focus group on how to improve the EDGE Program. ***They will provide free donuts and munchkins and a $10 gift card for each mentor to***

participate. *Please see their updated message below.*

Best,

Laura

Dear EDGE Mentor,

The EDGE Mentoring IQP team has designed a set of survey and focus group questions. The focus group will help the IQP team design an app for mentors to guide mentees. The focus group will be about 30 minutes in length, and will greatly help the IQP team. The Office of Disability Services invites all EDGE mentors to participate in the focus group. Note that there will be free donuts and munchkins offered and a $10 gift card for each Mentor who participates in the focus group!

We have attached an informed consent form for you to read before participating in the focus group.

A link to the Mentor survey (~ 5 minutes in length) is also given below:
http://wpi.qualtrics.com/SE/?SID=SV_0VtnBSDsz5lFqbH

We greatly appreciate your time and feedback!

B. EDGE Mentor Survey Questions

Answer how you feel about the following questions:

	Poor	Fair	Good	Very Good	Excellent
How would you rate the effectiveness of the EDGE Mentoring Program in helping your mentee	○	○	○	○	○
How would you rate your ability to mentor students	○	○	○	○	○
How would you rate your relationship with other Mentors (Not mentees)	○	○	○	○	○
How would you rate your relationship with your mentee	○	○	○	○	○

Rate how you feel about the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Your mentee is satisfied with their academic performance thus far	○	○	○	○	○
Your mentee is satisfied with their personal wellness thus far	○	○	○	○	○

What do you feel is the greatest challenge for your mentee

- Academic (e.g. courses, grades, exams)
- Social (e.g. transitioning to residence life, forming friendships)
- Wellness (e.g. getting enough sleep)
- Other (please explain)
- All these challenges are equally important

Which of the 3 areas (wellness, social, academic) do you focus on most as a mentor with your mentee?

- Academic (e.g. helping students with study strategies)
- Social (e.g. encouraging students to join on campus clubs)
- Wellness (e.g. educating students on how to be emotionally happy, and physically healthy)
- I focus on all 3 areas equally
- Other (please explain)

Which area out of the 3 do you feel your Mentee is the strongest in

- Academic
- Social
- Wellness
- I feel the mentees are equally strong in all 3 areas
- Other (please explain)

What features or tools would you like to see in an app, that would help you teach your mentees better

---

Please Explain a Specific challenge your mentee faces as an incoming Freshman

C. EDGE Mentee Survey Questions

On average how much sleep do you obtain per night, since entering WPI

- Less than 5 hours per night
- 5-6 hours per night
- 6-7 hours per night
- 7-8 hours per night
- More than 8 hours per night

Rate how you feel about the following statements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I have a good support structure in college (i.e. students/faculty/family who support you)	○	○	○	○	○
I feel that my mental well-being has been good since entering WPI (e.g. how is your ability to cope with stress, and how is your overall happiness at WPI)	○	○	○	○	○
I feel that I am doing well academically (e.g. do you feel that you are trying your best in school, and using appropriate studying strategies and seeking help)	○	○	○	○	○

I have good time management skills	○	○	○	○	○
I am able to connect well with students at WPI	○	○	○	○	○
I have strong organizational skills	○	○	○	○	○
I have a good relationship with my mentor	○	○	○	○	○

What area do you feel the strongest in, in terms of academic, social, and wellness

- Academic
- Social
- Wellness
- I feel Equally strong in all 3 areas
- Other (if so Please Explain)

Explain one feature that you would like to see in an app, that will allow your Mentor to be more able to help you

Rate how you feel about the following statement

	I feel disconnected	I feel somewhat disconnected	Feel neither connected or disconnected	I feel connected	Yes I feel very Connected
I feel connected to WPI's College Campus (e.g. do you feel that you have found enjoyable activities, friends you can talk to, students who share common interests)	○	○	○	○	○

D. EDGE Mentor Interview Questions

1. *What made you interested in joining the EDGE Program?*
2. *What is a major challenge of being a student mentor?*
3. *What can be done to improve your relationship with your mentee (i.e. in order to strengthen the mentor-mentor relationship)?*
4. *What Social and wellness tools would you like to see most in an app?*
5. *Are there any particular academic tools that you would like to see in an app?*
6. *Would your group be motivated to use an app, which would help you guide the mentees?*
7. *How do you think is the relationship between mentors?*

E. EDGE Mentor Survey Results

#	Question	Poor	Fair	Good	Very Good	Excellent	Total Responses	Mean
1	How would you rate the effectiveness of the EDGE Mentoring Program in helping your mentee	0	1	2	2	1	6	3.50
2	How would you rate your ability to mentor students	0	0	3	3	0	6	3.50
3	How would you rate your relationship with other Mentors (Not mentees)	0	0	5	0	1	6	3.33
4	How would you rate your relationship with your mentee	0	1	3	1	1	6	3.33

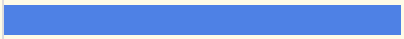
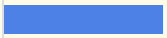
2. Rate how you feel about the following statements:

#	Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Total Responses	Mean
1	Your mentee is satisfied with their academic performance thus far	0	1	2	3	0	6	3.33

2. Rate how you feel about the following statements (cont.)

2	Your mentee is satisfied with their personal wellness thus far	0	0	1	5	0	6	3.83

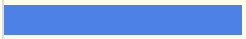
3. What do you feel is the greatest challenge or challenges for your mentee

Answer		Response	%
Academic (e.g. courses, grades, exams)		5	83%
Social (e.g. transitioning to residence life, forming friendships)		2	33%
Wellness (e.g. getting enough sleep)		2	33%
Other (please explain)		0	0%
All these challenges are equally important		0	0%

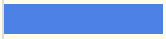
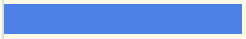
Please Explain a Specific challenge your mentee faces as an incoming Freshmen

Text Response
Balancing between all 3 categories equally. Work seems to take precedence forgoing social/sleep
Managing time and focusing on homework assignments
Being social and having a solid group of friends
has a hard time balancing everything and tends to let club activities go to the way side
My mentee has trouble keeping up with the fast paced curriculum
Adjusting to college life

Which of the 3 areas (wellness, social, academic) do you focus on most as a mentor with your mentee?

Answer		Response	%
Academic		3	50%
Social		1	17%
Wellness		0	0%
I focus on all 3 areas equally		1	17%
Other		1	17%

Which area out of the three do you feel your Mentee is the strongest in

Answer		Response	%
Academic		2	33%
Social		1	17%
Wellness		3	50%
I feel the mentees are equally strong in all 3 areas		0	0%
Other (please explain)		0	0%

What features or tools would you like to see in an app, that would help you teach your mentees better

Text Response
Perhaps a way for them to log how much time they spend in each of the three categories. This would help them be self aware about their habits.
Student support resources map and info
Something that updates us about events on campus
Personal Scheduling tool that links up with calendars
Regular meeting reminders
messaging

F. EDGE Mentee Survey Results

1. On average how much sleep do you obtain per night, since entering WPI

#	Answer		Response	%
1	Less than 5 hours per night		1	25%
2	5-6 hours per night		1	25%
3	6-7 hours per night		1	25%
4	7-8 hours per night		1	25%
5	More than 8 hours per night		0	0%

2. Rate how you feel about the following statements:

#	Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean
1	I have a good support structure in college	0	0	0	2	2	4.50
2	I feel that my mental well-being has been good since entering WPI	0	0	2	2	0	3.50
3	I feel that I am doing well academically	0	0	2	2	0	3.50
4	I have good time management skills	1	0	1	2	0	3.00

2. Rate how you feel about the following statements (cont.):

#	Question	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Mean
5	I am able to connect well with students at WPI	0	1	2	1	0	3.00
6	I have strong organizational skills	0	0	3	1	0	3.25
7	I have a good relationship with my mentor	0	0	1	1	2	4.25

3. Rate how you feel about the following statement

Question	I feel disconnected	I feel somewhat disconnected	Feel neither connected or disconnected	I feel connected	I feel very Connected	Mean
I feel connected to WPI's College Campus	0	0	2	2	0	3.50

4. What area do you feel the strongest in, in terms of academic, social, and wellness

Answer		Response	%
Academic		1	25%
Social		2	50%
Wellness		1	25%
I feel Equally strong in all 3 areas		0	0%
Other (if so Please Explain)		0	0%

5. Explain one feature that you would like to see in an app, that will allow your Mentor to be more able to help you
Text Response
small encouragement note that is sent to both them and the student
Some way to show me activities that I would be interested in.
App feature which shows the student's current class-load to the mentor, so check up meetings can be more efficient.

