



Major Qualifying Project:

MBSR & College Students

A Major Qualifying Project (MQP) submitted to the faculty of Worcester Polytechnic Institute in partial fulfillment of the requirements for the Degree of Bachelor of Science in Management Information Systems (MIS)

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## Acknowledgments

The MQP Team would like to extend a thank you to everyone who aided in the success of this project, including:

Professor Loiacono for advising the project and providing the team with guidance.

Dr. Davis and Dr. Fulwiler of UMass Medical School for meeting with the team.

Amanda and Robyn of UMass for helping schedule weekly sponsor meetings and reserving a location to meet.

Everyone who helped spread the word about the survey and/or focus groups.

All mindfulness instructors at UMass and WPI that volunteered to be interviewed for this project, as well as to everyone that took the survey or joined the focus groups.

## Abstract

The MQP team's goal was to determine technologies that would aid in the recruiting, adherence, and retention of MBSR training with college students. To accomplish these goals, the team surveyed young adults from across the country, interviewed mindfulness instructors, conducted several focus groups, and studied the effectiveness of social media campaigns. Based on the analysis of the resulting data, mockups for a prototype mobile application were developed.

Ownership of the social media accounts was also transferred to the CFM.

## Authorship

This section details the contributions made by each of the three team members over the course of this project. Though this section is not all-inclusive, it covers many of the major items.

**Amber Facchini:** Amber's focus was on organization/planning and writing/editing the MQP report. She handled the majority of communications between the team, advisor, sponsor, UMass mindfulness instructors, and potential focus group volunteers. A sample of sections of the paper written by Amber include: the Introduction, Successful Applications of Mindfulness, and Surveys. Additional contributions include the creation of the web survey and preliminary analysis of its results.

**Meghan Lutz:** Meghan's focus was on data analysis. She summarized the qualitative data from the instructor interviews and carried out statistical analysis on the survey data. A sample of sections of the paper written by Meghan include: An Epidemic of Anguish, Focus Groups, and Interviews. Additional contributions include hanging all flyers around campus, creating the artwork for the app mockups, and interviewing the Student Development and Counseling Center.

**Haili Welton:** Haili's focus was on maintaining all social media accounts associated with this project and analyzing the results of the campaign. She posted to the Twitter and Instagram accounts and sought ways to increase their followers. She also worked to develop the College Room on cfmHOME. A sample of sections of the paper written by Haili include: Technologies to Help with Retention, and Mindfulness as it Relates to Buddhism. Additional contributions include interviewing the Student Development and Counseling Center.

All three team members conducted MBSR Instructor Interviews together. Likewise, all three team members conducted the November 4th focus group together.

## Executive Summary

Mindfulness, “the practice of maintaining a nonjudgmental state of heightened or complete awareness of one's thoughts, emotions, or experiences on a moment-to-moment basis; also : such a state of awareness,” is growing in popularity as a treatment for depression, anxiety, stress, and chronic pain or illness. In 1979, Jon Kabat-Zinn founded a Stress Reduction program based on mindfulness, which was later named Mindfulness-based Stress Reduction (MBSR). Since the program's founding, over 22,000 people have completed the eight-week program.

Though MBSR has proven effective, training has mainly focused on adults. The goal of this Major Qualifying Project (MQP) was to identify technologies that may aid in the recruitment, adherence, and retention of college students in MBSR. The project team investigated ways that technology, particularly social media, might aid training MBSR.

To accomplish these goals, the team employed a web survey, interviewed mindfulness instructors, and conducted focus groups. To gather a broad array of respondents, the survey was broadcasted across both personal social media accounts as well as accounts created just for the project. Flyers were hung around WPI's campus, and the team also contacted old friends who might be willing to take a survey. With over 100 respondents, more than 20 colleges, and 55 majors represented, the results generated from the research allow for greater generalizability.

The team was able to reach out to mindfulness instructors via its sponsor, UMass Medical School, and found volunteers at the Center for Mindfulness (CFM) that were willing to discuss their views on the young adults that they had in their classes. Likewise, the team was able to interview the instructor of a mindfulness group at WPI.

Focus group recruitment was a bit difficult for the team, as volunteers experienced changes of heart and no longer wished to participate, or were unresponsive when contacted by the team. Some recruitment was done via the survey, some was done via reaching out to the Office of Disability Services (ODS) who advertised the focus group on the team's behalf, and some recruitment was done out of the mindfulness group at WPI.

The focus groups served as confirmation for what the survey data had indicated; young adults are fond of a mindfulness mobile application, as well as online exercises. The survey data likewise indicated that the app was popular whether or not a young adult is suffering from a mental health condition. This finding is fortunate, as the app can be advertised to all young adults, and may reduce any stigma surrounding it as an app for young adults with mental health conditions. Meanwhile, online exercises could be linked to the app, with videos available on YouTube, on cfmHOME, and on the app itself.

The focus groups confirmed that young adults prefer a hybrid approach of both technology and live classes, opposed to mindfulness purely through live classes or purely through technology. The focus group volunteers also expressed interest in the app having as many functionalities as possible, including a chat room, which is a way the college room (which scored poorly on the survey, potentially due to a misunderstanding as to what it was) could redeem itself.

Though these findings are interesting, the sample sizes of some of the groups studied were slightly smaller than the team would have liked. The chronic pain/illness group was an especially small group, and definitely requires more research to confirm any results. In addition to further research on particular mental health conditions and chronic pain, moving forward, the team recommends that a mobile app be built, and to this end, the team has supplied some mockups as to how such an app might look.



**Figure 1: Main Page of Proposed Mobile App, Detailing Where the Ideas Surfaced and Page Connections**

## 1 Introduction

Though on the surface it may be hard to see, many Americans are suffering. Mental illness is prevalent in the country and statistics serve well to illustrate the phenomenon. From 2013 data, one in four Americans experience a mental health (MH) problem in a given year, and one in seventeen live with a serious mental health issue [1]. This totals to 61.5 million and 13.6 million adults, respectively (NIH, n.d.a). Further, 6.7 percent of American adults suffer from major depression, and 18.1 percent live with some form of anxiety disorder, ranging from panic disorders to posttraumatic stress disorder. That is 14.8 million and 42 million lives, respectively (Duckworth, 2015).

Though this snapshot of adult mental health is startling, the picture of youth mental health is even starker. One in five youths from the ages of 13 to 18 suffer from a severe mental health disorder in a given year, meanwhile the age group of eight to 13 is estimated at 13 percent (NIH, n.d.b).

Comparing the two groups - adults and youths - the results are troublesome. Sixty percent of adults and about 50 percent of youths between the ages of eight and 15 receive no treatment (NIH, n.d.c). For chronic mental health issues, 50 percent crop up by age 14, and 75 percent surface by age 24 (Kessler, 2005). Sometimes decades pass before ailing individuals seek treatment (Duckworth, 2015).

The impact of these illnesses is staggering. For those between the ages of 18 and 44, depression and other mood disorders are the third most common cause of hospitalization (Wier, 2011). On average, Americans living with some form of mental illness die 25 years earlier than their mentally healthy counterparts. Mental health illness increases the risk of other chronic medical conditions for an individual, which are typically treatable (Parks, 2006). Suicide is the tenth most common cause of death in America, and it is the third most common for those between the ages of 15 and 24 (McIntosh & Drapeau, 2012). Over 90 percent of suicide victims suffered from at least one mental disorder (American Association of Suicidology, 2012).

Though alarming, there exist numerous potential remedies for this situation; medical organizations are seeking unconventional ways to beat back mental illness. One such method is Mindfulness-based Stress Reduction (MBSR). In 1979, Jon Kabat-Zinn founded a Stress Reduction program based on mindfulness. Since its founding, over 22,000 people have

completed the eight-week program. The goal of the program is to teach participants how to use the resources that they already possess but may not be in touch with in order to combat pain, stress, and sickness. MBSR is a combination of science, medicine, psychology, and Buddhist Dharma (meditative practices). Mindfulness is heavily linked to Buddhist meditation, as both seek to refine one's awareness, attention, compassion, and wisdom (CFM, 2015).

Though MBSR has proven to be effective in many cases, mainly adults enroll in the program. UMass Medical Center's Center for Mindfulness (CFM) is seeking ways to expand the reach of this program to include more young adults, particularly college students. For this reason, they have engaged a WPI Major Qualifying Project (MQP) team.

## 1.1 Project Objective

The goal of this Major Qualifying Project (MQP) was to identify technologies that may aid in the recruitment, adherence, and retention of MBSR with college students. The project team intended to conduct research on ways that technology, particularly social media, might pair well with MBSR. The team initially believed that these technologies would entail apps for personal devices that play guided meditative tapes, Facebook groups to build a sense of community, and so on; towards the end of the project, it became clear that an app and online exercises were the leading options.

The team reached out to college students, by means of surveys and flyers, to get their opinions on whether such pairings of technology would be effective in introducing young adults to mindfulness and recruiting them, as well as potentially aiding them in their adherence to and retention of mindfulness. Likewise, the team sought respondents' ideas on other pairings that may work. Worcester Polytechnic Institute (WPI) students served as a pilot sample, and from there the team expanded the study to include as many other college's students as possible given the project time limit; the team had great success with this for the survey, though the focus groups consisted only of WPI students. Ultimately, the team's findings helped develop a prototype, in the form of mockups of an app, based upon survey and focus group feedback. Said prototype mockups will hopefully lead to a grant and further development of the app.



In the sections that follow, the background, literature review, planning, and research methodology of the project are presented in greater detail. The purpose of these sections is two-fold. First, it demonstrates the research conducted by the team as the team immersed itself in mindfulness, ways that mindfulness has successfully worked in the past, the planning the team went through in deciding how best to tackle this project, and ultimately how the research was carried out. Secondly, these sections give the readers of this report relevant knowledge on mindfulness and allow them to better understand this project. The final sections delve into the results, analysis, and conclusions drawn from this project, presenting what the team found and why it is meaningful as well as what must be done moving forward to further this research.

## 2 Background

In order to frame this project, it is important to understand several details. In the sections of the background chapter that follow, first the key members of this project are described. This serves to differentiate names of contributors to the project from important figures in the history of mindfulness, and to familiarize the reader with those involved. Next, technologies are introduced that may help couple well with mindfulness. Following the technologies, mindfulness and its history are further discussed, first considering its Buddhist roots, then organizations that support mindfulness, and finally some details on coverage of mindfulness over the years. The background chapter ends with a section detailing the need for mindfulness.

### 2.1 Key Members of this Project

This project is a joint work between Worcester Polytechnic Institute (WPI) and UMass Medical School (UMass). From WPI, Dr. Eleanor Loiacono, Amber Facchini, Meghan Lutz, and Haili Welton are contributors. Professor Loiacono is the advisor of the project, and Amber, Meghan, and Haili are senior undergraduates carrying out the research, data collection, analysis, conclusions, and report writing. From UMass, Dr. Carl Fulwiler and Dr. Maryann Davis are contributors. Dr. Fulwiler and Dr. Davis are the project sponsors and the team's point of contact with UMass. This research builds on Professor Loiacono's expertise in human-technology interactions, Dr. Fulwiler's expertise in mindfulness interventions, and Dr. Davis' expertise in young adults with mental health conditions.

In the section that immediately follows, the undergraduate team relates its research into technologies that may help with retention of mindfulness, particularly social media.

## 2.2 Technologies to Help with Retention

According to Merriam-Webster, social media encompasses different “forms of electronic communication ... through which users create online communities to share information, ideas, personal messages, and other content.” There are many different types of widely used social media platforms that allow users to communicate and network in many ways. Research on Generation Y and their use of social media identifies two consumer categories that are broadly defined “as either contribution (posting) or consumption (lurking or observing) activities” (Schlosser, 2005; Shao, 2009).

Social media encompasses social networking sites such as Facebook, Twitter, and LinkedIn, user-generated services (blogs), video and picture sharing sites including YouTube, Vine, Tumblr, Instagram and SnapChat, virtual game worlds, and online communities including chat rooms and classes. This project focuses on how technology can enhance the retention and adherence to MBSR; therefore we have deemed certain social media platforms as inadequate for information flow, as they are simply more socially driven. Platforms such as virtual game worlds and picture sharing sites including Vine, Tumblr, and SnapChat, are arguably beneficial to students who are looking for an outlet to express themselves, however are not deemed an appropriate or effective tool for information display regarding MBSR. Though virtual worlds will not help with the retention of MBSR among college students, there are certain social media sites that are more beneficial and will get the job done. The team initially identified a number of the previously stated technologies that have the potential to help with retention of Mindfulness-based Stress Reduction (MBSR) in college students. These include Twitter, Facebook, YouTube and online courses. After the team received early feedback with the survey, Instagram was suggested as a proposed medium for MBSR that we previously did not deem as one of our top platforms for information display.

Ring true to the “social” aspect, many social media sites such as Twitter and Facebook offer personalization, making user experience seemingly more engaging and leading to higher retention among users. Personalization enables a sense of a stronger connection between users, which is especially important for those with mental illness, who often feel like they are alone. With the focus on the recruitment, retention and adherence to MBSR among college students, the

team will find it important to speak their language using information display on certain social media platforms.

### 2.2.1 Twitter

On the official Twitter website (<https://twitter.com/>), the tagline reads, “tell your stories here,” followed by the mission: “to give everyone the power to create and share ideas and information instantly, without barriers.” In other words, Twitter is a social communication tool that enables a user to connect with friends, family and other fascinating people around the world. Users are able to broadcast short messages, called tweets that are limited to 140-characters. Tweets can be sent via web-based applications as well as mobile devices, and can include content such as text, hashtags, links to web pages, images, and videos. One of Twitter’s attributes is its follow feature, where one can request to follow another user and receive access to view their tweets in a list known as the Twitter stream. Similarly, anyone who chooses to follow you will be able to view your tweets in their stream. Users create a customized profile, with a personal Twitter Name, Display Name, Location, and possible Website. Users also choose a photo to represent their account, as well as a background picture to make the overall experience very personalized.

Twitter is used as a means of social interaction, as well as a platform for business advertisements or displaying information to the community on a small scale, or the world at large. Once a tweet is sent out, it will be viewable on the user’s page as well as each of their followers’ streams. Tweets can include the use of hashtags, which make a word or phrase a direct link to other tweets containing the same word or phrase. Tweets are saved automatically and can be accessed at any time by followers unless the user removes the tweet. With the ability for information to be presented concisely and saved on display, Twitter is an application technology that may help with the adherence and retention of Mindfulness-Based Stress Reduction (MBSR). Given the surge of Generation Y’s technology and social media use, Twitter is already a largely accepted platform among college students and can be used to target those with mental health illnesses.

### 2.2.2 Facebook

According to the Facebook Newsroom, Facebook (<https://www.facebook.com/>) was founded in 2004 with the mission to “give people the power to share and make the world more open and connected. People use Facebook to stay connected with friends and family, to discover what’s going on in the world, and to express and share what matters to them.” This social networking site was originally developed for use by college students, however has expanded to connect users of many ages from around the world and different demographic backgrounds. Facebook, like Twitter, can be used from a web-based application on one's computer or mobile device, and is membership based, where one registers to create a free account. From there, users develop a public profile and begin connecting with other users through the Facebook directory. Profiles offer information such as a user’s birthday, hometown or current location, contact information, school and work history, personal likes, friends, photos, and many other details that a user may be willing to offer. The Facebook Wall is a part of the user’s profile and, similarly to Twitter, it displays statuses or photos posted. The Facebook home page is a timeline where friends’ posts appear. Once connected with their “friends,” users can leave messages on a friend’s wall for everyone to view, as well as send a private, personal message directly to his/her inbox.

One aspect of Facebook that is important to this project is that it allows users to create and join groups and events. Users can also invite others to become a member of a group or event, connecting people globally with similar interests or needs. Facebook groups allow members to post to the group’s main page, leave comments and discuss with as much or as little contribution as they would like to offer. Facebook enables an ease of communication as well as information transfer and display, whether public or private, making it a viable candidate as one of our recommended technologies. The social networking site will contribute to the recruitment and retention of MBSR among college students.

### 2.2.3 YouTube

YouTube (<https://www.YouTube.com/>) “provides a forum for people to connect, inform, and inspire others across the globe and acts as a distribution platform for original content,” according to the site’s mission statement. It is a popular video sharing service that allows users to view videos from across the Web, as well as upload content after creating an account. It is used mainly for entertainment purposes, but also as an educational tool and information aid. As well as hosting millions of videos, YouTube also lets users rate videos, post comments, and subscribe to producers. YouTube videos can also be easily accessed from other locations, such as websites, blogs, or power points with a navigation link. In this way, video sharing has become a large and pertinent tool among college campuses, utilized by professors and teachers, in the workplace for presentations, and on free time for entertainment.

The team analyzed YouTube as an educational tool, as it is first and foremost an easy and convenient way to view and share clips of any kind. YouTube’s potential in the classroom as well as for individual study is becoming more and more pertinent this day and age. The ability to imbed a link directly into a PowerPoint lecture allows versatility for a professor teaching a complicated subject. It can break up a somewhat droning lecture with a video that perhaps a more qualified professional has recorded and uploaded. Similarly, by searching a specific topic, users can find an abundance of videos explaining the various ways to go about teaching said topic. For example, a medical school professor may have trouble explaining to his class the range of symptoms that patients experience with a complex neurological disorder such as tarditive dyskinesia. The professor is able to show his class a YouTube video to better get the points across, contributing to the idea that “a picture is really worth a thousand words, or much more than that” when a video is utilized (Mohideen, 2010).

YouTube can also be a valuable resource for the retention of Mindfulness-based Stress Reduction and college students. It can allow for a Mindfulness Instructor to post videos of classes that will be available on users' mobile devices to take anywhere. The comment section can be an important tool for users to connect and talk about how effectively the class worked for them, or to post links to other videos that might be related and helpful.