G. EDGE Mentor Interview Results

1. What made you interested in joining the EDGE Program?

A: She received the email in D-term, which was looking for peer-mentors to join the EDGE Program. She also said that the connections program really helped her transition to WPI, and that she wanted to give back to incoming students in any way. Initially, she was interested in joining the Connections program but then she remembered the email she received in D-term, and she applied for the EDGE Program.

2. What is a major limitation of being a student mentor?

A: Trying to get mentees to take suggestions because you can not make them to do anything. For instance, she tried to provide suggestions for her mentee for academic skills, but her mentee did not follow all of the suggestions.

3. *What can be done to improve your relationship with your mentee (i.e. in order to strengthen the mentor-mentor relationship)?*

A: The program can spread the word more, and host more events (events where you get to formally meet with your mentee). For instance, the mentor we interviewed did not get to meet with her mentee until the end of last week.

4. *What Social and wellness tools would you like to see most in an app?*

A: The mentor likes the idea of including a calendar, specifically for EDGE, by using an outlook interface. For instance, emails can get lost, but by using a mobile application you would be able to keep a separate place for EDGE events.

5. *Are there any particular academic tools that you would like to see in an app?*

A: She likes the idea of keeping a Timetable of resources that are open (i.e. when ARC is open), knowing about good places to study (for instance, she did not know that the top floor of Higgins Labs is a great place to study), and resources for studies. She likes the idea of keeping these academic tools under a similar section in the mobile app.

6. *Would your group be motivated to use an app, which would help you guide the mentees?*

A: She explained how she would be motivated to, since all the tools for EDGE will be kept separate; she also thinks that mentors would like to use a mobile app for this same reason (it provides a convenient way to access mentor-related information

7. *How do you think is the relationship between mentors*

A: She thinks there is a good amount of collaboration between mentors, in meetings and especially on the Facebook page; for instance, mentors share ideas with each other.

H. Cost Benefit Analysis Survey

Q1 Enter your overall GPA:

Q2 Rate how you feel about the following statements

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
1. My physical wellness, which includes hygiene, proper nutrition, and exercise, has been good since entering WPI	○	○	○	○	○	○	○
2. I have good time management skills (i.e. I am able to effectively manage school, work, and social commitments)	○	○	○	○	○	○	○
3. My academic performance has improved since the beginning of last year	○	○	○	○	○	○	○
4. I have found on-campus clubs and activities that I enjoy being in at WPI	○	○	○	○	○	○	○
5. I am able to work productively in my school work	○	○	○	○	○	○	○

	Very Dissatisfied (1)	Dissatisfied (2)	Somewhat Dissatisfied (3)	Neutral (4)	Somewhat Satisfied (5)	Satisfied (6)	Very Satisfied (7)
6. I am satisfied with the resources on campus (which includes The Office of Disability Services, and more resources)	○	○	○	○	○	○	○
7. I am satisfied with the friendships I have formed at WPI	○	○	○	○	○	○	○
8. While being a WPI student, I am satisfied with the amount of sleep I have obtained	○	○	○	○	○	○	○
9. I am satisfied with my academic performance at WPI	○	○	○	○	○	○	○

I. Minutes of Weekly Advisor Meetings

Minutes of Team Meeting #1

September 3, 2015

Washburn Shops, Room 220

Attendees: Jessica Szivos, Laura Rosen, Justin Wang, Eleanor Loiacono, Ahmed Hakim, Ryan Orlando, Devon Coleman, and Joycelyn De La Rosa, Aaron Ferguson

Meeting called to order 1:00 pm

1. **Have a time line and objective**
    a. Data needs to be collected
        i. Experience (satisfaction) of EDGE Program
        ii. Alumni connections to WPI
    b. Literature analysis
        i. Interviewing
        ii. App development
            1. Economics behind developing an app
        iii. Mentoring Programs
    c. Write about
        i. ODS, EDGE Mentoring Program
        ii. Look up other IQPs to get an outline
        iii. Always document
2. **Include a presentation that is 3-5 min**
    a. Presentation will be due next meeting (9/10)

Meeting adjourned at 1:50 pm

Minutes of Team Meeting #2

September 10, 2015

Washburn Shops, Room 226

Attendees: Jessica Szivos, Laura Rosen, Justin Wang, Eleanor Loiacono, Ahmed Hakim, Ryan Orlando, Devon Coleman, Aidan Freeburg, and Joycelyn De La Rosa, Aaron Ferguson

Meeting called to order at 1:00 pm

1. Overview of Research:
    a. Ahmed gave presentation
        i. Issue(s) with the University of Pittsburg Study:
            1. Grade inflation
            2. Other variables – social and academic issues
            3. No test of satisfaction
            4. No Control group
                a. Identify problem to put in Literature Review
        ii. Technology for Students with disabilities
            1. Development different from K-12
            2. Look at Admissions App
                a. Interactive Map that shows events that are occurring in each building
                b. Keep in Mind that we need to integrate in a way that has accessibility for people that are putting in the events
                    i. Focus: on WPI and EDGE
2. Other Options for Research
    a. Mentoring in higher Ed
        i. How are other programs structured?
    b. Students with Disability as they transition
        i. Tap into the students that are here
3. Proposal
    a. Planning for analysis
        i. Set out what you are going to do
        ii. Support with: background, literature review, methodology
        iii. Timeline
        iv. Phases
        v. Dividing the Work
4. Action Items:
    a. Ryan – NIH Certificates
    b. Ahmed - IRB
5. Next Week:
    a. ODS presentation (15 min) - Aaron
    b. Paragraph for Objective – All

c. Outline of Paper – All

d. Timeline – All

Meeting adjourned at 1:50 pm

Minutes of Team Meeting #3

September 17, 2015

Washburn Shops, Room 228

Attendees: Ahmed Hakim, Joycelyn De La Rosa, Aidan Freeburg, Devon Coleman, Professor Loiacono, Professor Wang, Laura Rosen, Jessica Szivos, and Aaron Ferguson

Meeting called to order 1:00 pm

1. Devon led presentation
    a. Went over the project objective and timeline
    b. Went over the sections to include in the IQP Paper
    c. The team showed the advisors and clients the surveys we designed (the clients thought the questions were good but we just need to make some corrections)
2. Aaron gave a presentation about the EDGE Program
    a. He described what categories EDGE helps students with (academic, social, and wellness)
    b. He also explained where he thinks the scope of the project should be focused (on EDGE mentors)

Meeting adjourned 1:50 pm

Minutes of Team Meeting #4

September 24, 2015

Washburn Shops, Room 226

Attendees: Ahmed Hakim, Joycelyn De La Rosa, Aidan Freeburg, Devon Coleman, Professor Loiacono, Professor Wang, Laura Rosen, Jessica Szivos, and Aaron Ferguson, and Ryan Orland

Meeting called to order 1:00 pm

1. Discussion of the surveys

a. Refine the survey questions, and then send them to Professor Loiacono
b. Submit the IRB for the study as soon as possible
c. Find a way to asses a mentee's relationship with their mentor in the survey
d. Survey will be used to assess the three core areas
e. Can also be used to assess the mentor-mentor relationship

Meeting adjourned 1:45 pm

Minutes of Team Meeting #5

October 1, 2015

Washburn Shops, Room 226

Attendees: Ahmed Hakim, Joycelyn De La Rosa, Ryan Orlando, Devon Coleman, Professor Wang, Laura Rosen, Jessica Szivos, Aaron Ferguson

Meeting called to order 1:00 pm

1. The team gave a presentation of our current progress thus far.

2. Literature Suggestions

a. Mentor-Mentor relationship, programs at the college level, apps for wellness, or apps for academics, how to take best practices into our app (i.e. group chats).

b. Find a good example on cost-benefit analysis, intervention, how to compare outcomes
    i. cost-benefit analysis (i.e. for medical technology)
    ii. app technology to treat patients -> can model their methodology (1 or 2 articles).

c. Cost-benefit analysis: Big start-up cost in developing an app, needs to be feasible, can propose a model ($9.99 for cost). Find a breakeven point.

d. Look at Benefit: personal benefit vs. social benefit

3. Other Project Suggestions

a. Good resource is that there is the WPI app for admissions, see what's on their app

b. Crimson Key: What motivates students to take on leadership roles (for background research; what motivates a student to become a mentor).

c. A big identity for students. Understanding identity in who you are. (i.e. what motivates a mentee to become a mentor).

4. Action Items

a. We will send Professor

b. Proposal: Will say you will do this, as if you are doing your final presentation

c. Aim for Proposal for next week; Control group: people who can not use the app

5. Project Proposal

a. How will the app function, give a fair proposal, here is what we found in literature, look at what your process will be, literature survey look at health IT apps: do they use android or apple, but also because it more popular in literature.

6. Research Questions

a. Would it make sense to do a focus group; It probably will not be able to be completed by A-term.

b. Can email Aaron, and ask questions to Jess and Laura.

Meeting adjourned 1:50 pm

Minutes of Team Meeting #6

October 8, 2015

Washburn Shops, Room 226

Attendees: Joycelyn De La Rosa, Ahmed Hakim, Aidan Freeburg, Ryan Orlando, Devon Coleman, Laura Rosen, Jessica Szivos, Professor Wang, Professor Loiacono, Aaron Ferguson

Meeting called to order 1:00 pm

1) Getting feedback on how things are going
   a. Both as a whole and other group members
   b. Next week will be a meeting as just the group, "clients" won't be present.
      - Can talk about advisor guidance
   c. Evaluations (group and self) will be sent out for us
      - Use this to think about constructive criticism
2) Ahmed first: Cost-benefit analysis
   a. A few whitepapers that go over the costs of an app

- App stores will take up to 30% of revenue and users don't like to pay

b. 300 hours for a simple app
   - 400-600 for a more complex app
   - upwards of 600 for the most complex
   - Usually $100 per hour for consultations
   - Include this as it could be part of the fixed cost

c. Maintenance? Nothing specific found, will continue to do research
   - Make sure to look at what would maintenance be like down the road, for cost-benefit
   - Look at what the standard is for CS maintenance jobs

d. Costs in app development
   - No figures on how much the app cost the user, papers only went over savings
   - Paywall vs. paying up front, micro transactions
   - Potentially institution pays for the app, student doesn't pay for anything
   - Come up with comprehensive list of cost and benefit
   - 2 different levels: Private vs. Social cost benefit
   - No ads in this iteration, institutional vs. commercial

e, Cost/benefit:
- Show that the return is greater than the time and resources spent on the program and the app
- Health app found provided benefits to both patient and health system
- Ambulatory reconstruction surgery
- Patients had to travel an average of 76km to receive a follow-up
- app mitigated this by having the patient fill out a survey and take pictures
- Cost-benefit of the EDGE Program - in paper
- at least list by b-term
- dollar value of each item by end of project

f. EDGE App presentation
- Have a map of what you're going over in the presentation
- Problem statement
- Introduction: Here's the problem, here's why
- Objective
- Literature
- Conducting Surveys
- Mentoring Programs

- Students with Disabilities
- Could be important for cost-benefit (economy lose productive human capital)
- We lose tuition
- Apps for students
- App development
- Cost Benefit
- Methodology
- Start talking about problem with program, show it's cost-beneficial
- develop the tech that can be easily adopted into all universities, show that it will be useful

g. Be sure to capture:
- if there's something you need from the client talk about how you plan to proceed
- Make sure everyone commits to what you want, find out what the client can or can not give you.
- Visual design elements for the app

Meeting adjourned 1:50 pm

Minutes of Team Meeting #7

October 15, 2015

Washburn Shops, Room 226

Attendees: Joycelyn De La Rosa, Ahmed Hakim, Aidan Freeburg, Ryan Orlando, Devon Coleman, Professor Wang, Professor Loiacono

Meeting called to order 1:00 pm

1. The team gave the Proposal Presentation and received feedback
   - Remain consistent with the images
   - Adjust yellow with white text
   - Overview of presentation: here is what we done, here is where we will go.
   - Bullet points for the overview, and give an image (like the overview) for the timeline
   - Bold points in problem statement.
   - Why do people apps: in order to get widely adopted, Why do we need an app: providing a solution so that this program can be scaled. So other disability services across the country will adopt the program. You need to determine if the EDGE Program is cost-effective through surveys. But not every college can adopt this program, so future IQP's will continue

out the project. Professor Loiacono thinks the problem statement is effective. Example: making reservations at a restaurant (like

- Remind Eleanor of the write-up

Meeting adjourned at 1:50 p**m**

Minutes of Team Meeting #8

October 29, 2015

Washburn Shops, Room 220

Attendees: Professor Wang, Professor Loiacono, Ahmed Hakim, Joycelyn De La Rosa, Aidan Freeburg, Ryan Orlando, and Devon Coleman

Meeting called to order 2:00 pm

1. Group Dynamics:
    - Group dynamics are getting better
    - One option: splitting off a separate chunk (a marketing aspect- beyond the scope of this project) to assign; the marketing aspect will get the mobile app to other universities; once there is a prototype: we will look at the economic aspect

2. Faculty Advisor:
    - Meet with Professor Wang for literature on Cost Benefit Analysis
    - Can go over the write-up during the meetings (as one document)
    - Professor Wang will go over the write-up toward the end

3. Proposal Feedback:
    - We had concise slides
    - In objectives: we should bold some things
    - TedTalks: They use images to convey information (can have image of 34% of students dropping out of college)
    - Add economics of the program, and marketing components of the app

- Formal Proposal Presentation: Schedule a meeting with clients, and take feedback from clients
- Include a mock-up of the app in presentation

Meeting adjourned 2:50 pm

Minutes of Team Meeting #9

November 5, 2015

Washburn Shops, Room 220

Attendees: Professor Wang, Ryan, Joyce, Devon, Aidan, and Ahmed

Meeting called to order 2:00 pm

1. Updates for Professor Wang
    - Updated Professor Wang on Mentor Surveys and Focus groups, and Mentee Surveys
    - Ryan Showed Professor Wang the User Interface and features we will have in the application
    - Professor Wang provided suggestions that we should spend around 20 hours each, and we should all communicate our findings and research with each other.