However, as YouTube is comprised of user-uploaded content, some of it may not be reliable or legitimate. Because MBSR is a technique that takes practice and must be led or

taught by a certified instructor, one must be careful of knock-off or false video content that may be inaccurate or inappropriate for mental health students. The comment section is also of concern, where some of the comments can be negative and degrading. It will be important that users can distinguish between the MBSR videos posted by professionals, and those posted by people who just have extra time on their hands. Due to the unmonitored video display on YouTube, the team has put the site on the backburner for MBSR information display.

#### 2.2.4 cfmHome

cfmHOME is an online “living room” launched in 2015 as a project of the Center for Mindfulness at the UMass Medical School. As a website, it welcomes users to its “mindfulness community,” enabling them to learn about mindfulness, join conversations and connect with other users who are also interested in awareness techniques. The website is used as a platform to support mindfulness practitioners, teachers and researchers globally. A variety of online resources including community discussion forums and other digital media are available at cfmHOME. Launched recently in 2015, the project is still in its early stages of development, therefore it has the potential to grow as more people become interested in mindfulness. The unique feature that this site offers is its “rooms” that the community can join. Currently, the cfmHOME consists of a Living Room, Video Room, Teachers’ Lounge, and Science Corner. Each room welcomes users to learn about mindfulness by joining conversations, explore mindfulness-related digital resources, join in peer-led conversations about the science and theory behind mindfulness, and gain insight on support and teaching tips, respectively.

In discussion with Dr. Carl Fulwiler with UMass Medical, the team deemed it an option to introduce a College Room to the website. This would enable college age students to connect with others who have a similar mental health illness as well as discuss it in a safe environment. After receiving the OK from Dr. Fulwiler to create a room, the team began looking into naming options such as “The College Room”, “The Campus Center”, and “The Quad.” Once the room is created, the team aims to market cfmHOME, especially the College Room, on its Twitter and Facebook pages. In this way, those who have never heard of the online living room will have access to learning tools associated with MBSR.

The following chart was constructed using information from various infographics and regularly updated new age media blogs (Small Business & Entrepreneur Hub, 2015; Social Media Comparison Infographic, 2015; Comparison Chart for Choosing Between Top Social Media Sites for Marketing, 2013).









	<b>Facebook</b>	<b>Twitter</b>	<b>YouTube</b>	<b>cfmHOME</b>
				
	Social networking and content sharing site <a href="https://www.facebook.com/">https://www.facebook.com/</a>	Micro blogging social site that limits each post to 140 characters <a href="https://twitter.com/">https://twitter.com/</a>	Distribution platform for original content & videos <a href="https://www.youtube.com/">https://www.youtube.com/</a>	Online “living room” for the mindfulness community <a href="https://www.cfmhome.org/">https://www.cfmhome.org/</a>
	>1,000,000,000 USERS	645,750,000 USERS	>1,000,000,000 USERS	3,750 users
<b>INDUSTRY IMPACT</b>	B2B/B2C	B2B/B2C	B2C	B2C
<b>SITE FOCUS</b>	Sharing of news, content & stories as a business platform or for social interaction	Sharing of news, content & stories as a business platform or for social interaction	Sharing of informative & entertaining videos	Online resources for mindfulness & sharing of digital media
<b>EXPOSURE OPPORTUNITIES</b>	<ul style="list-style-type: none"> <li>- “Likes” or comments on content</li> <li>- Sharing of posts</li> <li>- Unlimited posts</li> <li>- Unlimited characters/post</li> </ul>	<ul style="list-style-type: none"> <li>- Retweets &amp; follows</li> <li>- Hashtag use</li> <li>- Unlimited posts</li> <li>- Posts limited to 140 characters</li> </ul>	<ul style="list-style-type: none"> <li>- Subscribe &amp; share activities</li> <li>- Unlimited views</li> </ul>	<ul style="list-style-type: none"> <li>- Discussion forums within rooms</li> <li>- Must register</li> </ul>
<b>FEATURES TO HELP MBSR</b>	<ul style="list-style-type: none"> <li>- Group/Event creation</li> <li>- Information display</li> <li>- Post YouTube links</li> <li>- Comments provide feedback</li> <li>- Post link to survey</li> </ul>	<ul style="list-style-type: none"> <li>- Tweets/Retweets</li> <li>- Post YouTube links</li> <li>- Hashtags</li> <li>- Post link to survey</li> </ul>	<ul style="list-style-type: none"> <li>- Sharing of MBSR videos</li> <li>- Access to related mindfulness videos</li> </ul>	<ul style="list-style-type: none"> <li>- Centered around mindfulness</li> <li>- Group discussion forums</li> <li>- Teacher/student interaction</li> <li>- Available mindfulness resources</li> </ul>
<b>PRIMARY AUDIENCE</b>	All	Young Adults	All (Most usages seen between ages of 18-34 )	Scientists, Researchers, Clinicians, Meditators, Teachers, Students, Community

Table 1: Strengths and Uses of Social Media Types

### 2.2.5 10% Happier: Meditation for Fidgety Skeptics

10% Happier: Meditation for Fidgety Skeptics, is an application for Smartphones where users have the opportunity to take a two week course and learn how to meditate with skeptical newsman Dan Harris and one of the greatest American meditation teachers, Joseph Goldstein. The app was created in response to a New York Times Bestselling book, 10% Happier, by Dan Harris. His book explores how his on-air panic attack in 2004 prompted him to search for a way to defang the voice in his head. He found meditation, and it has helped him control his emotions (Apple, 2015).

The goal of this app is to teach meditation to users who are often skeptical about the concept and show them not only different meditation practices and how to meditate, but also the benefits and unexpected, positive impact that meditation can have on anyone's daily life. It shows users that mindfulness meditation is a simple, secular, scientifically validated exercise for your brain. Meditation is no panacea, but it can make one 10% Happier (Apple, 2015). The application accomplishes this by using Dan Harris's real life examples, feelings about mediation, and experiences in a way that connects with users.

Included in the app are: daily video lessons that teach the essentials of meditation and mindfulness, guided audio meditations that walk one through the practice in the simplest possible way, and because self-discipline is not always enough, one also gets a living, breathing coach from Change Collective to help you follow through (Apple, 2015).

Change Collective builds lifestyle courses led by world-class experts, designed to help people kick start change. At the heart of each course is the voice of a true expert - someone who lives and breathes the change, and who has helped countless others make it happen. Every Change course comes with a personal coach who provides real-time support and accountability. Change coaches are steeped in the course topic and trained in the principles of behavior change science (Apple, 2015). The course content describes various aspects and values of meditation coupled with daily meditation practice. Overall, 10% Happier is a very good introduction for anyone who is skeptical about mediation. Screenshots of this application are pictured in Figure 2: Screenshots of the Smartphone Application, 10% Happier: Meditation for Fidgety Skeptics.

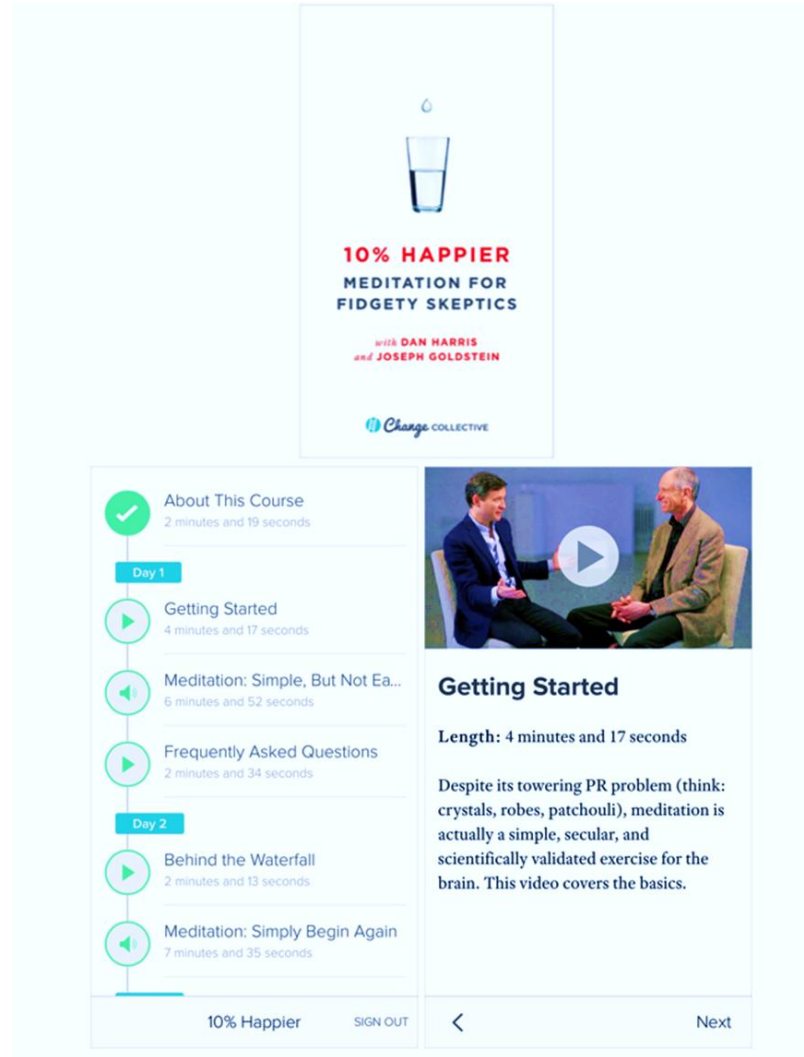


Figure 2: Screenshots of the Smartphone Application, 10% Happier: Meditation for Fidgety Skeptics

The above screenshots show the general layout of the Smartphone application and how it works. The application is organized by day and shows users a series of videos that they will watch each day, followed by what meditation session they will do as a part of the two-week course.

As the Meditation for Skeptics app implies, there is a connection between mindfulness and Buddhism through meditation. The section that follows describes this connection.

## 2.3 Mindfulness as it Relates to Buddhism

Located in Redwood City, California, the Insight Meditation Center (IMC) is a community-based urban meditation center dedicated to the study and practice of Buddhist teachings. Gil Fronsdal, co-teacher for the IMC and a teacher since 1990, wrote “Mindfulness Meditation as a Buddhist Practice,” conveying that mindfulness can be accomplished without Buddhism, however Buddhism cannot be practiced without mindfulness. He delves into three overarching goals to mindfulness meditation in the Buddhist context. These consist of knowing the mind, training the mind, and freeing the mind.

Knowing the mind deals with the simple process of discovery. With a focus on knowing, there is no attempt to change anything. This might be difficult for those who are constantly trying to make something happen, however just observing where the mind is at during points in time can be a radical relief.

Training the mind deals with shaping the mind so that it can operate in ways that are more beneficial for the individual. Fronsdal holds that “an important part of Buddhist practice is taking responsibility for the dispositions and activities of our own mind.” When we don’t hold this responsibility, external forces such as media, advertisements, and society will hold the key to our shaping.

The first goal in Buddhist practice to mindfulness meditation, knowing the mind, will reveal what is present in one’s conscious thought, and enable the third goal of mindfulness, freeing the mind, to emerge. Fronsdal teaches, “Central to Buddhist practice is training the capacity to let go of clinging,” or holding onto unwanted thoughts. Knowing the mind will show how and where this clinging is present, and Buddhism enables one to release these thoughts and free the mind.

Knowing, training, and freeing the mind develop together and contribute to a larger goal of mindfulness. With knowledge, comes ease of training and knowing what needs to be released. The more we train our minds, the more knowledge and wisdom we develop to let go. As we let more and more go, we see less obstacles come in the way of understanding ourselves, making it easier to train the mind.

Fronsdal concludes that caring for the body is a daily task, through eating, sleeping and exercising. The mind needs regular care as well, with consistent exercise and training. The goal is to care for the mind so much so that there is freedom from suffering. In this way, knowing, training, and freeing are the three Buddhist ways of caring for the mind.

### 2.3.1 Buddhism and Meditation

*Mindfulness, Stress Reduction and Healing*, a Google Tech Talk given by Jon Kabat-Zinn, overviews how meditation is used as a healing tool for stress. Mindfulness-based Stress Reduction deals with the interplay between the mind and body, therefore MBSR in practice can also be applicable to people with disclosed MH illnesses. It aims to change one's perception of stress, and similarly can change one's perception of a mental health issue and the perceived stress that comes along with it.

MBSR encompasses meditation, dialogue, reflective inquiry and mindful yoga. Mindfulness is universal, and Mr. Kabat-Zinn holds that "the most articulate expression of mindfulness on the planet comes out of the Buddhist tradition." When people had approached Buddha with the question of "are you a God?" he replied with "I'm awake," as he understood the importance of being completely present and one with the mind and body. The Buddha is a representation of states of mind, and in this fashion the mind should always be awake. It is possible, however, to be awake and still operate on autopilot. Meditation calls the mind and body to pay attention, switching from unconscious thought and action to conscious being. The implication of unconscious actions or an autopilot mode is that an individual may never be where they actually are. They may drown in their perceptions of MH and the stress that it creates. Mindfulness in everyday life pays attention to the body, mind, breath and world itself. Mr. Kabat-Zinn reveals that if people think they are "under intolerable amounts of stress," they create their own reality and indeed will feel heightened pressures. By practicing MBSR, one's perception of stress will be altered. Patients will learn how to better cope with the stress that disclosed MH illnesses may bring, and they will learn new and healthier ways to channel their associated emotions.

### 2.3.2 Dharma Punx

Individuals experience problems in everyday life, some unfortunately more than others if they are living with disclosed MH. “Dharma” means “protection,” therefore by practicing Buddha’s teachings one learns how to protect oneself from suffering and problems.

The story of Dharma Punx follows a young man, Noah Levine, amidst a generation of angry youths, where rebellion was seen at home, in school, and in the community. Levine was not subject to mental illness, however suffered from anger and frustration in his young life. Levine’s early search for meaning in life took the form of self-destruction, revolving around “punk rock, drugs, drinking, and dissatisfaction.” However as rock turned into funk, and drugs and alcohol began to take a toll, Levine began to search for positive ways to channel his rebellion against his perceived lies of society.

Levine was led to Buddhism practice and meditation, and he learned to channel his aggressive energy to “awaken his natural wisdom and compassion.” Levine, after changing his own life for the better, became a Buddhist teacher, author and counselor. Along with meditation workshops and classes, Levine seeks to channel the anger and aggression from the nation's most prominent homes for anger: juvenile halls and prisons. Here, it is common that inmates are angry simply for being held prisoner, so teaching them to release these negative feelings can improve the overall atmosphere of the prisons.

Similarly, the benefits of release can be applied to those with disclosed MH. Providing individuals with mental illness the tools to reduce their feelings of anger and frustration is potentially very beneficial. Meditation can allow people to stimulate areas of their brain and release Dopamine, affecting brain processes that control emotional response (The Happy Brain Chemicals, Altered States). Practicing Dharma is the superior method for improving the quality of human life, enabling your brain to emit more positive chemicals such as Dopamine and Serotonin. This is accomplished by focusing on the inner development of peace and happiness, rather than on material progress. One must live moment to moment, generating positive thoughts, rather than submerge themselves into the big picture that can sometimes be overwhelming and encourage feelings of stress.

## 2.4 Organizations Supporting Mindfulness

This section describes organizations that support mindfulness, via different approaches. The first two organizations described below offer support for people battling mental health conditions. The next two organizations continue the trend of seeking ways to improve lives, but also incorporate mindfulness more heavily in their missions.

### 2.4.1 Transitions RTC

Transitions RTC, short for the Learning & Working During the Transition to Adulthood Rehabilitation Research & Training Center, offers support for people between the ages of 14 and 30 who are battling mental health conditions as they work to improve their lives. The focus of Transitions RTC is to help this population successfully enter the workforce. The three research aims of Transitions RTC are to conduct population studies on this age group, to study systems that provide interventions, and to develop research-derived interventions (UMass Medical, 2015).

### 2.4.2 SPARC

The Systems and Psychosocial Advances Research Center (SPARC) works in collaboration with the Department of Mental Health (DMH). SPARC has made it its mission to improve the mental and behavioral health of citizens via systemic interventions, research, training, and so on. The center aims to also guide and inform political leaders in the development of public health policies (SPARC, 2015). Though similar to Transitions RTC, SPARC serves a wider scope: all citizens, instead of just 14 to 30 year olds.

### 2.4.3 Center for Mindfulness

The Center for Mindfulness (CFM) has made its mission to further mindfulness through varied means. There are seven strategies the center follows: Advance, Extend, Transform, Honor and Nurture, Address, Cultivate, and Expand. Their vision is to advance societal health through mind and body research. They aim to geographically extend the range of coverage for Stress Reduction Clinics. They seek to transform how medicine is practiced via the incorporation of mindfulness education for physicians and other healthcare professionals. They wish to honor and nurture youth via school programs as well as address the needs of individual organizations with programs that fit their particular wellness needs. They aim to cultivate relationships with healthcare providers in order to offer programs on mindfulness. Similarly to the extend initiative, they seek to expand the mindfulness community by reaching out on both a local and global scale (CFM, 2015).

### 2.4.4 The Mind and Life Institute

The Mind and Life Institute, more frequently called “Mind and Life” for short, was established in 1987. The Dalai Lama of Tibet, a lawyer, and a neuroscientist came together to perfect what they viewed to be an incomplete scientific approach for investigating reality. The three believed that by melding empirical sciences with introspective contemplation, lives could be improved, and science could contain a greater human element (MLI, 2014).