Meeting adjourned 2:25 pm

Minutes of Team Meeting #10

November 12, 2015

Washburn Shops, Room 220

Attendees: Professor Wang, Professor Loiacono, Joyce De La Rosa, Ahmed Hakim, Ryan Orlando, and Devon Coleman

Meeting called to order 2:00 pm

1. Discussion on Recommended Apps
    - Simply Noise
      -white/brown/pink noise generator
    - Remember The Milk

-To-do list

-tasks that need to be completed

- Quizlet

  -Study tool

- Promodoro time app

  -time management tool

- Cold Turkey

  - can block distracting websites

- Discussed the current prototype

  -Possibly add a tutorial/some way to introduce the app

2. Sections of the IQP Paper

- Data and analysis

  -Discuss data obtained from surveys and interviews

- Design interface section

  - Include mockups and sketches for the app

  -Figure out process for how we designed/developed the things

  -All results are different, we need suggestions of what to add to the app

  -Have to document process - emails, analysis, etc.

  -Specific data from surveys required

  -Actual data people gave

  -Show how the process changed the app's design

  -Show WHY

- Cost-Benefit Section

  - Determine if the EDGE Program is cost-beneficial

  -Based on additional studies

- Additional Features

  -Show features mentors would have liked to see, provide recommendations for what we need

- Marketing Section

  -How to market the app in order to produce most effective results

- Conclusion

  - reiterate findings of project

  -Place recommendations for future work

  -Discuss things we wish we could have done differently

- Reflection Piece

  -To reflect on the project

  -Basically just talk about it

3. Timeline

- Upcoming Weeks

  -This week

    - Continue coding main screen/different screens (splash screen)
    - navigation bar

- Data Collection

  -Have good feedback but need a way for higher response rate

  -Have all of our data together electronically

- Final Presentation

  -December 9th

- Make sure we're getting advisors paper first to get a few rounds of feedback

Meeting adjourned 2:40 pm

Minutes of Team Meeting #11

November 19, 2015

Washburn Shops, Room 220

Attendees: Professor Wang, Professor Loiacono, Joyce, Ahmed, Ryan, and Devon

Meeting called to order 2:00 pm

1. Cost Benefit Analysis Discussion
    - In the survey, Satisfaction is important based on comments from Laura and Jess
    - Our team will just focus on the mobile app but will not prove that the EDGE Program is cost-beneficial
2. Mobile Application Development
    - Showed the splash screen to advisors: Clients liked the logo
    - The search function (may contain a lot of code); Ryan and Devon are not as familiar with iOS
    - Reflection part: Learning code that you haven't learned before; document information to help future groups
    - Scope of this project
        - Add & remove apps; can have a search function:
        -Screen shots: will be included in the write-up (how you ended up w/ mountain)

3. Discussion of the IQP Paper

    - Cost Benefit analysis: keeping it as a separate section
    - Marketing Section (will be separate); may be supplemental and separate

4. Discussion of Final Presentation

    - We can book room on Wednesday, December 9th: 9-11 for MQP presentation
      1 -2 pm on Wednesday, December 9th (before walk-in hours);
    - Can email Laura and Jess; Let Laura and Jess know (use it as an advertising event: Record the presentation)

Meeting adjourned 2:40 pm

Minutes of Team Meeting #12

December 3, 2015

Washburn Shops, Room 220

Attendees: Professor Wang, Professor Loiacono, Joyce, Ahmed, Ryan, Aidan, and Devon

Meeting called to order 2:00 pm

Notes:

1. Showed the advisors the features of the mobile app and updates on the paper

    a. Two mild problems: unable to get the database synched; keep training material for Clients (we just need to provide documentation)

    b. They suggested a landing page for the app (about the app): see mountain with background and can tap to see different features

    c. Also include a storyboard in the mobile app: think about how you reached the image, and then describe the images, and what modifications were made and why you would be able

    d. For the paper: Can you add a feature to keep track of how much time you are spending on an app; Want to keep track of the amount of time that users spend on the intervention

    e. For this project: Capturing user time: this is a good feature for the future; How to determine which features are being used the most: In the write-up mention how this feature would be helpful (Cost-benefit analysis)-> knowing how much time they spend on the app

    f. For the write-up: put in as much as you can on tutorials and resources, add a glossary for terms (i.e. gamification, swift)

2. The team received suggestions for the paper

    a. How detailed should we go into paper: Add documentation; use good amount of research and background, and connect the method back to the research; why will the ICON look like this (because of HCI literature or we talked to the ODS).

    b. Make sure to describe how you got the three letters at the bottom (i.e. research and the EDGE Program: b/c ODS focuses on these areas; also we have a search bar because a certain reason).

    c. Next round: Professor Wang will go through the paper

    d. Main thing: don't need page things on front; major things: executive summary (abstract, 1 page or so, what was the motivation, what you did, what you came up, and where it will go)

e. always spell things out: can not NOT can't : be consistent in tense: Most things should be in past tense (i.e. we have done)

e. With the tables: use only data that is relevant (explain tables in your text)

f. Keeping consistent headers; consider indenting chapter 1 and chapter 2; put some more transitions (end of chapter 1 to transition to methodology: synthesize what you get back

g. Methodology: don't see explanation of surveys; go into time-table: it could be a figure or go into appendices; week 1-6: put timeline into a figure

h. Have to mention the user part of it; on research: you are gathering reqs to see what it should look like, and once you get those reqs you give it back the user

I. Include exact quotes from survey to strengthen argument and provide a sign-off for the proposal

3. The team also discussed the Final Presentation:

a. Question: Where should we include the (explanation on how to conduct surveys, focus groups, and interviews)

b. Final Presentation: build on the proposal

Meeting called to order 2:50 pm

J. Minutes of Client Meetings

Minutes of Client Meeting #1

September 10, 2015

Daniels Hall, Room 124

Attendees: Jess Szivos and Jocelyn De La Rosa

Meeting called to order 2:00 pm

Questions for Jess:

1. Where do you want to see the app going?
2. What features would you want to see?

1. Features in the APP

- a. Organizational
  - i. Worksheet to help with time management
  - ii. Blank and completed
  - iii. Guidelines
    - a. Time management
      1. Links that lead to outlook, hour by hour schedule
      2. Connect to phone
    - b. Schedules on App
      1. Students don't know how to the bannerweb
  - iv. MAP
    - a. Admissions has an APP
    - b. Could have a link that leads to their app
  - v. Other
    - a. EDGE has its own page w/ a link
    - b. Other office Hours
      1. Basic Info: Phone Number, Address, Hours day by day, Picture, Map
         1. Think: Google Search

Considerations:

2. Focus Booster (on Computer) → Blinks to notify the student that they have to move on to the next task

3. Remember the Milk → set up task

Tasks:

1. Define who we want are app to be for
    a. Mentor(s)/ EDGE: Include
        i. Worksheets
        ii. Strategies
        iii. Videos
    b. Colleges: Think more broad