Mind and Life began as a forum of discussion, covering topics from neuroplasticity to altruism, ethics to economics. These discussions are known as Dialogues with the Dalai Lama, or "Dialogues" for short. Beyond these Dialogues, the non-profit has grown over the years and now offers funding via grants and scholarships. Mind and Life has assisted researchers in the production of dozens of studies and over 200 print items like journal articles and books (MLI, 2014).



## 2.5 Coverage of Mindfulness Over the Years

This section details coverage of mindfulness over the years, both on television and in scientific discussions. This section is chronological, starting in 1993 and working up to 2014. Examining the dates of these events, it appears that mindfulness had more coverage from the 90s through 2005, and is just now resurfacing again. Thus the time may be ripe, in this context, to spread mindfulness to more young adults via a grant.

### 2.5.1 1993 Moyers' Program: Healing and the Mind

In 1993, Moyers & Company aired a documentary series with the aim of changing how viewers perceived health and illness. February 23, 1993 was the date of the Healing From Within special, in which Moyers interviewed Jon Kabat-Zinn (Moyers, 1993).

Thirteen years after establishing the stress reduction clinic, Kabat-Zinn had seen more than 5,000 patients, many of which were referred to him because neither conventional doctors nor medicine could do more for them. Moyers joined a session in which Kabat-Zinn worked with mentally healthy people with troubling conditions; one could die of a heart attack with no warning, two had serious back injuries that left them in terrible pain, another had most of her bowel removed, and another learned that both she and her baby were HIV-positive (Moyers, 1993).

To teach mindfulness, the first meditation exercise was an eating exercise. Kabat-Zinn had his patients eat one raisin at a time, slowly, chewing and tasting the raisin. He pointed out that frequently when people eat, they are multitasking and not paying attention to their food. This is the first exercise in learning how to be where one is, 100 percent (Moyers, 1993).

Kabat-Zinn later in the program states that meditation is really about learning how to recognize the chatter of the mind and decipher its patterns. He likens mindfulness to fishing, in that when the mind goes off after a thought, it needs to be reeled back in (Moyers, 1993).

The program mentioned an interesting statistic: treatment of pain around 1993 cost the United States \$63 billion per year. To combat pain that doctors could not solve, patients would be prescribed to Kabat-Zinn's clinic. Some would refuse at the mention of meditation,

immediately stating it was "not for them." A gastroenterologist from UMass expressed his views of Kabat-Zinn and his patients:

He deals with the toughest ones. That's why ... that's why I admire him so. And I think most of the physicians do because ... he takes the people we can't help. Those are the ones who get to Jon. (Moyers, 1993)

The idea of mindfulness is to understand one's pain and anxiety; the purpose of the clinic was not to make it vanish, but to learn to coexist with it in the present. The goal is to stop patients thinking long term about their pain and to get them to focus on one moment at a time, in which it is more bearable (Moyers, 1993).

One participant asked Kabat-Zinn if meditation was just a Band-Aid, something they might only turn to when needed. Kabat-Zinn turned the analogy to a parachute; one does not want to create the parachute the moment it is needed, but weaves it continually so that when one needs it, it is ready (Moyers, 1993).

Moyers returned on the eighth and final class for that group of patients. One patient remarked of her changes:

One of the reasons I came here was muscle spasms. And I haven't had ... hadn't one until the other day. All of a sudden I had to stand up suddenly and I suddenly thought of my breathing. And I put my hands down on the coffee table and I concentrated on my breathing and all the anxiety that I was feeling just...just went. And as soon as that went, the muscle spasm let up. It was ... like a miracle. (Moyers, 1993)

Patients reflected on how at first they were skeptical, especially given the hassle to reach the clinic in some instances. One that nearly abandoned the classes on the first day reported now finding joy in her life. Statistics from the period reported that three out of four of Dr. Kabat-Zinn's patients improved at least moderately, and that four years beyond the class, 90 percent still practiced their meditations (Moyers, 1993).

### 2.5.2 NIH 2004 Symposium

In 2004, the National Institute of Health had a symposium dedicated to mindfulness meditation, located in Bethesda, MD. The symposium lasted for a full day on May 27 and featured Kabat-Zinn as a speaker. The page detailing the day's schedule explained the topic to then-perspective attendees, highlighting the goal of awareness and its byproducts of calmness and serenity. The explanation continued, describing the relative newness of mindfulness:

Mindfulness meditation is thought to be helpful in reducing stress, and may also be useful in the treatment of a variety of mental disorders. Research is beginning to focus on possible mechanisms through which this form of meditation may affect physical and psychological well-being, such as altering immune function. (NIH, 2004)

During the day, there were two panels; one considered mindfulness meditation with mental health, and the other considered it with physical health. The target audience was primarily NIH employees and secondarily the general public (NIH, 2004).

### 2.5.3 Mind and Life XIII - 2005

In 2005, Mind and Life XIII, titled "Investigating the Mind: The Science and Clinical Applications of Meditation", occurred in Washington, D.C. Among the participants in this Dialogue were Tenzin Gyatso, the 14th Dalai Lama and one of the three founders of Mind and Life, as well as Jon Kabat-Zinn, founder of the MBSR program. This talk acknowledged that the clinical application of meditation was still in its infancy, and gave both scientists and contemplative thinkers a forum for discussing the growing field (MLI, 2005).

### 2.5.4 60 Minutes (2014)

*Mindfulness*, a CBS 60 Minutes video, delves into the power of being mindful in everyday life. Anderson Cooper reports on the healthy self-awareness technique of mindfulness, interviewing Jon Kabat-Zinn, a teacher who has practiced mindfulness for 47 years now. He

speaks of meditation as being a mental workout, the next generation of exercise that has the power to alter the lives of any individual.

One of the best tests of being present, awake, or mindful is when the alarm goes off in the morning. Does one jump out of bed with the list of daily chores and routine already knocking at one's head? Or does one lay there for a minute after the alarm shuts off, take a few deep breaths and be thankful for another day on this earth? Mindfulness encompasses the second scenario, a “being,” whereas rushing to start the day's activities revolves around a “doing” mentality. Mr. Kabat-Zinn suggests that we all adopt a being mentality.

During the interview, Mr. Kabat-Zinn had said it is indeed okay for the mind to drift away, if the individual is able to bring it back and regain awareness. He calls on us to just eat, when we are eating, or just drive, when we are driving. If one were to eat in complete silence, one would taste more and eat less, as every thought would revolve around chewing and actually tasting the food. Mindfulness calls on people to help their bodies heal themselves, as it has the power to alter the function of the brain. This is especially important for individuals with MH illnesses.

## **2.6 The Need for Mindfulness**

As the previous section concludes, mindfulness can alter the way the brain functions. In the sections that follow, the need for mindfulness and its mind altering capabilities is described.

### **2.6.1 Stress and its Effects**

Stress is very broadly defined as the brain's response to a demand (NIMH, 2015). Stress is a natural reaction, manifesting as the fight or flight response to dangerous situations. One's pulse and breath quickens, muscles become tense, and brain activity increases. Though stress can be beneficial in short term situations, chronic and long-term stress is detrimental to one's health; immunity is lowered and body systems work abnormally (NIMH, 2015).

In 2013, surveys found that stress from the work place was on the rise. Eighty percent of the 1,019 respondents reported stressing over their jobs, particularly the pay and amount of work.

In the previous year's survey, 73 percent had reported work stress. In descending order, the top stressors reported were: low paychecks (14 percent of respondents), heavy workload (tied at 14 percent), frustration with coworkers (11 percent), frustration with commutes (tied at 11 percent), jobs that are not one's career choice (8 percent), lack of work and life balance (7 percent), inability to advance in a job (6 percent), and fear of losing one's job (4 percent). Almost twice as many women as men responded that a low paycheck was their primary work stressor (Work Stress On The Rise, 2013).

A study from 2012 illustrates that stress increases the rate at which the body ages. The study, featured in the journal PLoS ONE, examined the impact of job stress on DNA telomeres, a segment of DNA related to longevity. As one ages, telomeres shorten (and shortened telomeres may also be linked to cancer). The study surveyed 2,911 workers between the ages of 30 and 64 on exhaustion from work and measured leukocyte telomeres. The findings suggested that the source of the exhaustion was prematurely shortened telomeres (Job Stress Linked with Shorter Telomeres, 2012). In other words, there is scientific proof that stress causes early aging.

Statistics from 2014 demonstrate how great a problem stress is. Forty-three percent of adults suffer from health ailments derived from stress. Between 75 and 90 percent of doctor visits are for ailments or complaints pertaining to stress. Headaches, high blood pressure, heart problems, diabetes, skin conditions, asthma, arthritis, depression, and anxiety all share stress as a common culprit. The Occupational Safety and Health Administration (OSHA) counts stress to be a workplace hazard, and it is one that costs over \$300 billion each year (Goldberg, 2014).

The National Institute of Mental Health (NIMH) suggests numerous coping mechanisms and advice. People are a major asset, whether it is a healthcare provider, counselor, family or friends. One must look to what he/she has accomplished rather than what still remains to be done. Exercising for half an hour daily is a mood booster and stress reducer. The final bullet recommends looking into programs for coping with stress, which may incorporate yoga and meditation (NIMH, 2015).

## 2.6.2 An Epidemic of Anguish

The Chronicle of Higher Education featured an article titled, *An Epidemic of Anguish*, written by Robert Wilson, which discusses how colleges are overwhelmed by the demand for mental health care, but face conflicts in choosing how to respond.

Mental health care in college institutions has attracted a lot of attention in today's society due to increased mental illness and suicide among college students. As a result, there has been controversial debate over how much should be expected of colleges when it comes to mental health care and when to draw the line between "the need for intensive or long-term therapy versus what a college counseling center can provide" (Wilson, 2015).

The article explores different institutions' responses to the increased need and demand for mental health care, and raises serious questions about the proper role universities should play in providing mental health services.

Mental health illness on college campuses has skyrocketed in recent years. At Appalachian State University, initial screening interviews with students at the counseling center increased by 65 percent from the fall of 2009 to the fall of 2014, and individual therapy sessions rose by 50 percent over the same period. The number of students who said they had thoughts of ending their lives more than doubled to 400 last fall, among a total enrollment of about 18,000 students. In the academic year just past, three Appalachian State students killed themselves. Nationally, the number of college-student suicides has remained about the same, but it is the second-leading cause of death, after accidents (Wilson, 2015).

One of the reasons for the dramatic increase in rates of anxiety and depression among American college students may be explained from the structure and environment within today's American households. The article claims:

Students do seem less resilient today than in the past. They haven't developed skills in how to soothe themselves, because their parents have solved all their problems and removed the obstacles. They don't seem to have as much grit as previous generations. (Wilson, 2015)

In addition, many more students than in the past come to campus having already seen therapists and already on medication for mental illness. According to the National Survey of College Counseling Centers, 86 percent of counselors report an increase of students arriving on campus already on psychiatric medication. Ninety-four percent report larger numbers of students with a history of anxiety issues, depression and self-injury (“cutting”) before they ever get to college. Fifty-two percent of college counseling center clients have “severe psychological problems” - an increase of almost 10 percent in just two years (Wilson, 2015).

This increase in the demand for mental health care and services is putting a strain on college counseling centers, and many colleges are unable to keep up with these increasing numbers. While many colleges are trying to meet the demand by hiring more counselors, creating group therapy sessions, and arranging for mental health coordinators who help students manage their own care, there are many colleges that feel that campuses are first and foremost educational institutions, rather than health-care providers (Wilson, 2015). That being said, they must also maintain appropriate limits to what they are responsible for offering and what is beyond their level of responsibility in order to protect not only their own liability, but also the safety of others. This “Epidemic of Anguish,” as referred to by The Chronicle of Higher Education, has brought about many serious challenges to colleges, as they struggle to find their role in balancing mental health care and education.

## 3 Literature Review

In the chapter that follows, the team will discuss its literature review. This review explores the work that others have done with mindfulness, demonstrating its effectiveness. Following this review, the team discusses its options for data collection: surveys, interviews, and focus groups.

### 3.1 Successful Applications of Mindfulness

This section details areas in which mindfulness has had success in medical trials. Mindfulness meditation has improved psoriasis, increased immune system functionality, altered brain activity with regards to gamma activity, and reduced stress, anxiety, and depression. The first significant medical study to look at meditation's effectiveness was a psoriasis study.

#### 3.1.1 Psoriasis Study with Meditation

Psoriasis is a skin condition that is believed to worsen under stress. In 1998, researchers at UMass combined MBSR with phototherapy/photochemotherapy to see how effective MBSR would be at reducing stress and clearing patients' skin. The study consisted of 37 patients, each with more than 15 percent of their body covered in psoriasis, who were randomized to four treatment groups. One group received only phototherapy, also known as ultraviolet B light, called UVB for short. Another group received only photochemotherapy, also known as psoralen plus ultraviolet A light, called PUVA for short. These groups were the controls. The other two groups received either UVB and meditation, or PUVA and meditation. During treatment, the meditation groups listened to prerecorded tapes on breathing exercises and awareness. Of the 37 patients, 13 did not complete the entire study, and two underwent changes in their therapy, thus their data was removed (Frankel, 1998).

The patients that had meditation tapes healed faster than their control counterparts. For the PUVA meditation group, a 50 percent probability of clearing occurred on average at 48.5



days, while the PUVA only group averaged 85 days. For the UVB group, the meditation group took 83 days, and the control took 113 days. Numerous benefits were derived from this outcome, including reduced healthcare costs due to a need for fewer phototherapy/photochemotherapy sessions, as well as less exposure to ultraviolet radiation. Perhaps most importantly, this study implied that the mind has the ability to influence the healing process (Jancin, 2000).

### **3.1.2 2003 Influenza Vaccine Study with Meditation**

Similarly to the Psoriasis study, 41 healthy subjects were evaluated before and after receiving an influenza vaccine. Brain activity was initially measured for all subjects. Of the 41 subjects, 25 received the eight-week MBSR course, and the control group of 16 did not (Anderson, 2006).

Following the completion of MBSR, all 41 subjects received a flu vaccine. Those that meditated were found to have both significantly greater left anterior brain activity and antibody response than the control group. Such findings supported MBSR positively impacting both the brain and immune system, and no assumption was made as to whether the left anterior brain's greater activity caused the antibody response. Jon Kabat-Zinn and Richard Davidson were among the coauthors of this study (Anderson, 2006).

### **3.1.3 Training the Brain**

In an interview, *Explore*, a medical journal interviewed Richard Davidson, a neuroscientist and psychologist that works with meditation. Though Davidson had researched meditation in the late 1970s and early 1980s, he opted for a safer career path in more traditional sciences and did not return to his studies of meditation until 1992, when he met the Dalai Lama (Davidson, 2005).

According to Davidson's work, the prefrontal cortex of the brain reflects an individual's level of happiness. Those with greater left side prefrontal activation are happier, have more energy, and are more optimistic. This is what Davidson refers to as an "active, involved happiness" (Davidson, 2005).

Davidson's first attempts at studying the brain activity of monks were met with failure. Despite trekking up the Himalayan Mountains with 5,000 pounds of equipment and having respected and trusted individuals in the party, the monks had no desire to participate in the research by strapping on measuring sensors. Following that failure, Davidson managed to study other Tibetan monks who were more exposed to the West and thus better understood the research being conducted. Ten individuals with between 12,000 and 60,000 hours of meditation had been studied (Davidson, 2005).

Neuroplasticity is the idea that the brain can be trained and reshaped based on experience. Davidson was of the opinion that the West does not recognize the brain as trainable; he likened training the brain to cultivate happiness to going to the gym to physically train, or learning to play a violin. The closest that most Americans come to a monk's meditations would be Kabat-Zinn's MBSR program, and thus Davidson opted to study a group of mindfulness meditators. This came to be the influenza study of 2003 (Davidson, 2005).

Davidson had also studied the monks on other areas than emotion; he had also spent time studying attention, which he viewed to be the second primary component of meditation. Quoting William James from *The Principles of Psychology*, Davidson related that a person is unable to focus on an object for more than three to four seconds before the mind wanders off. Davidson also related that this passage is found to be humorous among the monks, as they are unable to imagine such a short attention span (Davidson, 2005).

To study attention, Davidson studied vigilance. Historically, vigilance, remaining attentive to a stimulus for a long time span, has been studied by a simple, repetitive task. Davidson supplied an example:

To test vigilance, you might have a simple task in which every time a particular letter appears on a computer screen, the participant simply has to press a button as quickly as he or she can. So let's say that you are presented with the same letter each time, and there is a long interval—about thirty seconds—between each letter. And every time the letter X appears, you have to press the button very quickly. (Davidson, 2005)

For most people, performance wanes over time, with slower reactions and missed keys; however the monks do not suffer the same issues. MRI scanners assist in this study, monitoring gamma activity (Davidson, 2005).

Gamma activity is rare among the average person; it might appear for a fraction of a second when a person observes an optical illusion and sees it change from one image to another (such as an illusion of two faces or a vase). The monks are capable of sustaining this gamma activity for several seconds (Davidson, 2005).

Davidson supplied an example of one disorder that could potentially be cured through meditation: asthma. He noted that stress worsens the symptoms, and thus the brain influences how the lung acts. Should one train through meditation and better master positive emotions, one could potentially reverse the effects and stop an asthma attack. Davidson also proposed that some heart attacks may begin to develop in the brain (Davidson, 2005).

### **3.1.4 Mindfulness on Anxiety, Stress, and Depression**

In 2013 a meta-analysis on mindfulness was done, combining the data from 209 separate Mindfulness-based Therapy (MBT) studies. This meta-analysis thus considered 12,145 participants, and sought to clarify inconsistencies in how effective the treatments were; a meta-analysis is more statistically significant than a single study (Khoury et al., 2013).

By comparing data from before and then after treatments, MBT proved moderately effective in comparison to other active treatments. Meanwhile, it was found that the effectiveness of MBT was not different from behavioral therapies or pharmacological treatments. The meta-analysis concluded that MBT can effectively treat many psychological problems, including but not limited to anxiety, stress, and depression (Khoury et al., 2013).

This confirms the findings of a 2010 Boston University meta-analysis, based on 39 studies and 1,140 participants. Among those studied were patients suffering from cancer, general anxiety, depression, chronic fatigue, panic disorders, fibromyalgia, chronic pain, social anxiety, and many more conditions. The study conceded that MBT showed promise for treating mental health conditions such as anxiety and mood disorders, and deemed the treatments moderately effective (Hofmann et al., 2010).

## 3.2 Considerations on How to Collect Data

There were several factors that the team had to consider, chiefly among them how best to collect data. What follows is an analysis of surveys, interviews, and focus groups, all of which the team considered for fit with this project. All of these data collection methods fall under the umbrella of participatory research, as members of the public that fit the team's sample population criteria are involved; lessons learned from other participatory research efforts are first considered before delving into the merits of surveys, interviews, and focus groups.

### 3.2.1 Participatory Research: Case Studies and Lessons Learned

Community-based participatory research (CBPR), a specific type of participatory research, is a collaboration between researchers and the communities defined by said research. When researching vulnerable populations, CBPR is cited as the preferred model. Two case studies situated in Boston detail the use of CBPR in attaining research goals (Freeman et al., 2006).

The first case details the Healthy Public Housing Initiative (HPHI), which aimed to improve public housing home environments, increase building capacity sustainably, and impact multifamily housing design policy. Community concerns led to a focus on asthma and pest management. Many partners of the study were larger names and organizations - including the Boston Housing Authority and Tufts University of Medicine - but public housing residents also participated by collecting data, recommending changes to policies, and participating in data analysis. Meetings were a large, informal affair that occurred monthly, and frequently broke into further sub-committees due to the sheer size of the project (Freeman et al., 2006).

The second case detailed the Asthma Center on Community Environment and Social Stress (ACCESS) project. This project consisted of a partnership between a research-intensive institute and a minority serving institution - Channing Laboratory of Brigham, and Women's Hospital Harvard School of Public Health. Funding was unique on this project, which led to more power for the community than the academic partner. Meetings occurred both monthly and biweekly for different segments of the project. The partnership sought to comprehensively

assess the community, examine social and physical environmental exposure, examine the role of genetics in modifying said exposure risk, and determine the effectiveness of existing health care interventions for asthma (Freeman et al., 2006).

Both cases encountered similar challenges, and it is the challenges that are most vital to understand when preparing to embark on one's own participatory research projects. First and foremost, the collaboration must be a real partnership; frequently the community partners can be overshadowed. The community must be involved early, at the birth of the project. There must also be transparency between partners (Freeman et al., 2006).

Funding is another area of tension, especially when grants are involved. While the academic partner can frequently stand a delay in repayments, the community partner frequently cannot. The team must seek ways to avoid delays in payment (Freeman et al., 2006).

Another challenge is stereotypes, which can be two-sided. Academics commonly feel that the community partner lacks the capacity to complete the research aims and thus are hesitant to delegate anything to the community partner. In the HPHI case, for instance, some of the academic partners had to overcome perceived stereotypes of residents of public housing in order to better work alongside them. Likewise, the community side has its own stereotypes of the academic side. A particular view is that the academics are only seeking ways to further their own careers. Academics may be viewed as uncaring. It is imperative that all involved discuss their objectives early in the project and are open to discussion of stereotypes. Trust between partners or its lack thereof can make or break a project (Freeman et al., 2006).

There are also likely to be culture clashes between the academic and community sides of the project. This may occur in the way research is conducted, accepted forms of leadership, and so on. Power should not be centered on a single individual as the collaboration then becomes moot (Freeman et al., 2006).

The article concludes with lessons learned, which are for the most part common sense items for group work of any kind. Honest communication is vital, but complete and perfect agreements are not required. Objectives and perceptions will always differ, and should be dealt with early in the project. Relationship building is a major requirement between partners (Freeman et al., 2006).

Another article lists a similar cadre of lessons learned. When new to conducting participatory health research, a mentor with experience in it is essential. Funding is important,

though this article does not imply its impacting power and relationships. Multidisciplinary collaboration is best, even if it may cause tension at times. When the community group approaches the research group with the idea, the CBPR process is improved, implying the early community involvement, which the previous article called for (Khanlou, 2010).

Necessary for Participatory Research	Not Necessary for Participatory Research
Honest Communication; Transparency  Clearly expressed objectives  Relationship building  An experienced mentor  (Timely) Funding	Perfect agreement  <hr/> <b>Detrimental for Participatory Research</b>  Stereotypes  Power Struggles

Table 2: Keys to Participatory Research

### 3.2.2 Surveys

The following section details when to use a survey, advantages and disadvantages of five different types of surveys, and how to design questions for a survey.

#### 3.2.2.1 When to Use a Survey

Surveys are essentially a means of sampling data, typically in a static form without face-to-face interaction. Surveys are fairly easy to implement, can collect information from a large group of people, and when designed in a statistically proper manner, are easy to summarize. The difficulty in surveys comes from responses; people may not respond, biases can be harder to read without having body language to interpret, responses may be too brief, and frequently there can be no follow-up (University of California, 2015).

### *3.2.2.2 Pros and Cons of Different Survey Types*

There are five different types of surveys, and each has its own sets of benefits and disadvantages. The most commonly used survey is the fill-in-the-blank (FITB) survey in which one checks boxes and scrawls open responses into large blank areas. Growing in popularity are optical mark recognition (OMR) surveys and optical character recognition (OCR) surveys, which can be scanned by computers. The OMR is also known as a bubble survey, as circles are filled in for corresponding responses. An OCR, meanwhile, works with text-recognition software and can accept open responses in addition to bubbles. The two remaining types of surveys are electronic: email surveys and web surveys. Email surveys are delivered by email, such as via an attachment, and web surveys are posted on a website. These five survey types will be compared in terms of equipment, development, transmission, data entry, handling of open-ended questions, and time (Porter, 2004).

In terms of equipment, FITB surveys are the least intensive; they can be created on a personal computer and simply printed. Data entry into a database must be done by hand. OMR and OCR surveys require both a scanner and scanning software in terms of equipment. Scanners can cost anywhere between \$500 and \$5000, depending on what features may be required, such as duplex scanning. OCR scanning software is more sophisticated than OMR software. An email survey can have very simple equipment requirements - a text editor and email account - but one could also purchase software for processing the surveys. For a web survey, software can be purchased for under \$500. Depending on how one handles a web survey, programming skills and HTML may be required (Porter, 2004).

In terms of development costs, electronic surveys tend to be cheaper than their paper counterparts, due to printing costs. OMR bubble surveys are more costly than OCR and FITB surveys as they often require the purchase of special forms. Meanwhile, aside from man-hours, there are essentially no development costs for email and web surveys, as the copies are all electronic (Porter, 2004).

In terms of transmission costs, again electronic surveys tend to be cheaper. The paper surveys can require postage, envelopes, cover letters, and more, when not transmitted in person. Electronic surveys can easily be transmitted in bulk.

In terms of data entry, FITB is fairly expensive, as it must be done by hand and costs personnel time. There is also a project cost, as data entry prolongs collecting and analyzing the data. Likewise, manual entry can result in entry errors. OMR surveys are often sent to a firm for scanning, which can be costly - up to 50 cents per survey - and adds length to project time, unless an OMR scanner is purchased. OCR surveys are usually scanned with the prior mentioned scanning software and thus do not need to be sent to an outside firm for processing. OMR and OCR surveys are both error prone, depending on quality of form, scanner, and software. Email surveys can be tampered with by respondents, and thus may need to be checked for missing characters in places. In a web survey, data entry is done virtually immediately as the respondent completes the survey; though errors are possible via HTML bugs, they are very rare (Porter, 2004).

For open-ended questions, typically the answers must be entered into a database, and thus both FITB and OMRs must be typed manually. OCRs are the best of the paper surveys for handling open-ended questions, though still may erroneously read characters. Both electronic surveys come ahead in this category because they already exist in an electronic form, and in addition, potentially illegible handwriting is removed from the equation (Porter, 2004).

In terms of project time, all paper surveys increase the length due to printing, transmission, and so on. Electronic surveys tend to have shorter project times, though email surveys take slightly longer than web surveys due to the data entry step (Porter, 2004).

### *3.2.2.3 Designing Questions for a Survey*

There are a few guidelines to keep in mind when forming a list of questions, whether they be for use as a survey or in an interview. All questions should be related, lest a seemingly unrelated question break the flow and give those being questioned pause. In terms of difficulty, harder questions should be centered amid easier questions; start off with simpler questions, build up to more difficult ones, and end on an easy note; otherwise, those being questioned may lose interest. Demographics are usually a good place to start (Frey and Oishi, 1995). Aside from the placement and design of the questions, the greatest challenge is in creating questions that are clear and unambiguous. Such characteristics are also important for interview questions, and are discussed below, in section 3.2.4.3.



### 3.2.3 Focus Groups

A focus group is a small group of people with similar characteristics or common interests, who are brought together by a moderator to engage in a guided discussion of some topic. The moderator uses the group and its interactions as a way to gain information about a specific or focused topic.

Focus groups are a form of qualitative research, meaning that the data is descriptive and cannot be measured numerically. These qualitative approaches in comparison with quantitative ones, are often far more engaging, stimulating, and yield much richer data than quantitative figures alone.

Typically, a focus group consists of about six to ten people who do not know each other, but are selected because they have certain characteristics in common relating to the topic of the focus group. The benefit of having a smaller sized group allows more time for each individual to talk and makes it easier for the moderator to facilitate. The moderator or interviewer creates a permissive and nurturing environment that encourages different perceptions and points of view, without pressuring participants to speak their opinion, plan, or reach consensus (Krueger, 1988).

Because the idea of focus groups is to take advantage of group interactions, it is important to use the information at the group level, not the individual level. Focus groups are not a valid way to find out how much progress an individual client or participant has made toward his or her own goals. Also, because focus groups are usually made up of a very small number of people who voluntarily participate, one cannot assume that their views and perceptions represent those of other groups that might have slightly different characteristics. They are not "random samples" (Marczak & Swell, 2015).

#### 3.2.3.1 Pros and Cons of Focus Groups

There are many advantages of using focus groups for research. Focus groups give researchers the opportunity to observe group interaction on a topic. Group interaction helps

people articulate and clarify their views and provide researchers with in-depth information on perceptions, attitudes, or beliefs and ideas on a topic more quickly and at a cheaper cost than interviewing individuals independently (Marczak & Swell, 2015). To add onto that, they also give researchers the opportunity to interact directly with group members, allowing them to gain information from both, verbal and nonverbal responses, i.e. body language. Finally, data collected through focus groups includes group members' own words, allowing researchers to obtain deeper levels of meaning and understanding on a specific topic.

On the other hand, like all participatory research methods, there are also disadvantages of using focus groups. Because focus groups are interactive and involve communication that is unpredictable between members of the group, the moderator has less control over what information will be produced. There is also uncertainty about accuracy of what participants say. Results may be biased by the presence of a very dominant or opinionated member; more reserved members may be hesitant to talk (Marczak & Swell, 2015). Lastly, although focus groups provide more in depth and meaningful data, the data produced is relatively disordered making data analysis more difficult.

### ***3.2.3.2 When to Use a Focus Group***

It is beneficial to use focus groups when researchers are interested in hearing a wide diversity of opinions on a topic. This includes interest in getting in depth information on individuals' deep feelings, insights and perceptions. It is also beneficial to use a focus group if key issues on a specific topic have not already been solved and solving these issues will require the insights or historical perspectives of people close to the issue. Typically, focus groups are used at a preliminary or exploratory stage of research because they provide researchers with insight and additional information needed to prepare for a large-scale study (Casey, 2000).

### 3.2.4 Interviews

Kvale defines qualitative research interviews as "attempts to understand the world from the subjects' point of view, to unfold the meaning of peoples' experiences, to uncover their lived world prior to scientific explanations" (Kvale, 1996). In other words, successful interviews take the form of a conversation between two or more people where questions are asked by the interviewer to gain insight and information on a specific topic or subject. There are two different approaches to conducting interviews: qualitative and quantitative.

#### 3.2.4.1 Qualitative Interviews

Qualitative interviews are sometimes called intensive or in-depth interviews. These interviews are semi-structured; the researcher has a particular topic about which he or she would like to hear from the respondent, but questions are open ended. For qualitative interviews, the primary aim is to hear from respondents about what *they* think is important about the topic at hand and to hear it in their own words. Qualitative interview data is analyzed using methods such as thematic analysis (Blackstone, 2012).

#### **Qualitative Interviews: Pros and Cons**

Qualitative interviews are beneficial to the interviewer or evaluator because it allows them to collect more detail and ensure that participants are interpreting questions the way they were intended. Qualitative interviews are also more flexible because open ended questions can be easily adapted or changed depending on the respondent's answer (Blackstone, 2012).

On the other hand, qualitative interviews can be seen as more intrusive to the interviewee than quantitative approaches. Also, analyzing and interpreting qualitative interviews is much more time-consuming because of the open ended questions that are asked (Blackstone, 2012).

### ***3.2.4.2 Quantitative Interviews***

Quantitative interviews are sometimes referred to as survey or standardized interviews because they resemble the survey-style question and answer formats. The difference between quantitative interviews and surveys is that question and answer options are read to respondents. These interviews are structured; the researcher has a specified set of close-ended research questions that are organized to maximize the reliability and validity of measurement of key concepts (Blackstone, 2012). For quantitative interviews, consistency in the way that questions and answer options are presented is very important as the interviewer aims to pose every question-and-answer option the same way to every respondent.

Quantitative interview data is analyzed by assigning a numerical value to participant's responses. For example, "not important, slightly important, fairly important, very important" can be assigned 1, 2, 3, and 4, respectively.

#### **Quantitative Interviews: Pros and Cons**

Quantitative interviews are easy to replicate because using a fixed set of closed questions is easy to quantify. Also, structured interviews are fairly quick to conduct which means that many interviews can take place within a short amount of time. This means a large sample can be obtained resulting in the findings being representative and having the ability to be generalized to a large population (Blackstone, 2012).

One negative of quantitative research is the limited ability to probe answers. Also, people who are willing to respond may share characteristics that do not apply to the audience as a whole, creating a potential bias in the study. In addition, quantitative research experiments can be costly. Also, data from quantitative interviews lack detail as only closed-ended questions are asked (Sheragy, 2013).

Qualitative Interviews		Quantitative Interviews	
Pros	Cons	Pros	Cons
Open-ended questions: provide more detail and explore topics in more depth	More intrusive	Easy to replicate: use repeatable information and questions	Information may not apply to audience as a whole, creating bias in the study
Offers flexibility: do not need to interview a large number of people at once	Cannot generalize findings: cannot use findings as a basis for a broader audience	Quick to conduct: data is collected at a fast speed	Closed-ended questions asked: lack detail
Less expensive: don't need to recruit as many participants	Difficult to analyze: cannot quantify results and generalize findings	Easily sample a large population: findings can be generalized to the entire population	Can be costly
Measures "how" and "why"	Analysis is much more time consuming	"Measures "how much," "how long" and "how many"	Limited ability to probe answers

**Table 3: Pros and Cons of Interview Types**

### **3.2.4.3 Wording Interview Questions:**

Creating effective research questions for the interview process is one of the most crucial components to interview design. Researchers desiring to conduct such an investigation should be careful that each of the questions will allow the examiner to dig deep into the experiences and/or knowledge of the participants in order to gain maximum data from the interviews (McNamara, 2009). Creating effective research questions for interviews includes the following elements: (a) questions should be as neutral as possible (avoid wording that might influence answers, e.g., evocative, judgmental wording); (b) questions should be asked one at a time; (c) questions should be worded clearly (this includes knowing any terms particular to the program or the respondent culture); and (d) be careful asking "why" questions (Turner, 2010).

## 4 Planning

Though the background and literature review serve as a good foundation for the project, they were not the first steps. Even before research could be conducted, a plan on how to complete the project had to be made.

Planning is central to every successful project. Most Major Qualifying Projects (MQPs) at WPI are completed over the course of three terms, with one unit of the MQP per term - the equivalent of one class. This MQP is a less common variant called an AB-term MQP, in that the first term (A-term, August 27-October 15) consists of one unit of MQP and the second term (B-term, October 27-December 17) consists of two units of MQP. Though the same number of credits are taken, this project will conclude in December instead of the typical March deadline. The amount of work does not change, but there are fewer days to work with for scheduling purposes.

The first week of the project was dedicated entirely towards making a plan and setting up the appropriate infrastructure to complete this project. The team utilized When2Meets (When2Meet is a free online survey tool that can help map out a group's availability, found online at [when2meet.com](http://when2meet.com)) to determine days and times that would work for advisor and sponsor meetings. Wednesday mornings were allotted to sponsor meetings, and Friday mornings were allotted to advisor meetings, based on these results. Unfortunately, due to scheduling conflicts, the initial meeting between the team and sponsor did not occur until September 9th, the third week of the project. The team created and brought a tentative timeline for the MQP to the meeting for discussion purposes. This timeline was based off the format of a traditional three term MQP. In such an MQP, typically the first term is spent developing the proposal, the second term is spent collecting data, and the third term is spent on data analysis and conclusions. From the start of classes on August 27 to the end of the second term on December 17, there were 15 weeks in total. A week was lost at the end due to a conference, and thus one week was shaved from the project, leaving 14 weeks to work with. Approximately 1/3 of the time was allotted to activities typically done in the first term, and so on. Thus about the first five weeks were dedicated to finalizing a proposal for the sponsor, the next four were dedicated to data collection, and the final five were dedicated to data analysis, drawing conclusions, and finishing up. This original timeline is pictured in Appendix A: MQP Schedules.