Meeting adjourned 2:50 pm

Minutes of Client Meeting # 2

September 11, 2015

Daniels Hall, Room 124

Attendees: Jocelyn De La Rosa and Laura Rosen

Meeting called to order 2:00 pm

1. What should our focus be?
    a. EDGE and the Mentors
2. EDGE Program
    a. Mentors go to classes to get training
    b. Help them develop relationships with their mentees
3. What are other mentoring programs focusing on?
    a. Academics
        i. EDGE's Focus:
            1. Academics
            2. Social
            3. Wellness
4. How could we use technology to give mentors the right tools
    a. Focus: Community

        i. Talking with others
        ii. Interactive
5. Tools
    a. Time Management
    b. Study Tools
        i. Example: Cornell Note Taking Method
        ii. Tools should Include:
            1. Items to pull up and show as examples
            2. Videos
            3. Articles
            4. Helpful apps
            5. Links
        iii. Learning what the mentees are like to give them the right tools
6. Research
    a. Mentoring Programs
        i. What should we be training our mentors on?
        ii. Other models
        iii. What can we pull in from other programs
    b. Transitions from high school to college
        i. Students with disabilities
7. Note:
    a. The research we did was good we just have to take into consideration other aspects of mentoring programs
8. Mentoring Programs at WPI
    a. See what really works in the programs
        i. Connections
            1. There is a community aspect

Meeting adjourned 2:45 pm

Minutes of Client Meeting #3

September 22, 2015

Daniels Hall, Room 124

Attendees: Ahmed Hakim and Jessica Szivos

Meeting called to order 1:00 pm

1. Discussed study design with Jess
    a. In asking interview question, don't focus on a mentee's disabilities, focus on their transition to college, and how that is going. Also, how is the mentor is helping. Are they able to find transition resources. Might not get as many interviews with mentee's because they might be hesitant.
    b. Mentor Focus Groups: Ask Mentor's how they help their mentee's in the transition from high school to college. Can capture the focus groups from last year. ODS has the recording from last year.
    c. What are the biggest challenges mentees' face
    d. Is the focus group more to understand what to put in the app, or to understand how the Edge mentoring program is doing - > decide which one to concentrate on. Or you could concentrate on both. Should the focus group concentrate on what to put into the app, or how the app benefits the program (i.e. what they like about the program, and would an app motivate them)
2. For the Mentees:
    a. Ask how do they like the edge mentor program.
    b. Kind of flip the questions (ask less app questions). What do they like about their edge mentor, and what else they would like to hear/learn about more, or do more in their meetings.
    c. Can leave a question or 2 about the app. We can ask the mentees would use an app to be motivated to use an app.
    d. Bring back the scope to mentor's and mentee's. There are currently 12 mentee's. How is there relationship going. How can an app help the mentee-mentor relationships.
3. Overall, Jess likes the survey questions. She just wants us to modify the scale, and make the answer choices less wordy. For instance, we can do a scale from 1 to 5.

Meeting adjourned 2:50 p**m**

Minutes of Client Meeting #4

November 5, 2015

Daniel, Room 124

Attendees: Jess, Laura, Ryan, Joyce, Devon, Aidan, and Ahmed

Meeting called to order 3:00 pm

1. Proposal Presentation Feedback
    - One question: as you are developing app, do you see this for mentors or mentees (do you see a separate login for Mentors or for Mentees).
        - Ryan's input: Want tools in one easy place; the app will be set-up for Mentors as a base in this project; then we will expand to Mentees
    - Jess's Question: would it be 2 separate apps?
        - Ryan's input: in the app, we will ask what type of User is this
2. Features to focus on in a mobile app
    - Jess's and Laura's feedback on user interface and functionality: Laura sees problems in executive function (in creating goals, managing time (time-management is number 1), how to adjust quick 7 week term and still balance social (attending clubs)).
    - Jess wants to see an interactive to do list, that is separate, using the syllabus, a special to-do list
    - Jess wants a calendar with classes
    - Laura's suggestion: Have an easy to see to do list (day at a glance, week at a glance, month at a glance, and can click on each block)
        - This idea is a model; we won't be able to be create a big app; would Jess and Laura prefer us to develop a few small features, or one major feature (allow students to input: To-do's, Week at a glance, term at a glance)
    - Laura and Jess asked whether we use outlook
    - The student would add in data for Today's to do's
    - Student would put in their classes
    - Tips: i.e. this block is empty, then you can spend time doing your homework
    - There is a large time commitment in developing more than one feature
    - Devon's Preference: get 1 feature down really well, and set-up the user interface
    - Toggle App that Aidan suggested, times the amount of time you spend on each project
    - Laura's Suggestion: would want a tag for each category; should also have by category, and have links in 1of 3 categories, make the app less list like, and more icon-like
    - Put the time-management app (as a feature area of future research);
    - Jess would want us to focus on how to reach out to more Mentors
3. Feedback on the visual feature of the mobile app
    - A button that is a color; Blue; green; yellow (EDGE color); yellow is hard for students with vision issues

- Can make the text a certain color
- Jess likes icons; Laura wants us to incorporate EDGE symbol on app (with yellow, green, and blue)

Meeting adjourned 4:10 pm

Minutes of Client Meeting #5

November 11, 2015

Daniels Hall Room 124

Attendees: Jess, Laura, Aaron, Ahmed, Devon, and Ryan

Meeting called to order 11:00 am

1. Cost-Benefit Analysis Discussion
   - Mentors usually meet with mentees once a week (varies, about an hour in training, and at least ½ hour to hour with their mentees per week).
2. Mobile Application Discussion
   - Aaron has a ton of resources, he can find good worksheets/tip sheets.
   - We will have a splash screen (with EDGE logo); will have three icons at the bottom
   - We will have a splash screen (with EDGE logo); will have three icons at the bottom.
   - We will also have a list to search specific ideas that we have in mind, and a keyword search
   - From surveys we found that Mentors like to get information about events on campus. Having events on a calendar basis. We are planning to build an app, in a way that is easy to input information.
   - Other option from Laura's perspective: Laura shares Mentor Approved events; We could have suggestions for events that Mentors really like and events that are helpful for EDGE mentors. (Mentors add resources for events)-> Would mentors like to look at a selective list of events or all of them
   - Want to find a way to have Mentors to input events that are most applicable rather than have all the events (and have people sort through them).
   - On the homepage of ODS website: a list of 5 helpful apps ; Aaron has a good list of apps that are helpful to include; We will also get worksheets from Laura, Aaron, and Jess

Meeting adjourned 11:30 am

Minutes of Client Meeting #6

November 18, 2015

Bartlett Center, Room 137

Attendees: Devon, Ahmed, Aidan, Jessica Szivos, Laura Rosen, and Aaron Ferguson

Meeting called to order 11:05 am

1. Cost Benefit Analysis of the EDGE Program
    - Time Commitment for mentees:
        - Once a week (time varies: at least ½ hour to 1 hour)
        - Early move in program (some mentees): 2 days
    - Is it feasible to gather GPA data for both groups:
        - Data was collected from last year: non-participant grades vs. mentees
        - We also had satisfaction data: Eleanor did the survey in qualtircs
        - In terms of grades: Aaron had broken down every thing into A,B,C, and D term
        - Mentees in program vs. mentees (first-year program) who were not in program : Non-edge: 2.81 vs. mentees: 2.76
    - But, satisfaction survey: more community connection
        - Breaking it down between terms: there was a student who was an outlier:
        - A & B term: fewer NR's in participant group
        - Satisfaction is the piece to consider: Satisfaction can be more included in cost-benefit
2. Updates for the mobile application
    - Splash screen:
        - Wants us to take the word EDGE out
        - Make it semi-transparent
    - Next Steps:
        - App that will have lists
        - Ability to have apps that you can remove and add
        - Searchable and filterable
        - Will make the app modular
    - Laura sent some tools: (add stop-breath-and think): easy to add
    - We could provide ex. To go along with the app; Aaron has different resources tagged
    - As we are searching for tools; you can dial into how to search whether it is video

- Narrow down the tools you want to add: email him now, which resources and topics (i.e. sleep) you want on the app; (email him by tomorrow); Time-management (not just calendar): here are resources (videos); Aaron has hundreds of articles
- Marketing Concepts: web design -> associate diff. topics with visual icon
  - Aidan will present on marketing during the next client meeting
  - The team will look at more icons during the next client meeting