Several additions and changes were made to the timeline, reflecting discussion with the sponsors. For meeting minutes (including those from the first sponsor meeting,) see the entry for 9-9-15 in Appendix B. (Likewise, the agendas for sponsor meetings may be found in Appendix C, and weekly reports which track what has been accomplished each week are located in Appendix D.)

To log the changes to the initial timeline, it became evident that the team would be unable to sit in on MBSR classes, either to participate or observe; MBSR classes were removed from the key. Days that Dr. Davis is unavailable have been added to the calendar.

Presentations have been given an orange key, as there will be two major presentations. A proposal presentation was initially scheduled for week six or seven, however, upon plotting days that Dr. Davis is unavailable, and those dates would not work. In accordance with the team's and Dr. Davis' schedules, a proposal presentation has been set in stone for October 14<sup>th</sup>, a Wednesday in week eight, from 9AM to 10AM. Meanwhile, the final MQP presentation has been officially scheduled for Wednesday, December 9<sup>th</sup> from 10AM until noon; this is the team's hard deadline.

An issue that has cropped up early and is likely to impact this project is the issue of Institutional Review Boards (IRBs) and their approval of our data collection protocol. Upon querying a member of WPI's IRB regarding this project as well as IRBs in the nearby consortium colleges, the team was informed that this project would be "not impossible, but a challenge for a couple of reasons." There are issues of privacy, consent, and data management to be considered. Campus counselors such as in the Disabilities Office will be unable to assist us in finding potential candidates as such assistance would be breaking confidentiality; the team would have to obtain permission to advertise, and do so heavily. To be able to advertise, the team must go through each school's Institutional Review Board. The consortium has no agreement in place for joint IRBs, and each school - including WPI - limits which surveys and studies actually reach the students.

The schedule for the MQP, which is visible on the team's Google Drive, has been continuously altered over the course of the project. Changes were made to reflect what actually happened at given points instead of just estimates for time frames.

## 4.1 Initial Brainstorming of Technologies

The team brainstormed ways that assorted technologies might be able to couple with mindfulness, and then conducted research to support the ideas. Currently, MBSR classes occur over eight weeks with 31 hours of direct instruction (CFM, 2015). Aside from the in-class time commitment, there is homework; one needs to practice his/her meditations daily. Technology may be able assist young adults in adherence to the program by helping them keep up with their daily meditation. The first step, meanwhile, is to recruit more young adults into these live, in-person programs - another place where technology may be of assistance. Likewise, it is the hope that technology will keep young adults engaged in mindfulness long after they complete the eight-week course. With regards to potential for recruitment into live classes, adherence to what the classes teach, and retention of the practices after the classes, four ideas surfaced:

Idea 1: Facebook groups for a community feel and access to likeminded people one can reach out to. This goes well with the community feel of mindfulness. In a study of breast cancer groups on Facebook, 620 groups and 1,090,397 members were found. Most groups were created for fundraising purposes (44.7%) and the least were created for support groups (7%). Forty seven percent of the support groups had been started by young adults (high school and college students), and had the greatest activity among all other categories of groups considered. This may be a worthwhile avenue through which to reach out to young adults and create a support network (Bender et al., 2011).

Facebook groups could potentially act as a recruitment tool, if there is a group dedicated to raising awareness, but primarily they would serve as tools for adherence and retention by sharing ideas, resources, and support with others in the program. The team created a Facebook Group, “Mindfulness-based Stress Reduction (MBSR) & College Students.” It will serve as a communication medium for its members, with links to mindfulness resources and other likeminded peers.

Idea 2: A phone application that, on a timer, alerts one that it is time to meditate. A random prerecorded meditation tape is pulled up, on which one can tap "play" when in a location one can meditate. Upon research, there exists a mindfulness app that is fairly similar to this idea,



called Insight Timer, which can be found at: <https://insighttimer.com/>. Mobile applications such as these would serve mainly for adherence, properly running the user through meditative exercises. With a timer, or some mechanism in place to enforce daily meditations, this is also a tool for retention, after the termination of the eight week program. Unless advertisement for CFM courses is built into the app, it will probably not serve well as a recruitment measure.

Smartphones continue to grow in popularity; in 2014, 58% of Americans had one, and in 2015, 64% of Americans had one. Back in 2011, only 35% of Americans had a smartphone, for further comparison. Breaking the 2015 ownership down by age ranges, 85% of the 18-29 group owned a smartphone, and 79% of the age 30-49 group had one, compared to 54% of those ages 50-64 and 27% of those age 65 and older. Smartphones are more popular in the younger generations, especially young adults (Smith, 2015).

Breaking Pew's 2015 smartphone ownership data down by other groupings, there are visible trends. The greater the level of education, the greater the ownership; the "HS grad or less" category only reported 52% ownership while "some college" reported 69% and "college+" reported 78% ownership. The greater the yearly income, the greater the ownership; those reporting less than \$30,000 per year report 50% ownership of a smartphone while those earning \$75,000 report 84% ownership. Urban areas have the greatest smartphone ownership, at 68%, followed closely by suburban areas at 66%; rural areas report 52% ownership (Smith, 2015).

Ethnicity in relation to smartphone ownership is an interesting category. Three categories were considered: "White, non-Hispanic," "Black, non-Hispanic," and "Hispanic." The Hispanic grouping reported the highest ownership, at 71%, followed closely by the Black grouping at 70%, and the White grouping reported the lowest ownership at 61% (Smith, 2015).

Idea 3: A Twitter account and campaign advocating #MBSR or #BeWhereYouAre in order to spread awareness and reach out to those who have never heard of MBSR. Combine peaceful images with mindfulness sayings. This idea seeks to leverage the ability of positive images to improve moods (Pictet et al., 2011). Below is the first prototype image that the group created as a means of a mockup:



**Figure 3: Prototype Image for Twitter Retweet Campaign**

The team has created a Twitter account for the project, named @mbsr\_wpi15. This mockup image, and others that the team creates, will be tweeted during data collection. Retweets will be tracked as a means of determining if this type of Twitter campaign could work for raising awareness of Mindfulness and thus increasing recruitment. The Twitter account will also be used in recruiting participants for the team's survey. Twitter would serve as a means of recruitment via awareness but would not necessarily help with adherence or retention.

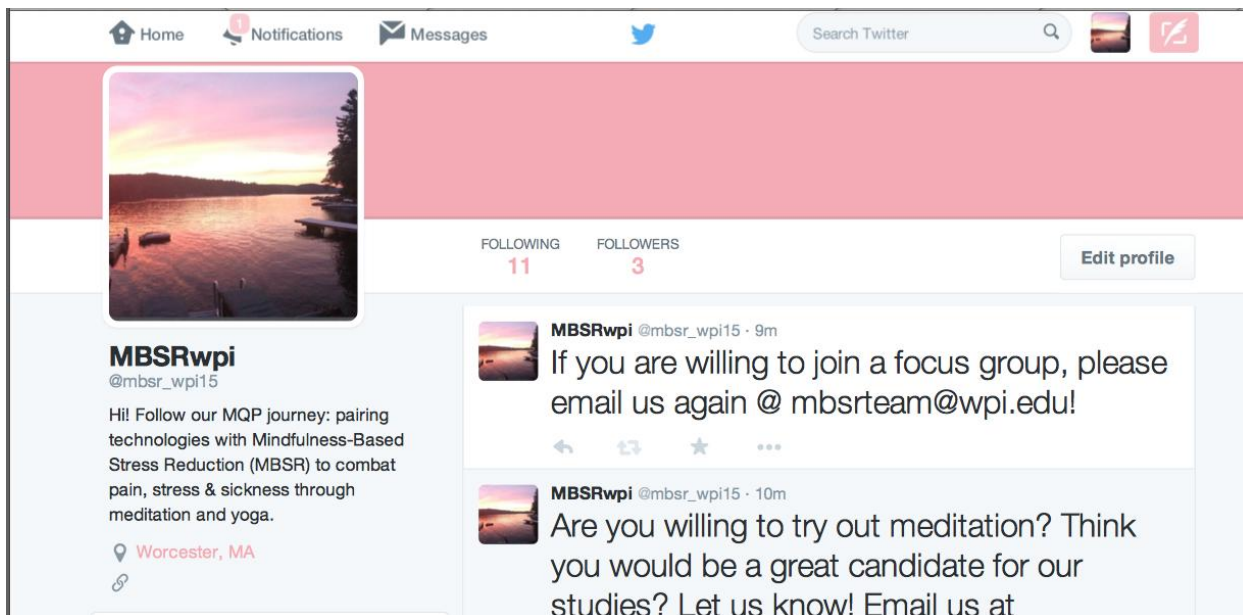


Figure 4: Screenshot of the Team's New Twitter Account

Idea 4: A YouTube series for an online MBSR course for free. Though there is a free online MBSR course available < <http://palousemindfulness.com/selfguidedMBSR.html> > this is not necessarily a place that young adults will look, even if it is the first two Google results for "free online MBSR course." Likewise, they might stumble upon this on YouTube via recommended videos, if they have no idea what MBSR is. Upon further discussion with the project sponsors, it was also determined that this free course is not necessarily of the highest quality - from the view of those that specialize in mindfulness - and thus not necessarily something that the team should promote. An alternative resource to promote may be the guided breathing exercises of Tara Brach. The goal is to give young adults a taste of mindfulness, where they may wish to delve further via a live course.

Regardless of the specific material promoted, YouTube is an incredibly popular medium. With over a billion users, this website reaches nearly 1/3 of all people with access to the internet. YouTube also reaches more people in the age range of 18-34 than any cable network in the country; young adults congregate on YouTube (YouTube, 2015). Depending on the types of videos launched, YouTube could serve as a recruitment tool (videos describing mindfulness and its benefits,) or an adherence tool (the user might look to certain videos on meditative exercises during their 8 weeks). The lack of interactivity on YouTube, aside from comments, make it less effective for retention on a long term scale; there is nothing to prod the user to continue.

	Recruitment	Adherence	Retention
Facebook	X	X	X
Mobile App		X	X
Twitter	X		
YouTube	X	X	

Table 4: Potential of Technologies with Regards to Recruitment, Adherence, and Retention

## 4.2 Initial Brainstorming of Approach

The team's approach was four-pronged:

1. Completed the IRB through WPI, worked with WPI as a pilot, and conducted two focus groups. (The team anticipated being unable to get enough volunteers to come forward for the focus group, as was the case, though two small groups were conducted.) The focus group utilized the questions and script found in Appendix E. Focus group recruiting was done via Appendix F's flyer and the survey.
2. Project Grapevine: Through social media (Twitter, Facebook) promoted the web survey to the general public, thus hedging the risk of relying solely on IRBs to reach other young adults. This approach filtered through the public in general, seeking voluntary participation, opposed to reaching students via their institutions and flyers.
3. Interviewed adult volunteers at the Center for Mindfulness who have completed the MBSR program, and were willing to offer hindsight on their college years and technologies that might have helped them. The team did not complete this step, but did instead reach out to a mindfulness group at WPI for one of the focus groups.
4. Interviewed MBSR instructors at the Center for Mindfulness who have had young adults in their classes, and got their view on the differences between adults and young adults in the program.

## 5 Methodology

In this chapter, the team discusses the selected method for data collection: a survey. Though secondary methods were used, like the focus groups, said methods built off of the survey and its questions in an effort to find saturation and confirmation.

This chapter further discusses the different technologies that were chosen to enhance the adherence to and retention of MBSR in college students.

The team created a Facebook group, “Mindfulness-based Stress Reduction (MBSR) & College Students,” as a plausible starting point to find out if there is indeed interest in MBSR. The group recruited users to participate in the practice of MBSR and allowed for communication with other college age students going through similar situations.

The team also created a Twitter page, @MBSR\_wpi15. The purpose of this Twitter account was two-fold; it was both used to distribute the survey to a wider audience, and to launch a Twitter campaign to raise awareness of mindfulness.

After early responses to the survey were collected, one suggestion was for an Instagram account. The team quickly created one, named @doyoumindful, and began following other users in order to gain traction in MBSR information display.

The Twitter and Instagram accounts were used as a comparison of social medias, as both sites enable the use of hashtags. The team was be able to see which platform has more of an impact.

### 5.1 Conducting the MBSR Survey: General Approach

The survey that participants took began with questions about general demographic information. This demographic information included the participant's age, major, college they attend/did attend, and what year of college they are in. This demographic information was used when comparing the results of the survey and ensuring that the sample draws from a diverse group of college students.

The survey questions that follow the demographics focused on the participant's past experience and history (if any) with mental health conditions. These questions were originally

asked in order to eliminate participants who did not fit the study's criteria, i.e. students who do not disclose a mental health issue will not be studied. Towards the end of data analysis, those students that did not disclose a condition were considered as a seventh group, to determine if young adults, regardless of any conditions, share the same preferences.

The questions the team asked about mental health were broadly scoped and worded in a way that respected the participant's privacy. For example, "Do you suffer from depression, anxiety, chronic pain/illness, or another challenge or condition?" versus "Do you have a mental illness?"

Next, the team introduced mindfulness and asked questions about the participant's own exposure and knowledge about it, accompanied by a brief explanation of what it is.

The last group of survey questions focused on getting information and insight on what would be most helpful to the participant in terms of mindfulness rather than focusing on the participant's own mental health issue. The goal of this survey was not to gain information to diagnose participants, but to gain insight on what they believed would be most helpful to them when dealing with their mental illness.

In designing the survey, feedback was sought from potential participants, resulting in some changes. A block of text giving the background of MBSR was at one point marked as optional reading, for instance; one user did not like having the reading there, and it "hung him up" until he skipped the reading halfway through the block. Other survey takers may be curious about the history of MBSR and want to learn about it, thus the block is left there, albeit marked as optional reading. Following review by the sponsors, the "optional" header was removed, a video was embedded, and the layout further adjusted.

Another red flag was the wording of the questions in which the team sought to determine whether or not participants possess mental health issues. The team consulted with UMass Medical School to better phrase the questions. After running the questions by the team's sponsors, the questions were run by the Young Adult Advisory Board, which consists of young adults with live experience with mental health illness, and adjusted accordingly.

For the full list of survey questions, see Appendix G. To see screenshots that preview the survey before it was launched, see Appendix H. To view the letter of IRB approval from WPI, see Appendix I.

## 5.2 Rationale for Survey Questions

The first four questions were basic demographic questions; the team needed to know the age of participants to ensure that they were indeed young adults and not someone continuing his/her education much later in life. College, major, and year of college all serve the purpose of ensuring that there is diversity among respondents.

The next few questions determined whether or not the participant was in the targeted sample population. The team did not ask "have you been diagnosed with depression" but phrased the question more broadly and less intrusively, inquiring as to if the individual suffers from depression, anxiety, chronic pain/illness, overwhelming stress, or some other challenge. "I do not wish to answer" was an option for participants if the question made them uncomfortable. Likewise, the introduction of the section asked participants to only answer questions that they felt comfortable answering. If the user had selected yes, a new question would appear for the purposes of binning responses into particular categories. The team did not ask the participant to blatantly state his/her condition, but asked respondents to check all statements that apply, such as "I often feel very stressed out and I'm not sure I can handle it." Aside from binning, this question also existed to narrow the field; everybody feels stressed or down at some or another point, but not everyone copes with it the same way and it is not chronic for everyone.

The next batch of questions introduced mindfulness, by inquiring as to the respondent's familiarity with yoga, meditation, and mindfulness. After defining mindfulness, the third question asked the respondent if mindfulness might be beneficial to him/her.

The majority of the remaining questions involved technologies, mainly social media. The team wanted to gauge which technologies best resonated with respondents. Some of the technologies already existed, like free online guided breathing exercises and the Insight Timer app, while others were proposed ideas. At the end of the survey, the team informed respondents about the existing technology and where it might be found; those that were curious about mindfulness and feel it may be beneficial could look into these resources. Another purpose to highlighting existing technologies was that of innovation; there could be better ways to get these resources to target populations. For instance, the team polled respondents if they think YouTube would be a more appropriate place for the guided practices, as YouTube's automatic recommendations on videos may bring up the videos more readily.

### 5.3 Data Collection

On September 29, 2015, the team received formal approval from the WPI IRB to launch the survey. Following some last minute formatting adjustments, the survey was launched at 7:15PM that evening. With the survey finally live, the team began recruiting respondents.

The team dispersed the survey among varied means. Old high school classmates were contacted. Friends and family were informed and asked to pass the link along, by word of mouth, personal Facebook pages, emails, and so on. The link was sent to clubs at WPI that team members were a part of. The project's Facebook page and Twitter account both posted the link. Long distance friends from online games were contacted. In the first 12 hours of the survey, eight respondents completed it.

Next, IRB approval meant the team could hang flyers around the school. The flyer, which as was already mentioned, can be found in Appendix F, was hung in multiple places in multiple buildings. The table below logs where the flyers were placed, noting the entry level of each building to be the main floor, and then other floors were referred on a relative basis to the main floor; not all buildings have logical floor labeling, so consistency was preferred.