Meeting adjourned 11:45 am

Minutes of Client Meeting #7

December 2, 2015

Bartlett Center, Room 137

Attendees: Devon, Ahmed, Joyce, Ryan, Jessica Szivos, Laura Rosen, and Aaron Ferguson

Meeting called to order 1:00 pm

1. Updates on the mobile application

    a. Searching is working (app to app store)

    b. Devon is showing Laura how to add tools to the app

    c. Having bugs of synching data to the app

    d. Ryan asked about deep linking

    e. We also have an icon for the app

2. Feedback from the clients

    a. What will the page be if you login; we can give intro page

    b. Having a landing page would be helpful (on how to use the app)

    c. What is the goal for end of B-term: De-bugging the mobile app, and having the main page

    d. In terms of pdf's: Aaron has 100's of tools: Social, sleeping/wellness

    e. The code for the app will be on a computer so feature team's can add to the app

    f. What were expecting: Landing page with tools, and a splash screen

g. For future teams: Hooking it up with WPI login, adding functionality/more tools, showing suggestions based on the articles you have viewed (machine learning-machine learns about you) ; Next year's IQP Team -> the project can be very customizable

Meeting adjourned: 1:35 pm

K. Minutes of Group Meetings

Minutes of Group Meeting #1

Sept. 4, 2015

Gordon Library, 3rd Floor

Attendees: Ahmed, Joyce, Devon, and Ryan

Meeting called to order 4:00 pm

Discussion:

1. Who is the App for?
    a. Mentor
    b. Mentees
    c. WPI Students (1st year)
2. What do we want the App to have?
    a. Fuzzy (search/Help)
    b. Event notifications
        i. Pull events from Org Sync
        ii. GPS tracking → lead to events
    c. Chat between mentors and mentees
        i. Question and answer
        ii. Mentee can asks questions anonymously
    d. Contact List
    e. WPI Campus Map
    f. Connect to WPI server
3. Game-ification
    a. Give the students the ability to earn points
    b. Upgrade capability
    c. Thought: Use points for avatars
4. Server we will use?
    a. IOS (IPhone)
    b. Android
    c. Conduct a survey to see what WPI have

Action Items

All:

1. IRB
2. NIH
3. Conduct surveys

Joyce:

- Start paper
- Timeline

Ahmed:

- Survey students about the type of phone they have
- Literature for Mentoring

Ryan:

- Start paper
- Previous IQPS

Devon:

- Look up previous IQPs
- Literature for App development.

Meeting Adjourned 4:50 pm

Minutes of Group Meeting #2

September 7, 2015

Gordon Library, 3rd Floor

Attendees: Ryan, Aidan, Devon, Joyce, and Ahmed

Meeting called to order 12:00 pm

Ahmed →

- Found articles
    - Mentoring
    - The Benefit of using an IPad and Apps for students with disabilities
- Will complete the IRB

Devon →

- Completed NIH
- Sent out link for NIH

Aiden →

- Suggested apps: You shall pass and Things
    - What out off each of the suggested app would be beneficial for the WPI students
    - Ryan = if the app is free and good, we shouldn't remake the app

Review:

What we want in the app?

1. Direct chat between mentor and mentee
    a. Mentees can ask questions anonymously
2. Map → guide students where to go
3. Directory
    a. Office locator
    b. Contact list
    c. Building Hours
4. Offer a free app with possible upgrading capability
5. Link to WPI website
    a. Get to ODS, SDCC pages

Needs for Students

Academic	Social	Organizational	Personal
Chat with EDGE	Campus Events	To Do List	SDCC
Campus Map	Residential Live	Grade Calculator	RHC (Contact w/ RAs and CAs)
Building Hours	Athletic Events	Strategies (Articles?)	Dorm Life Tips
MASH	Intermural	Send Notifications (Reminders)	Healthy Habits
ARC	Greek Life: Rush & Recruitment		
Academic Advising	Other clubs		
In class Locator (Reminder)	DAKA/ Dining Hours		
	Rec Center Hours		

Things we need to do:

- Joyce → talk with Laura

    - Email was sent out
- Aiden and Ryan → Look at old IQPS
- Meet with the Edge Mentee and Mentors before Thursday
    - Joyce will ask Laura what a good time would be
    - Possibly go to one of the meetings they hold
- Need to work on Presentation
    - Meet Wednesday 11am – 2 pm in the Library
    - Joyce will try to book a tech suite
- Those who haven't completed NIH please complete and sent certification to odsapp@wpi.edu

Meeting adjourned 12:50 pm

Minutes of Group Meeting #3

September 9, 2015

Gordon Library, Room 111A

Attendees: Ryan, Ahmed, Devon, and Joyce

Meeting called to order 1:00 pm

Items already completed

- NIH (certificates on Trello)
- Notes/minutes for each meeting (on Trello)
- Survey
    - Ryan emailed 50 people
    - Ahmed asked 14 people

Objective

- Big Picture: Trying to Connect
- To connect new students with resources on campus to empower their success for their 1st year.
- To make it more easier for the mentor to support the mentees

Discussion:

- Any questions we might have for advisors and/or clients
- Show table of our thought process

Presentation:

Objective: To connect new students with resources on campus to empower their success for their 1st year.

1. Who: WPI Students
    a. Android or IPhone (Survey)
2. What: Trying to connect first year students to WPI life
    a. Meet with Laura and Jess
    b. EDGE Mentors
3. Where: WPI and possibly Hampshire
4. When: Next few years
    a. Timeline (on Trello)
5. Why: to allow for first year students to have an easy transition
    a. Show research on mentoring
    b. Benefit of using technology for students with disabilities

    Look big picture: What we want the app to have

Side note:

- Look at the connections program
- Have the same purpose but implementing it differently

Meeting adjourned 1:50 pm

Minutes of Group Meeting #4

September 11, 2015

Gordon Library, Ground Floor

Attendees: Ryan, Aidan, Joyce, Devon, and Ahmed

Meeting called to order 2:00 pm

Discussion:

1. Review Thursdays Meeting:
    a. Focus on WPI and EDGE Mentors
    b. An electronic tool box for the mentors to help the mentees
        i. Features:

1. Worksheets
2. Tips and trick
3. Strategy articles

c. Can appeal to other college students

2. Objective:
    a. Give mentors easy access to tools to help them ease the transition for new students in academic, social, and wellness settings/skills.
    b. The Areas of focus are:
        i. Academic: making sure students do well in classes, studying, grades and comprehension.
        ii. Social: Easing into new social settings, make friends and find their place on campus
        iii. Wellness: Ensuring that new students are taking care of themselves physically and mentally.
    c. We plan to connect the mentors through mobile technology, to ensure of access to these resources.
    d. Aidan: Wrote up an objective
        i. This Interactive Qualifying Project (IQP) will focus on developing a Mobile Application (app) to give mentors easy access to a variety of tools to assist new students in their transition to college. These tools will include mobile technologies focused on three specific settings: Academic, Social, and Personal Wellness. Tools for academic assistance will help students with class work, homework, studying techniques and faculty communication. Social tools will help students get more involved on campus and aid them in finding their place in their college community. Finally, the mobile app will also provide tools to help new students further their personal wellness.
3. Rough Outline:
    a. Abstract
    b. Acknowledgement
    c. Table of contents
    d. Introduction
    e. Background/ Literature Review
    f. Methodology
    g. Analysis

h. Technical and Participatory Design Processes
i. Summary
j. Conclusion

4. Action Items
    a. Devon – will make survey, post on class Facebook, and email out link
    b. Joyce – Timeline for A Term
    c. Ahmed – Questions
    d. All – Research
        i. Ryan – technology needed to construct app

5. Weekly Meeting
    a. Monday 4-5pm
    b. Wednesday 4-5pm
    c. Friday 2-4pm

Meeting adjourned 3:50 pm

Minutes of Group Meeting #5

September 16, 2015

Gordon Library, Ground Floor

Attendees: Ahmed, Devon, Joyce, and Ryan

Meeting called to order 4:00 pm

1. Meeting Presentation Discussion
    - Start off with Aaron's presentation, objectives, timeline, server that Ryan looked out.
    - Ask about IRB.
    - Finding articles
        - Tasks:
        - Continue working on proposal, present our 3 deliverables, research methods, research for students with disabilities

Meeting adjourned 4:30 pm

Minutes of Group Meeting #6

September 21, 2015

Sigma Pi, 17 Dean Street, Worcester, MA

Attendees: Devon, Ryan, Joyce, and Ahmed

Meeting called to order: 4:00 pm

1. IQP Paper Discussion
    - We went over the sections of the IQP paper
        - Put up the literature review for the different research options
        - We determined that we should separate the sections of the literature review (by topic) so that they are distinct
        - We should also write the contributions of each group member
2. For the upcoming weeks, the group will work on the following areas:
    - How are you planning to analyze the data, defining the problem, literature review, here is our timeline for project (for September, October, and November), here is how we are diving the work, here are options for focus groups, literature> which is the best method to collect the data: we plan to do this based on literature , what the document looks like in terms of major topics (outline of the write-up so far)
    - Find more literature and write out the different research sections
    - Divide up work on sections including the Introduction (which Joyce will work on) and the Methodology (which Devon and Aidan will work on). Also the literature review (which Ahmed will work on)

Meeting adjourned 4:45 pm

Minutes of Group Meeting #7

September 23, 2015

Gordon Library, Ground Floor

Attendees: Ryan, Ahmed, Devon, and Joyce

Meeting called to order 4:00 pm

1. Project updates

    - Talked about making a gantts chart.
        - We might add a control group for the survey (use the general WPI freshmen students)
    - Ryan brought objective paragraph to the writing center
    - Objective paragraph: Professor Loiacono wanted the paragraph to be sent to her
    - Joyce worked on the introduction of paper

2. Tasks

    - Show everyone the survey, and the parts of our paper.
    - Joyce will send us the agenda
    - Keep working on methodology

Meeting adjourned 4:40 pm

Minutes of Group Meeting #8

September 25, 2015

Sigma Pi, 17 Dean Street, Worcester MA

Attendees: Devon, Ryan, Joyce, and Ahmed

Meeting called to order 2:00 pm

1. IQP Project Updates

    - We are focusing on the mentors
        - The scope has been nailed
    - Discussed the different sections of the paper like intro, methodology, mentor resources
    - Ryan has mentor resources

2. Actions Items

    - We will keep working on paper sections
    - Post notes on Trello from Thursday
    - Consult with Jess and Laura on literature review, Jess will re-route Professor Loiacono and Professor Wang back to the focused scope
    - Show study methodology to everyone

Meeting adjourned 2:50 pm

Minutes of Group Meeting #9

September 30, 2015

Gordon Library, Ground Floor

Attendees: Aidan, Joyce, Ryan, Ahmed, and Devon

Meeting called to order 4:00 pm

Notes:

Discussion:

1. Projects Needs
    - App
    - Paper
    - Where to do from there
2. Put sections of the paper on Google Doc
    a. Devon – 1 ¼ page
    b. Ahmed – 15 pages
3. Start working on the Development of the app
    c. Skeletal structure with two things
        i. Basic stuff for an app
        ii. Option of useful apps
            1. Provide an end goal → we can't do it all
4. Survey
    d. We are approved for the survey
        i. Start early next week
    e. Working on the focus group
5. B-Term
    f. Ryan and Devon - coding
    g. Joyce, Ahmed, and Aidan – paper, survey, Visual

Action Items:

- Compile a list of app deemed helpful – Aidan

- Write and send out agenda – Aidan
- Send Ahmed the Literature - Ryan
- Place parts of paper on Google Doc - All

Tomorrow:

Aidan – to present

- Paper
    - Show them where we are at
- App
    - Using IPhone
        - More mentors have IPhones
    - Apps we are looking at
- Questions
    - Big Picture in our scope of the mentors?
        - Should we be collecting more data?
    - Ask about the proposal…How detailed?

Ryan – Minutes

Meeting adjourned 4:50 pm

Minutes of Group Meeting #10

October 2, 2015

Sigma Pi, 17 Dean Street, Worcester, MA

Attendees: Ryan, Joyce, Ahmed, and Devon

Meeting called to order 4:00 pm

1. Action Items

- Talk to admissions about app
- Find cost benefit analysis of apps that have been used (1 or 2 articles)
- Move survey to qualtrics (easy to do).
- Make methodology for choosing programming language
    - Finding article that backs up using an app for the iPhone
    - Can get feedback for the app
- Proposal: Introduction, background, source materials, methodology

- Look at ways to make an app look well
- Have Aidan work on making the mobile application look better

Meeting adjourned 4:30 pm

Minutes of Group Meeting #11

October 7, 2015

Gordon Library, Ground Floor

Attendees: Aidan, Ryan, Devon, Joyce, and Ahmed

Meeting called to order 4:00 pm

Discussion:

Aidan

1. Researched gathered for app/web design
2. Will start initial design for what the app might look like

Joyce

3. Showed the beginning of the proposal power point
4. Showed the admission app
    a. Many mini apps combined into a large WPI app
    b. Most application lead to links of WPI website
        i. First year students
        ii. Athletics

Ahmed

5. Cost benefit of a hospital app
6. App development → research showed that most people have androids
7. Talked to professor Loiacono
    a. Proposal due next week
    b. Elements of the paper given
8. Talked to admissions → another company developed the app

Tomorrow:

Lead → Aidan

Minutes → Devon

Discussion Cont'd:

Aidan

1. Show initial stages of design for app
    a. Research
        i. Menu layout
        ii. Text
        iii. Transition
        iv. Other application examples
    b. Will provide a power point w/ an image of what it might look like

Ahmed

2. Cost benefit analysis

Other

1. Proposal
    a. Presentation and paper
        i. Show the presentation
    b. Questions
        i. Is it incorrect?
        ii. What needs to be added?
        iii. How will the formal proposal presentation differ from the one we will be giving next year?