Building	Number of Flyers	Notes
Atwater Kent	1	Main Floor
Campus Center	2	Main Floor
Daniels	1	Main Floor
Fuller	2	Main Floor
Goddard	1	Main Floor
Higgins	2	Main Floor, Up One Floor
Kaven	1	Main Floor
Library	3	Main Floor, Up One Floor, Down One Floor
Olin	2	Main Floor
Recreation Center	2	Main Floor, Up One Floor
Salisbury	2	Main Floor
Stratton	4	Up One Floor, Up Two Floors, Up Three Floors
Washburn	3	Up Two Floors, Up Three Floors

Table 5: Flyer Placement at WPI

One particular flyer stop was WPI's Office of Disability Services (ODS). Here the team spoke with the front desk, inquiring as to if the team could leave some flyers, and if the front desk would be willing to pass on information about the survey and focus group to peer mentors who act as a support network for students with disabilities; the idea was that peer mentors would be a very interesting group of respondents in a focus group, if any would volunteer. Not only was the front desk staff willing to pass on the flyers and information; she also volunteered information about a mindfulness group located on West Street, near WPI. This became another stop for the team in the search for survey respondents and focus group volunteers.

A blurb about the project, accompanied by a link to the survey, was sent to Dr. Fulwiler for forwarding along to contacts with other schools. Likewise, the IRB information from WPI was sent along in the hopes that the IRBs from other schools would accept it. The probability of acceptance in time for the team to hang flyers, before the end of the data collection period, was fairly slim; hence this was not the main avenue. The team did not receive IRB approval from any other colleges.

Meanwhile, throughout the entire data collection period, a campaign to spread mindfulness messages was waged on both Twitter and, following an idea from the early survey data, Instagram. Images were regularly posted, and shares/retweets over time were tracked.

Also throughout the data collection period, mindfulness instructors were interviewed to discuss young adults that they have had in their classes. This data, like most of the focus group data, was qualitative in nature, while the data obtained through the survey and Twitter/Instagram campaign was more quantitative in nature. There was a wide array of information on young adults, mindfulness, and technology by the end of this period.

## 5.4 Analyzing Data

There were essentially four sources of data: the survey, the focus groups, the instructor interviews, and the social media campaign and comparisons. The data obtained from each of these sources was treated differently.

The survey data was aggregated and studied as a group, without looking into individual responses. Given the way the survey had been distributed, it was a possibility that people outside the team's targeted sample would respond; some data needed to be removed from the aggregate. (For instance, had a hypothetical 50 year old who had returned to get another degree responded, he is far from our sample and would be removed.) There needed to be a cutoff for what is considered to be a young adult; typically the age range of 18-34 is considered young adult.

Within this age subset, there were many ways the data could be broken down. There were a few bins, to be considered separately; the idea was that those that suffer from chronic pain may prefer a different technology than those that suffer from depression. Likewise, it was worthwhile to compare the data of respondents that report no condition to the data of respondents that report a condition. Data could be examined by major, by year of school, by college, by severity of condition, and numerous other factors.

The social media campaign included analyzing how receptive users were to the Facebook and Twitter pages. After the first day of data collection, a theme emerged from the eight survey respondents that a Facebook page would probably not be in their best interest. Taking one respondent's suggestion - the use of Instagram as a promotional tool - the team discussed a new

option with Dr. Fulwiler. The team looked into creating an Instagram account to post photos and information easily.

Instagram is a social media platform that is popular among the younger generation. It originated as a mobile application available for download on smart phones, wherein the user would have to create an Instagram account in order to post photos. Accounts that are created are initially set to “public,” viewable by anyone. Users can change their account settings to “private” if they so wish to keep their posts limited to their followers’ timelines. However, if an account is public, posts are still viewable from a PC at <https://instagram.com/>, even without an account.

The name “Instagram” is a combination of “instant” and “telegram,” enabling a user to edit pictures from their mobile camera roll using built-in filters, and share them with the Instagram world. By having an account, a user can tag pictures and leave comments that may include hashtags. The hashtag feature is very relevant to the data collection of this project, as Twitter also enables the use of hashtags. Hashtags make a word or phrase a direct link to other posts including the same word or phrase, enabling users of both sites to find related material. This sparked the Twitter/Instagram comparison campaign, where data was much simpler to analyze than the survey data. Essentially, the plan was to plot retweets/likes over time, followers over time, and compare the two campaigns in the end to see which media had greater promotional success.

The team quickly rolled out an account, called @doyoumindful, to promote mindfulness and wellbeing through pictures. Instagram is a technology that has the potential to reach college students, as it is already heavily trafficked by young adults. By posting reminders to meditate or to take a moment to stop and breath, the Instagram account gained traction as a technology that could help with the retention of MBSR among young adults.

Aside from the social media comparison campaign's quantitative data, some additional quantitative data came from the focus groups, such as rankings of which social media the group preferred for sharing images or text, but this shall mainly be quantitative data that will be aggregated and summarized.

The greatest source of qualitative data was the interviews with mindfulness instructors. Like the focus group data, this data was aggregated and summarized, with one exception. Most

of the mindfulness instructors shared a similar background, but one differed in that her daughters had gone through the Mindfulness-Based Stress Reduction classes. As such, this instructor was asked questions that differed from the instructors with more uniform backgrounds, and was summarized separately.

## 5.5 Presentation and Feedback

On October 14, 2015, the MQP team presented its project proposal to its sponsors at UMass - Dr. MaryAnn Davis and Dr. Carl Fulwiler - and to its advisor, Dr. Eleanor Loiacono. Though a preliminary proposal had been submitted to UMass Medical School for review earlier, the formal proposal with the sponsor sign-off was submitted as a hard copy at the presentation. The sponsors signed their approval stating that they were satisfied with the progress and direction of the project. A scan of the signed document can be found in Appendix J. Likewise, the slides for the proposal presentation can be found in Appendix K.

The sponsors gave the team helpful feedback throughout the presentation, as well as at the end of the presentation during a discussion period. One specific statistic that they wanted to know was how many of the disclosed mental health and chronic pain group completed the entire survey. From the snapshot of the data, there were 93 respondents and 69 totally completed surveys. For the question on disclosure, 30 of the 80 said yes, that they met the listed criteria. Though the team did not have the figure on hand, it did intend to look into how many of those 30 respondents finished the entire survey, whilst also examining that bin separately from those who answered no to the disclosure question.

Most of the discussion centered around focus groups, which had been an area of concern for the project. First, there was the concern that the team was struggling to get volunteers to come forward at all. Compounding that concern was the possibility that the focus group could consist only of young adults who were not suffering from a mental health condition or chronic pain, opposed to either a mixed group or a group consisting entirely of the target population that disclosed their conditions. Likewise, a worry was expressed that in a mixed group there might be a stigma where those who do have mental health conditions would be unwilling to speak

when in a room with others who might not relate to their experiences. The composition of the focus group had to be considered deeply.

Ideally, the focus group would consist of only students who all suffer from a mental health condition and/or chronic pain. However, because of the time restrictions, and restrictions from the Institutional Review Board (IRB), there are limited resources and ways to reach out to students and isolate only those students with an identified condition. As a result, this ideal scenario might not be feasible and other options would need to be analyzed moving forward. (Fortunately, both focus groups consisted only of young adults that did disclose suffering from conditions.)

Two options for the focus group dilemma surfaced over the course of the discussion. The first option entailed not conducting a focus group, but modifying the questions to be used as an interview instead. The idea was that participants might feel more comfortable speaking one on one to team members opposed to in a larger focus group. Switching course from a focus group to interviews would also work better in the event that few volunteers stepped forward, which had been the theme when trying to contact those who left an email address signifying that they would be willing to participate in a focus group. This option was not used.

The second option is what the team suspected to be the best possibility, and therefore is what the team pursued first, and succeeded in. The team contacted the mindfulness instructor at WPI that leads the Student Development and Counseling Center's (SDCC) mindfulness group to see if she would be willing to spread the word to her students. The idea was that, if the WPI mindfulness group is willing to participate in this focus group, it could be held immediately following a Tuesday night mindfulness session. This was done, and was convenient for the students who attended the mindfulness group; some remained afterwards to talk with the MQP team in an environment that they were comfortable with. The number of participants in the SDCC's mindfulness group ranges anywhere from zero to 52 students in a given week, so the team had a great, albeit variable, opportunity to find volunteers.

## 6 Results and Analysis

This chapter details the analysis of the data, carried out after the data collection period ended. As described in the methodology chapter, data came from four sources: the survey, the social media campaign, interviews with instructors of mindfulness, and focus groups. The survey yielded data that could be studied extensively from multiple angles.

### 6.1 Survey Data

From September 29 to October 28, 2015 the team collected data via its survey. The sections that follow detail the analysis of the aggregate survey data. To view the report generated by Qualtrics, before the data was cleaned, see Appendix L.

#### 6.1.1 Cleaning the Data

Upon closing the survey and downloading the data, it needed some cleaning. Some columns were removed, as values were recorded for questions that were not actual questions, merely text; these columns would have the value of 1 for every response, hence they meant nothing. (For instance, a value was recorded for a block of text that gave background information on mindfulness, when no question was asked in this block.) Likewise Qualtrics recorded some miscellaneous information, such as survey start and end times, that were irrelevant and thus removed.

The second step involved removing individual responses that were "jokester" responses. There were two such responses clouding the data. In one, a respondent only entered joke answers, including an obscenity for the name of his/her school, exiting the survey as soon as the fill-in-the-blanks ended. The second jokester likewise set off red flags by claiming to major in "geek ed," finishing the survey in a mere 90 seconds, and answering "no" to every question. A third response raised a flag but was left in the data, as it did not appear to be intentionally

disrupting the data; a respondent entered the same information for their college and their year of college.

After removing the jokesters, responses that were totally blank were removed; some respondents clicked their consent, and then closed the survey without answering any questions. There were 19 blank responses to be removed. Next, the data needed to be made uniform, in terms of majors and schools. For example, all instances of "WPI" were changed to "Worcester Polytechnic Institute," and all majors of "CS" were changed to "Computer Science." Capitalization was standardized as well. Following this, some data was removed as it was outside the desired age range of the sample; 3 responses were removed.

A quirk in the data collection needed to be fixed as well. For all questions that had a scale from "definitely" to "definitely not," the numbers should have been recorded as a 1 for "definite yes" and a 4 for "definite no." In question 17 and 19, the order of the options was flipped around, and thus the numbers were inconsistent with the rest of the data. To avoid confusion later, the numbers were inverted to match the standard 1-4 scale. Meanwhile, the number values assigned to options in questions where the options were in the correct order also needed to be fixed; for some reason, question 16 recorded the four options as: 1, 3, 4, 5.

A pattern that the team noticed was the first option being fine, then the second option should have been the third option, the third option should have been the fourth option, and the last option (be it numbered 4 or 5) should have been the second option. Thus the team suspects that in creating options, the software automatically assigned numbers to each option, and the editing may have led to the deletion of certain assigned numbers, with Qualtrics numerically ordering the questions by its assigned numbers opposed to the order in which they visibly appeared before launching the survey. With the survey now closed, it was possible to see the survey in its editable format, and sure enough everything is in the proper order, while the values Qualtrics has assigned are not visible. These hidden values seem to be the culprit behind why the survey, when launched, appeared slightly different than how it was designed.

MT\_4

If you had access to live mindfulness courses/workshops/clubs at your school, would you enroll in them?

I would definitely enroll      I would probably enroll      I would probably not enroll      I would definitely not enroll

Figure 5: Question 17 and its Order of Options as it Appeared in Design View

17. If you had access to live mindfulness courses/workshops/clubs at your school, would you enroll in...

#	Answer	Response	%
1	<a href="#">I would definitely enroll</a>	6	7%
2	<a href="#">I would definitely not enroll</a>	3	3%
3	<a href="#">I would probably enroll</a>	38	44%
4	<a href="#">I would probably not enroll</a>	40	46%
Total		87	100%

Figure 6: Question 17 and its Order of Options as it Appeared When Launched

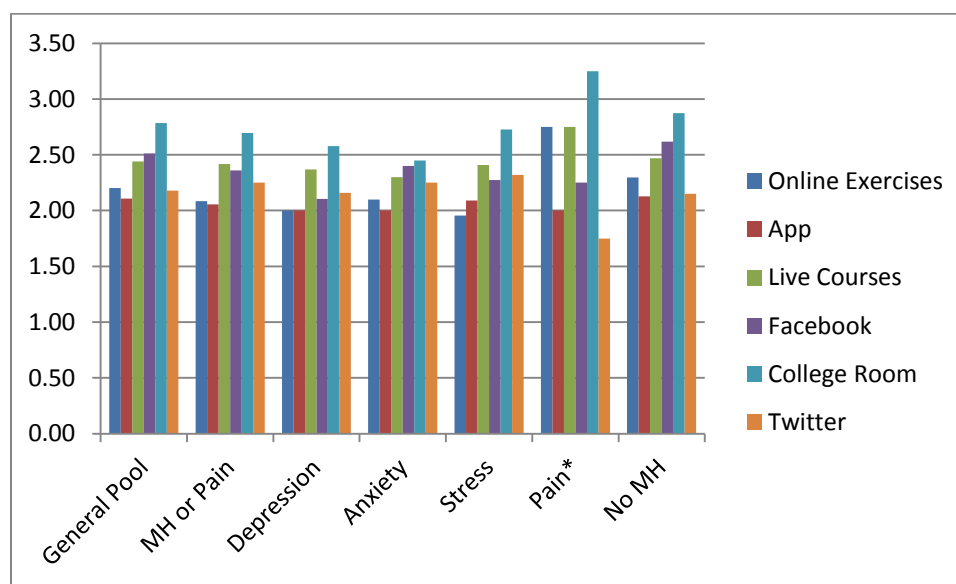
As one final touch, the "AGE" column was adjusted, subtracting 1 from all values. As the data was, a value of one meant 1900 for a birth year, two meant 1901, and so on. At a glance, one would see a 97 and think it meant that the respondent was born in 1997, when in fact they were born in 1996. Now a 96 represents a birth year of 1996. Finally, with the data cleaned up, analysis could begin.



### 6.1.2 Analyzing the Cleaned Data

Seven groupings of respondents were analyzed: 1) All respondents that remain after cleaning the data, 2) Only those respondents with a mental health condition and/or chronic pain, 3) Respondents suffering from depression, 4) Respondents suffering from anxiety, 5) Respondents suffering from overwhelming stress, 6) Respondents suffering from chronic pain and/or illness, and 7) Respondents not suffering from a mental health condition or chronic pain/illness.

Below, three figures give an overview of what comes ahead in this chapter, to demonstrate how the results of the seven groupings compare. The first figure demonstrates that all of the groupings scored the assorted mindfulness options similarly; the pain group has the most extreme values due to its small sample size of four respondents. Excluding the pain group, scores varied from a low of 1.95 (the stress group's score for online exercises) to a high of 2.87 (the no MH group's score for the college room. Recall that a low score is better.

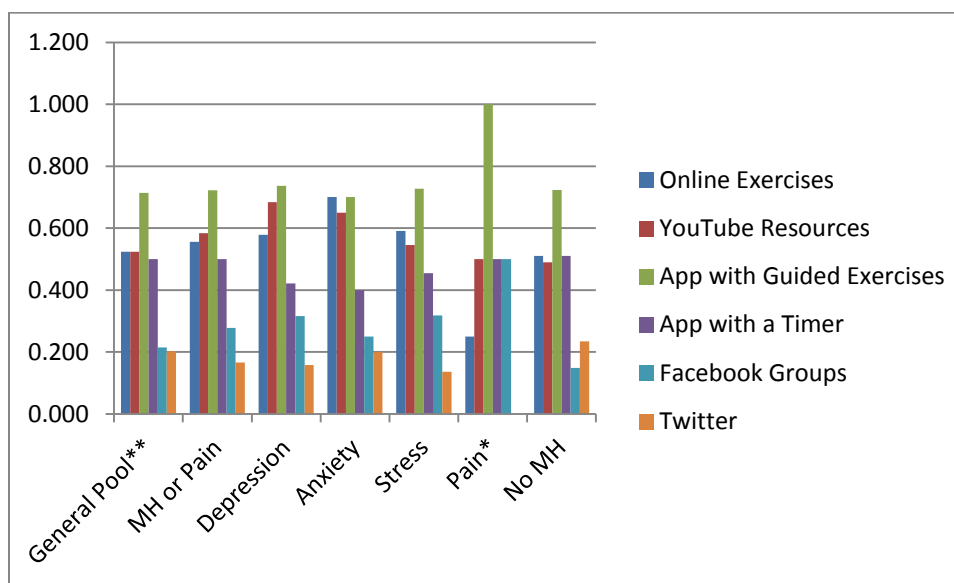


\*Pain group has a sample size of four

Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best

The next figure gives an overview of the interest of each group for specific mindfulness technologies. The totaled interest for each group was divided by the number of respondents

belonging to the group. Note again that the pain group only had four respondents and is thus an outlier. In addition, the sample size used for the general pool was 84 instead of 104; the respondents who did not finish the survey were removed, as they had not answered these questions and would only dilute the numbers. As this is proportional data, the greatest interest would be one.