Action Items:

- Joyce – Finish the power point
- Aidan – Start the design of the app
  Send out the agenda for tomorrow
- Ahmed – Outline of paper on Google Doc
- All – Put information gained on Trello
- All – Writing on Google Doc

Meeting adjourned 4:45 pm

Minutes of Group Meeting #12

October 9, 2015

Sigma Pi, 17 Dean Street, Worcester, MA

Attendees: Aidan, Devon, Ryan, Ahmed, and Joyce

Meeting called to order 2:00 pm

1. Project Logistics
    - Self evaluations and peer evaluations
    - Practice Proposal in front of Eleanor next week.
    - Going over the design of the app
    - Joyce: finished the Introduction
    - Aidan will do the Non-technical methodology
        - Look at visual design info for future: especially HCI

Meeting adjourned 3:00 pm

Minutes of Group Meeting #13

October 28, 2015

Location: Aidan's apartment

Attendees: Ahmed, Aidan, Joyce, Devon, and Ryan

Meeting called to order 4:00 pm

1. We need to define the problem our app will solve. Need to define a problem statement.
2. Went over the Mentor survey, and features for the app
    - Timer app: Toggle
    - We could implement a to-do list
    - Coding language: Swift, Xcode
    - Gamification: Making the app appealing to mentors; we can do this toward the end

3. Tasks:

- Send Laura the consent forms for the focus group
    - 3-4 pm on Wednesday is when EDGE meets

- Give Ryan and Devon the following: the main page of the app, and the functionality.
- Weekly meeting tomorrow
    - We will review the feedback for the team dynamics and surveys (30 min); 10 min for the presentation critique ; next steps : where we will go from here (last 10 min)-> we can talk about where we are at in the coding and survey.
    - Ahmed: will lead the meeting

Meeting adjourned at 4:40 pm

Minutes of Group Meeting #14

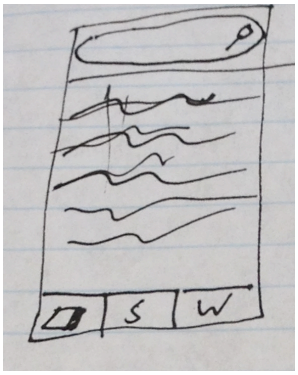
November 2, 2015

Sigma Pi, 17 Dean Street, Worcester, MA

Attendees: Joyce, Ryan, Devon, and Ahmed

Meeting called to order 2:00 pm

1. Mobile Application Development
    - The team discussed the main page of the mobile app



    - Ryan likes the idea of keeping all three icons at the bottom of the screen, and keeping a search bar on the top
    - Additionally, the team discussed features that we would want to implement based on the mentor surveys
        - For instance, we would want to implement the WPI tour app, a link to a list of clubs, and a messaging interface

Meeting adjourned 2:30 pm

Minutes of Group Meeting #15

November 4, 2015

Gordon Library, Room 112A

Attendees: Aidan, Ryan, Devon, Joyce, and Ahmed

Meeting called to order 1:00 pm

1. Discussed the proposal presentation that we will deliver to the clients tomorrow

- Slides to Present: Where we are going: Coding the app
- Literature, Conducting surveys (add the survey info gathered so far after slide)
  - Mentoring Programs, cost benefit of EDGE Program
- We can import Slides to Google Drive
- The team went over all the slides for the proposal presentation tomorrow

Meeting adjourned 1:15 p**m**

Minutes of Group Meeting #16

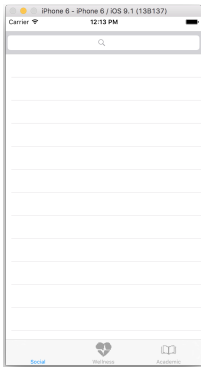
November 11, 2015

Location: Sigma Pi

Attendees: Aidan, Ryan, Devon, Ahmed, Joyce

Meeting called to order 12:00 pm

1. Ryan and Devon updated the team on their progress with the mobile app
   - Can place animations to put into the app (if we have extra time). 2 and ½ weeks left to code. Put the proposal presentation on Trello. Server side: for the app features; user will have to fill in the data.
   - We Showed Joyce the feedback we got from Laura and Jess
   - We will show initial prototype to Eleanor and Professor Wang;
   - Devon showed the team a screenshot of the main page of the mobile app
   - The icons at the bottom represent the three main categories of academic, social, and personal wellness



2. Tasks

    - We will ask about the IQP paper tomorrow, and about surveys, interviews, and focus groups; we will also get feedback for the mobile app from Eleanor and Professor Wang
    - Send Joyce Interview questions for Mentors

Meeting adjourned 12:30 pm

Minutes of Group Meeting #17

November 17, 2015

Sigma Pi Fraternity: 17 Dean St, Worcester, MA

Attendees: Ahmed, Aidan, Joyce, Devon, and Ryan

Meeting called to order 4:05 pm

1. Mobile Application updates

    - Search bar (working on it in the back end)
        - University of Illinois library
        - Placing color in it
        - Finding good themes in the app
        - Meeting with Jess & Laura:
        - Waiting to implement marketing principles (color scheme and text)
        - We have the splash screen
        - Will work on icons
    - Aidan's suggestions:
        - For text: want color associated w/ each topic

    - Keeping font easy to read ->defont.com ->good resource

2. Tasks
    - Show Jess and Laura the splash screen we have developed

Meeting adjourned 4:35 pm

Minutes of Group Meeting #18

November 18, 2015

Gordon Library, Ground Floor

Attendees: Joyce and Ahmed

Meeting called to order 1:00 pm

1. IQP Paper Discussion

- Data& Analysis: in research section
    - Ask whether email ads go in appendix
- Cost Benefit Analysis: can go in the literature review (end of lit. review)
- Additional Features Section: Joyce will help with this section
- Work on User interface section with Ryan and Devon
- Ask where marketing would go toward the end of the paper (near the conclusion)

2. Tasks and Questions to ask advisors

- Email all sections: send links to Joyce
    - Sections that we do have: go through how we all come up with designs: ask whether to include power point presentation and app development steps in methodology or in user design interface
- Send picture to Joyce
- Ask whether we should include all the meeting minutes

Meeting Adjourned: 1:30 pm

Minutes of Group Meeting #19

December 2, 2015

Sigma Pi Fraternity

Attendees: Joyce, Ahmed, Ryan, and Devon

Meeting called to order 4:00 pm

1. Updated each other on the progress of the project
    - Presentation: mostly app stuff; should we keep the same benefit; Will ask about final presentation power point tomorrow
    - 5 topics: basic of app, how we designed it and why; database stuff Ryan and Devon are doing, code architecture that they used, and a few more technical things if Ryan and Devon want to get into them
    - Can show the story board in the paper and project
    - Provide updates to Eleanor; ask questions about power point (how it is diff. from last power point)

2. Discussed the sections of Paper
    - Ryan and Devon Sections of the IQP Paper:
    - Coding reflection section (big reflection: project should be MQP)
    - Technical Methodology/ Tech Process -> We should ask why we did things the way we did

Meeting adjourned at 4:35 pm

Minutes of Group Meeting #20

December 7, 2015

Gordon Library, Ground Floor

Attendees: Joyce and Ahmed

Meeting called to order 5:10 pm

1. Discussed the IQP Paper
    - Went over the IQP paper with Joyce
    - Slides on the user interface &
    - Show Professor Loiacono sections of the paper that were added
    - Put the interview questions for mentees in the appendix
    - Joyce will also put the questions for the mentee and mentor survey in the appendix
    - Will make UI design a new chapter

- We can make the glossary in alphabetical order
- Highlight Sections of the paper to give to Joyce
- Add a summary of each section for the literature review at the end of the lit. review.

Meeting adjourned at 6:10 pm

Minutes of Group Meeting #21

December 9, 2015

Gordon Library, Room 112A

Attendees: Joyce, Ahmed, Ryan, Aidan and Devon

Meeting called to order 9:15 am

1. Went over final project presentation
    a. Practiced presenting the power point slides
    b. Added a couple of slides to the User Interface sections
    c. Also practiced using Echo recording software

Meeting adjourned at 10:00 a**m**

Minutes of Group Meeting #22

December 15, 2015

Salisbury Labs Room 407

Attendees: Joyce, Ahmed, Ryan, Aidan and Devon

Meeting Called to order 5:20 pm

1. The team recorded the presentation by using Echo software
    a. The team first practiced presenting the slides
    b. Then, the team delivered the presentation
2. After going through the presentation, the team discussed the IQP paper
    a. Went over the reflection portion of the paper
    b. Discussed the UI section of the paper and the sections that Ryan went over
    c. Also, talked about how we think the project went.

Meeting adjourned 7:00 pm