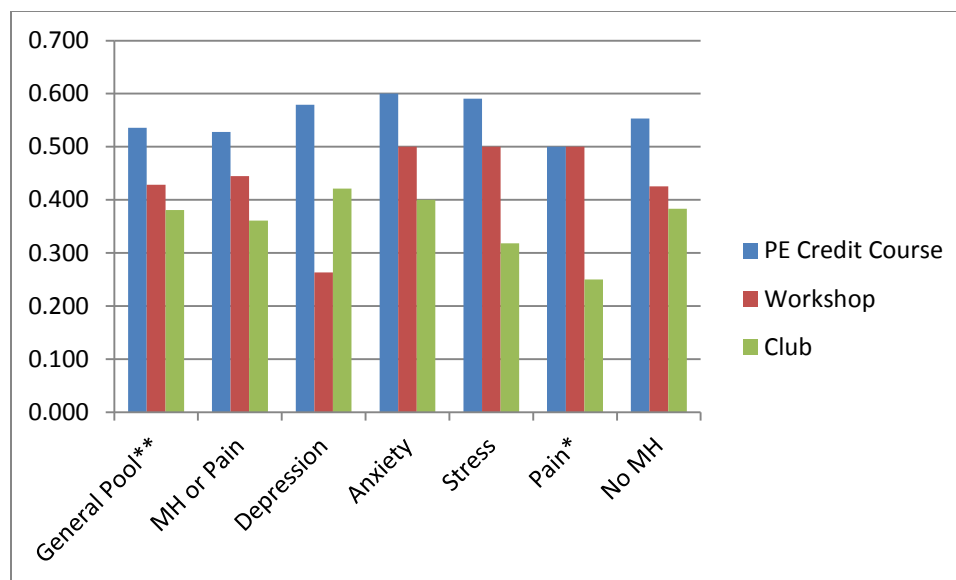


\*Pain group has a sample size of four

\*\*Using 84 as the General Pool sample size, as 20 of the 104 did not reach these questions

**Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options**

The final overview figure demonstrates the proportion of interest by size for each group, considering live options.



\*Pain group has a sample size of four

\*\*Using 84 as the General Pool sample size, as 20 of the 104 did not reach these questions

**Figure 9: Column Chart of (Interest / Size) by Group for Live Options**

In the pages that follow, each of the seven groups are considered individually and in greater detail. The analysis began with the general pool of all respondents, those with and without conditions.

### **6.1.2.1 General Respondent Pool**

The first data grouping examined was the general pool of all respondents. The team wanted to see what the spread was in terms of colleges, majors, year of school, ages, completion of survey, and self-disclosed conditions.

#### **College Representation:**

A total of 23 different colleges had representation via at least one student in the survey. Please note, the student who responded "gap year student" for his/her college may or may not be

from one of the other schools listed, and thus there may be a representation of only 22 schools; the team cannot verify what the respondent intended to input.

Row Labels	Count of UNIV
Assumption / Simmons	1
Assumption College	3
Curry College / Emerson College	1
Elon University	1
Framingham State University	2
gap year student...	1
Ithaca College	1
Johnson & Wales University	1
Keene State College	4
Lesley University	1
Massachusetts Bay Community College	2
North Dakota State University	1
Northeastern University	1
Oberlin College	1
Salt Lake Community College	1
Tufts University	7
Umass Amherst	2
University of Minnesota Duluth	1
University of Rhode island	1
William & Mary	1
Worcester Polytechnic Institute	45
Worcester State University	15
Wright State University	10

**Table 6: Table of Colleges Surveyed**

A pie chart gives a good visual of the spread of colleges. Unsurprisingly, 45 of the 104 respondents came from WPI, where the team had the greatest access to students. Through Project Grapevine, Tufts University, Worcester State University, and Wright State University also contributed sizeable slices of the pie.

### College Representation

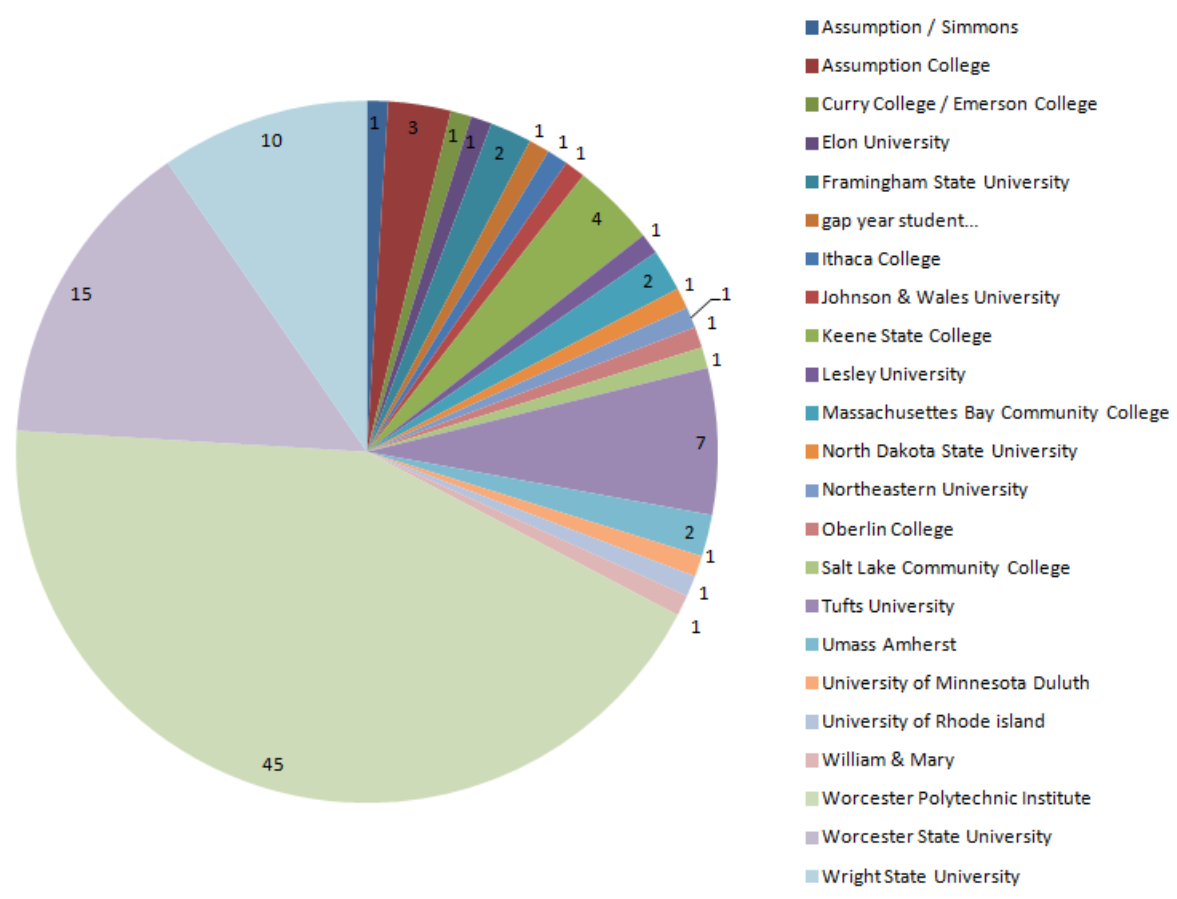


Figure 10: Pie Chart of College Representation

#### Major Representation:

One concern about using only WPI students as a pilot study was having a small sample of majors represented, particularly engineering majors. Thus the desire was to reach into as many schools as possible, to get respondents from various walks of life and disciplines, widening the view. Surprisingly, even though WPI was the school most represented with respondents, the

most popular major was Psychology, a major not traditionally associated with WPI. The figure below gives a visual representation of the spread of majors.

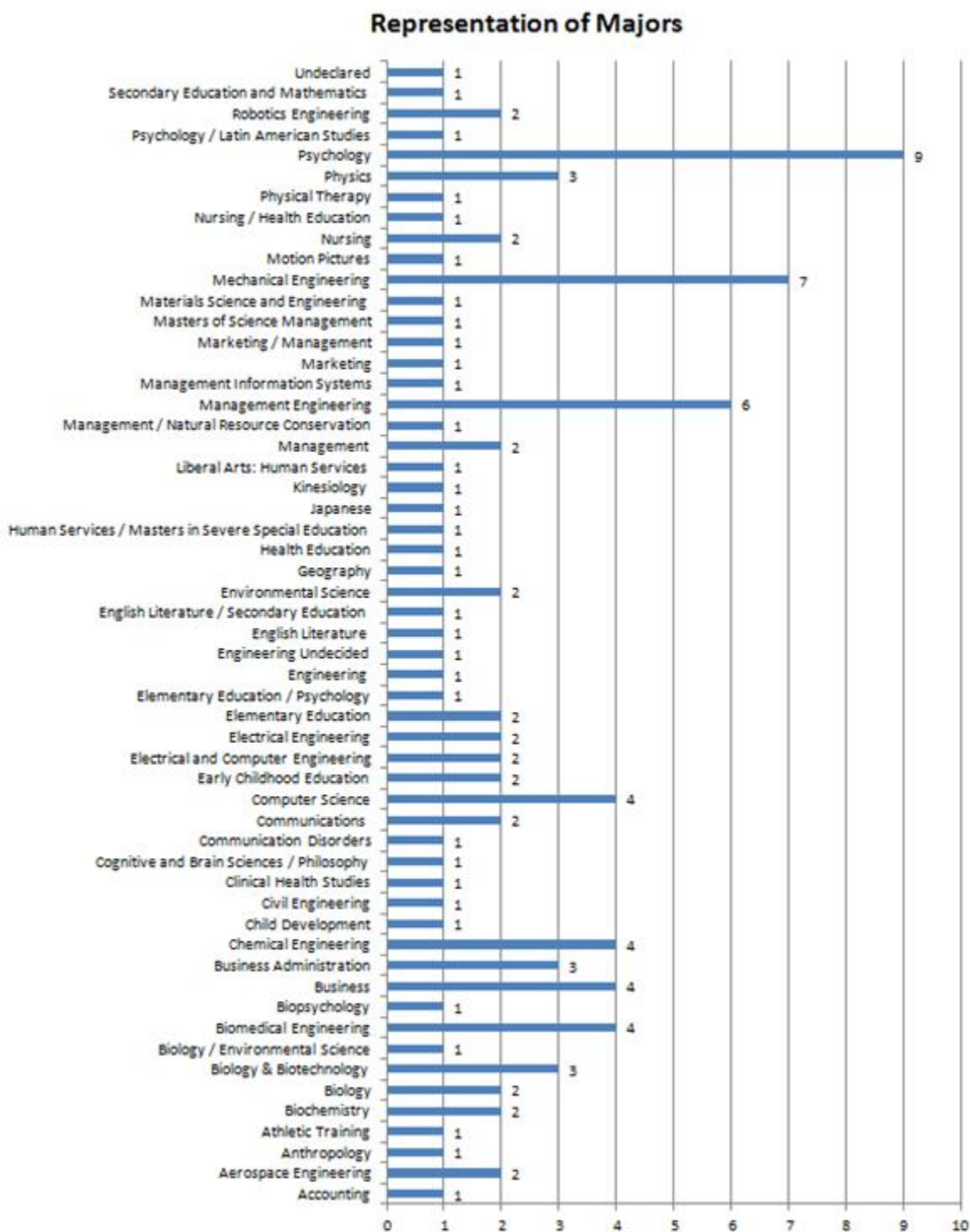


Figure 11: Bar Chart of Representation of Majors in the General Respondent Pool

Between the 104 respondents, 55 majors were represented. Double majors were counted separately - for instance, a student majoring in both Biology and Environmental Science was considered separately from students majoring in Biology as their only major. A slash is used to denote double majors or students pursuing two separate degrees (such as a B.S. and M.S.). Please note that "Biology & Biotechnology" is a single major. A tabular view of the data on major representation can be found below.

Row Labels	Count of MAJOR
Accounting	1
Aerospace Engineering	2
Anthropology	1
Athletic Training	1
Biochemistry	2
Biology	2
Biology & Biotechnology	3
Biology / Environmental Science	1
Biomedical Engineering	4
Biopsychology	1
Business	4
Business Administration	3
Chemical Engineering	4
Child Development	1
Civil Engineering	1
Clinical Health Studies	1
Cognitive and Brain Sciences / Philosophy	1
Communication Disorders	1
Communications	2
Computer Science	4
Early Childhood Education	2
Electrical and Computer Engineering	2
Electrical Engineering	2
Elementary Education	2
Elementary Education / Psychology	1
Engineering	1
Engineering Undecided	1

English Literature	1
English Literature / Secondary Education	1
Environmental Science	2
Geography	1
Health Education	1
Human Services / Masters in Severe Special Education	1
Japanese	1
Kinesiology	1
Liberal Arts: Human Services	1
Management	2
Management / Natural Resource Conservation	1
Management Engineering	6
Management Information Systems	1
Marketing	1
Marketing / Management	1
Masters of Science Management	1
Materials Science and Engineering	1
Mechanical Engineering	7
Motion Pictures	1
Nursing	2
Nursing / Health Education	1
Physical Therapy	1
Physics	3
Psychology	9
Psychology / Latin American Studies	1
Robotics Engineering	2
Secondary Education and Mathematics	1
Undeclared	1

**Table 7: Table of Majors Represented**

### **Year of College:**

Looking at the year of college, approximately half of the respondents were freshmen. As the year of college progressed, from freshman undergraduate to graduate student, fewer students took the survey. This is perhaps related to the amount of free time a student has at different times in their college careers, but none of the evidence collected could confirm this possibility, nor is it entirely within the scope of this project. Regardless, it is an interesting find, as if



students become less willing to take a brief survey as they continue their college careers, one wonders how likely they would be to dedicate time daily to mindfulness meditations.

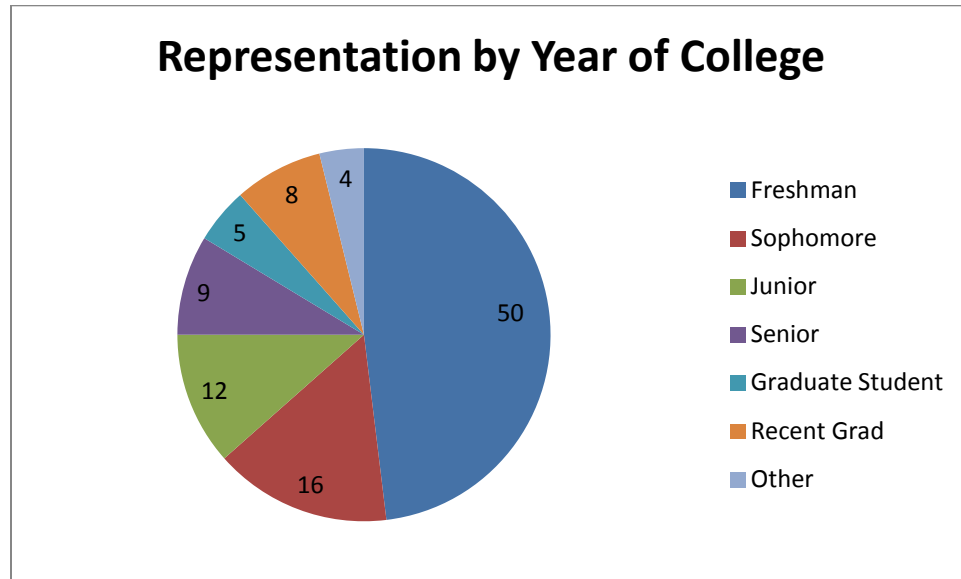


Figure 12: Representation by Year of College in General Respondent Pool

### Ages:

Consistent with about half of the respondents being freshmen, close to half of respondents were born in 1996 and 1997; between those two years, 59 of the respondents were born. The following bar chart demonstrates how the younger the participant, the greater the response rate.

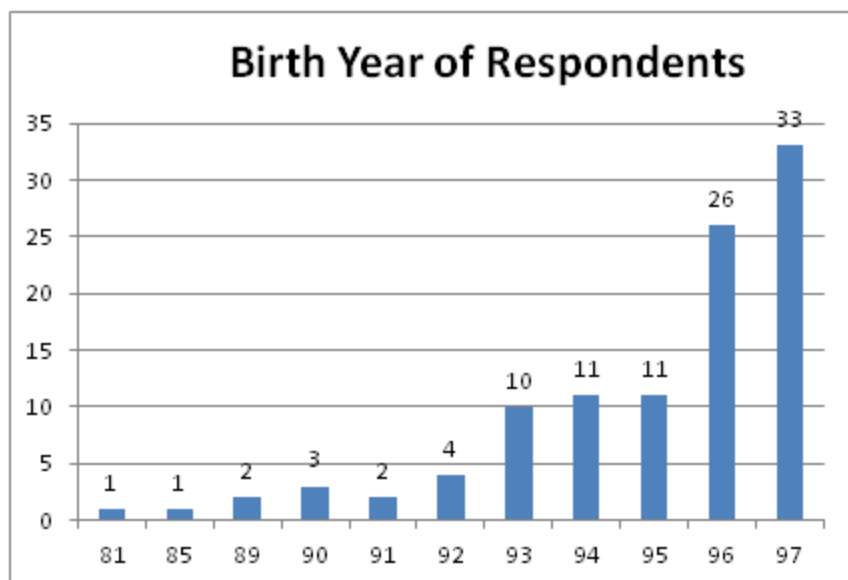


Figure 13: Birth Year of Respondents in General Respondent Pool

### Completion of Survey:

Of the 104 respondents, 20 did not finish the entire survey.

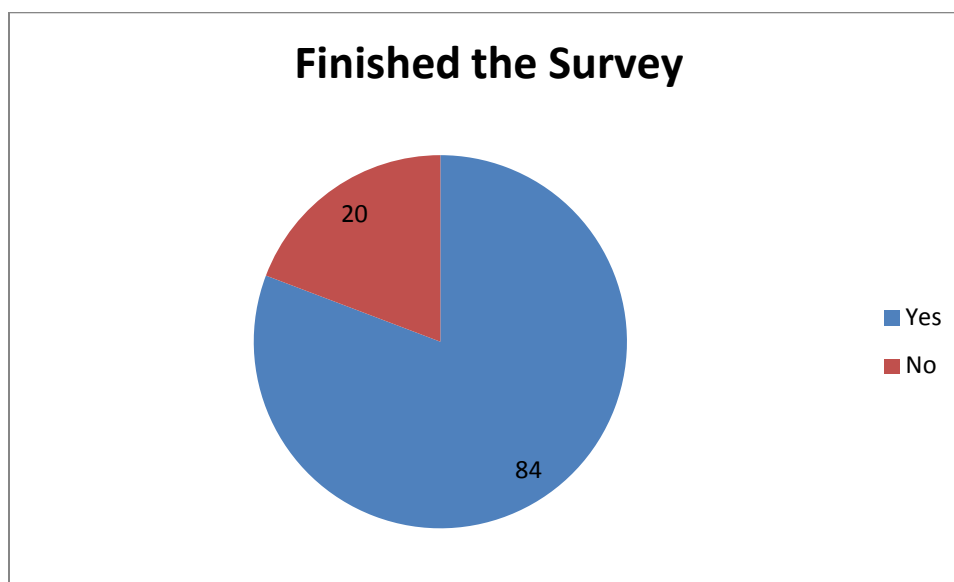


Figure 14: Pie Chart for Survey Completion

Looking closer at the 20 respondents that did not complete the survey, all quit without answering anything on the final page. For a breakdown of where respondents stopped, two quit after completing page one (after answering YEAR), 12 quit after completing page two (after answering MH\_ISSUE, ANX, and STRESS which were the last question on page 2 depending on the answer to MH\_ISSUE), one quit in the middle of page three right before the imbedded video, and five quit after completing page three.

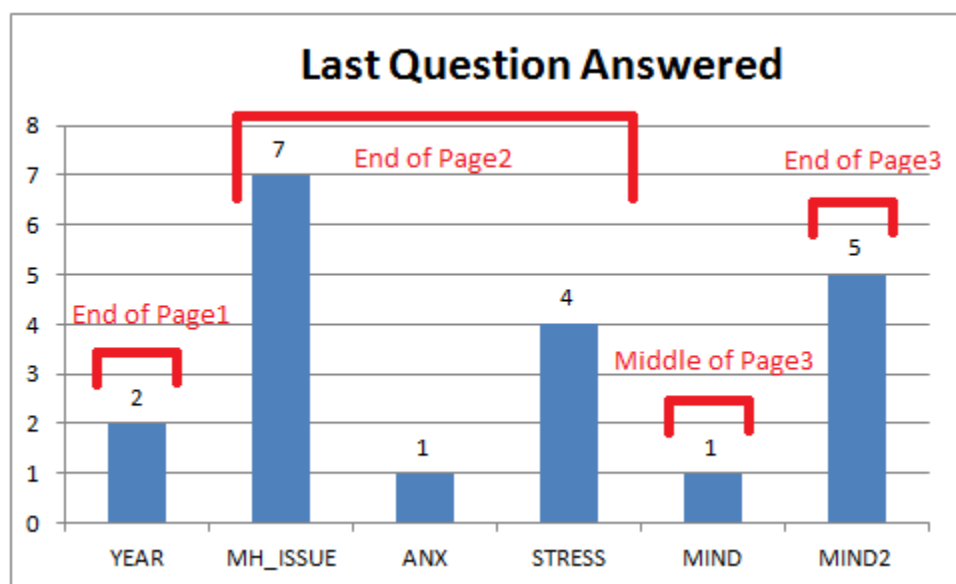


Figure 15: Column Chart of Last Question Answered for Unfinished Surveys

Unsurprisingly, the question that had the greatest drop rate was MH\_ISSUE, the question in which the team asked respondents to disclose their conditions: "Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge?" The two respondents that stopped the survey after completing page one looked at this question and closed the survey without answering it, and seven respondents answered the question and then did not continue. What is surprising is that all seven of the students that quit on this question answered "no." The team expected respondents that answered "yes" to quit on this question, as answering "yes" prompted new questions trying to place the student within bins of the sample. The team believed that respondents might feel uncomfortable giving more details and might drop off when asked for them, which did not happen at all.

Looking at all 20 incomplete responses, there are four groups in terms of the desired sample: those with a mental health condition or chronic pain, those without a mental health condition or chronic pain, those who did not wish to answer, and those that did not answer anything for the question.

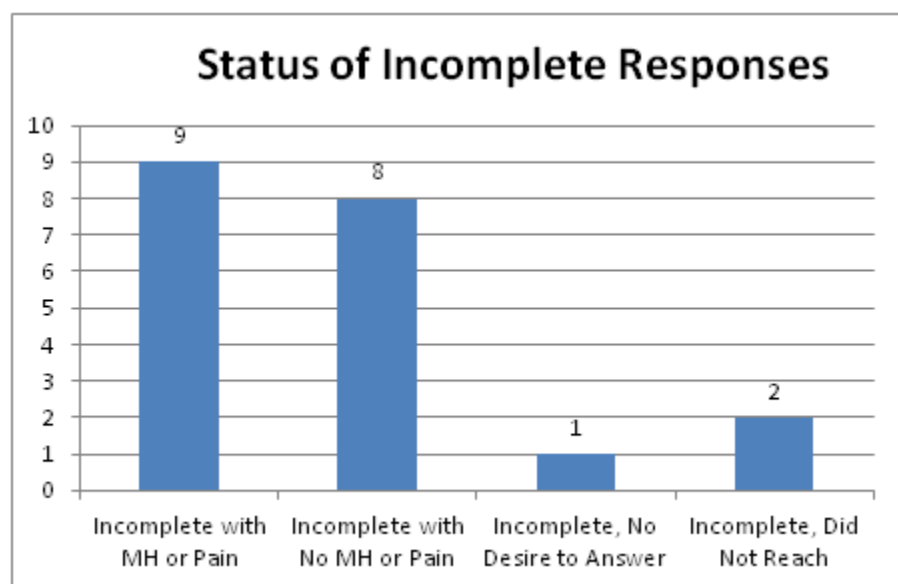


Figure 16: Status of Incomplete Responses in the General Respondent Pool

Unfortunately, nine of the 20 respondents that did not finish were in the desired sample of having a mental health condition or chronic pain. Moving forward in analysis, all incomplete responses will be removed as none of them answered the questions on technology that were the most important part of the survey. This unfortunately shrinks the pool of young adults suffering from mental health conditions or chronic pain by a decent margin.

### Self-disclosed Conditions:

Still examining the general pool of respondents, self-disclosed conditions were analyzed. As noted above, two respondents did not answer the question on self-disclosure before exiting the survey early. The majority of respondents reported no mental health conditions, but a sizeable number did report suffering from either a mental health condition or chronic pain.

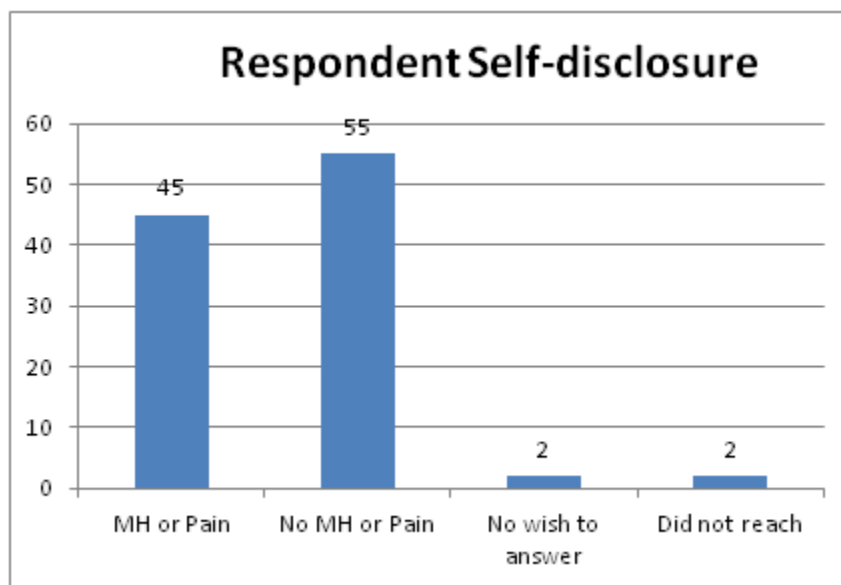


Figure 17: Column Chart of Respondent Self-disclosure

Of the 45 respondents suffering from mental health conditions or chronic pain, stress appeared with the highest frequency, though depression and anxiety did not lag far behind. Very few respondents reported suffering from chronic pain. Note that a single respondent can be counted towards multiple categories in the chart below, as respondents can suffer from multiple of the conditions.

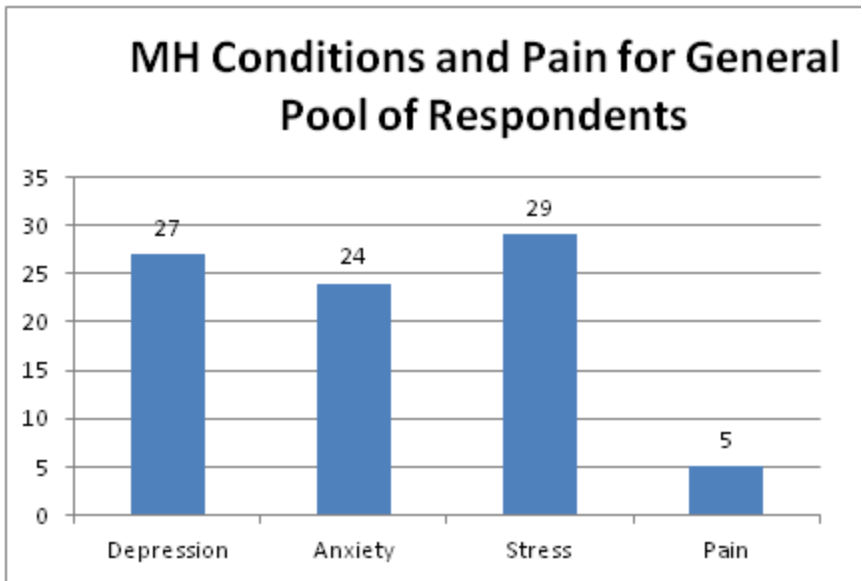


Figure 18: Column Chart of Conditions in the General Pool

**Yoga and Mindfulness:**

More respondents than not have practiced yoga and heard of mindfulness. The vast majority of respondents believe that mindfulness could be beneficial to them, and likewise the vast majority would be willing to try mindfulness practices in the future were they more accessible.

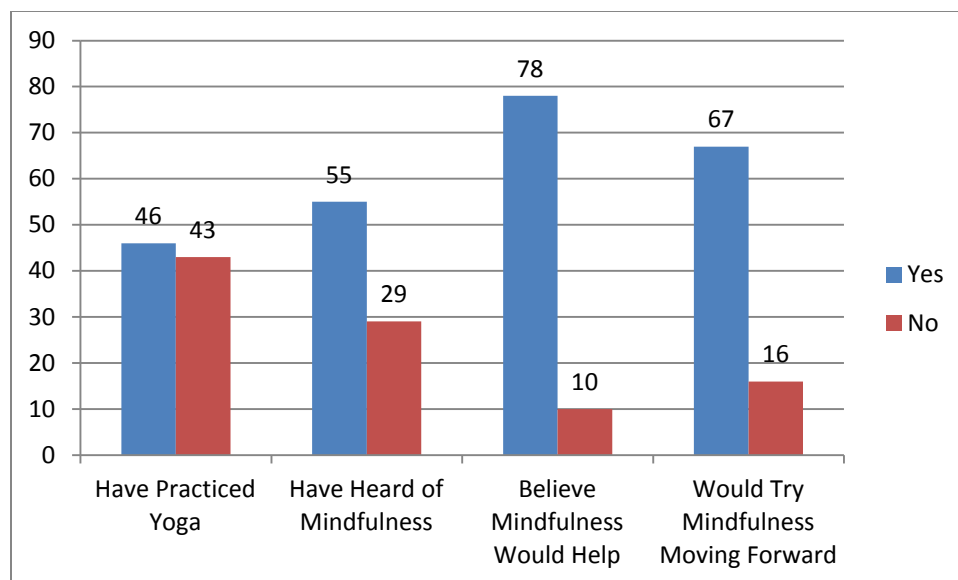


Figure 19: Column Chart Depicting Views on Mindfulness and Yoga

### Comparing All Mindfulness Options:

Respondents were asked to rate options on a scale, from a "definite yes" to a "definite no" in terms of their interest in the option. Each answer was assigned a value, with one corresponding to the "definite yes" and four corresponding to the "definite no." Following this scale, the lower the overall score of an option, the better. Below is a column chart demonstrating the scores of each option relative to each other. The scores were obtained by averaging the numeric data for every technology option.

Looking at these values, for the general respondent pool, the app is the clear victor while the virtual living room is in dead last. Twitter and online exercises scored closely together, not far behind the app. Live courses, and then Facebook, trail further behind, with the virtual living room coming in a large margin behind all options. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

**Preferred In-person Mindfulness Option:**

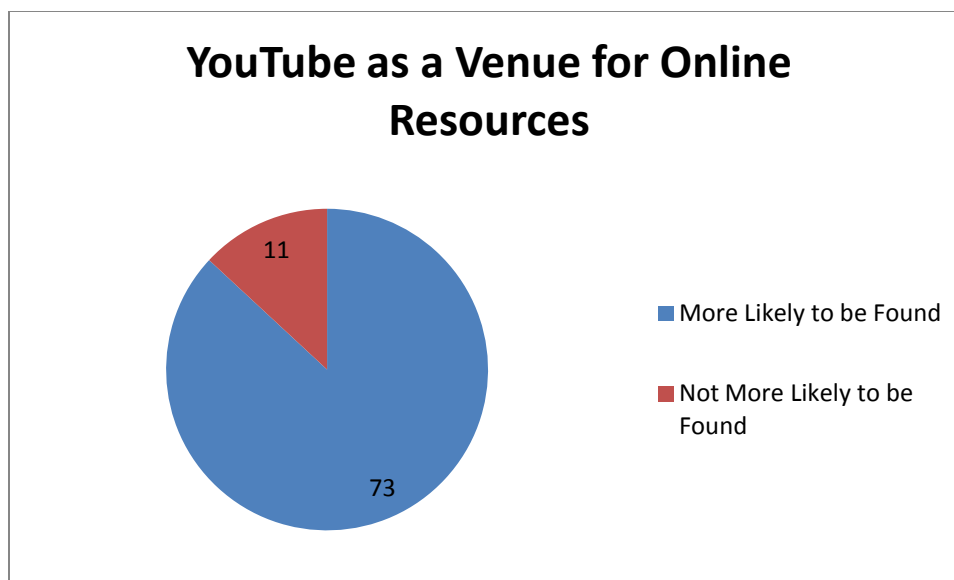
Respondents were asked which options appealed to them for a live mindfulness course: a class for credit, a workshop, or a club. Respondents were allowed to select as many of the options as interested them. The most popular option was for a gym class. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

**Comparing Preference to Intent:**

At the end of the survey, respondents were asked which technologies they might consider using in the future. Respondents were allowed to check as many options as interested them. An app with guided exercises on it was the winner by a long shot. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

Online guided exercises and YouTube resources tied, as the two options were essentially the same, just available in different venues. In a separate question, respondents were asked if they believed young adults would be more likely to find the exercises if they were on YouTube (opposed to on individual sites like Tara Brach's.) The answer was overwhelmingly "yes."





**Figure 20: Respondents Believe More Young Adults Would Find Guided Exercises on YouTube**

Lagging slightly behind the online guided exercises was a more basic app; respondents seemed more interested in an application with more utility. Bringing up the rear were Facebook groups and Twitter. Though the high interest for an app confirmed the earlier best relative score of the app, Twitter received two contradictory scores. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

Comparing the rankings by score (derived from averaging the values corresponding to how likely a respondent would use said technology option) and the rankings by interest (a simple check as to if the respondent realistically would use the technology option in the future) confirms certain options while contradicting others. Some form of app was ranked first both times, thus is definitely the front choice for the general respondent pool. The Twitter data majorly contradicted itself; though respondents described themselves as fairly likely to use Twitter, they admitted that in the future they would not realistically use it. Online exercises was consistently a decent option, and Facebook was consistently a poorly regarded option.

### **Additional Comments from Respondents:**

Respondents had a handful of things to say in some of the fill-in-the-blank areas throughout the survey. One respondent wanted "something text-based that does not require [his/her] presence" which somewhat defeats the purpose of mindfulness and getting young adults together for classes. Another respondent particularly requested yoga classes, and another respondent was of the opinion that a TED talk might serve as a decent recruitment tool.

In the question that queried respondents for other technologies that might work with mindfulness, a plethora of ideas were suggested. One early respondent suggested an Instagram page, which the team rolled out accordingly for a comparison to Twitter. Another respondent requested courses for middle school students, particularly those at Forrest [sic] Grove. Two respondents, one from WPI and the other from Wright State, both suggested exercises on Netflix. For additional mobile application functionalities, respondents requested ways besides meditation for practicing mindfulness (which is where something so simple as a timer might come in), and guided yoga poses. Another respondent suggested radio commercials, particularly for use on Pandora. Branching into Smartwatch technology was another recommendation. One respondent suggested a website that sends email reminders and daily information, and lastly another respondent suggested quick Snapchat mindfulness exercises.

#### ***6.1.2.2 Mental Health Condition and Chronic Pain Pool***

In this section, only respondents that suffer from depression, anxiety, stress, and/or chronic pain and illness will be studied. The purpose of this section is to determine what the preference for technology is in this particular subgroup, and to see if it differs from the general respondent pool, or if young adults appear to share the same technological preferences regardless of any present conditions. All respondents who did not finish the survey were likewise removed from this sample, as none of them answered the questions pertaining to technology. This sample consists of 36 young adults suffering from at least one of the following: depression, anxiety, stress, and chronic pain.

## Conditions of Respondents

In this sample of 36 young adults, the most common condition was stress. Anxiety and depression follow slightly behind, and there were very few respondents that reported suffering from chronic pain or illness. The data below totals greater than 36 respondents, as a single respondent could belong to more than one bar if suffering from multiple conditions.

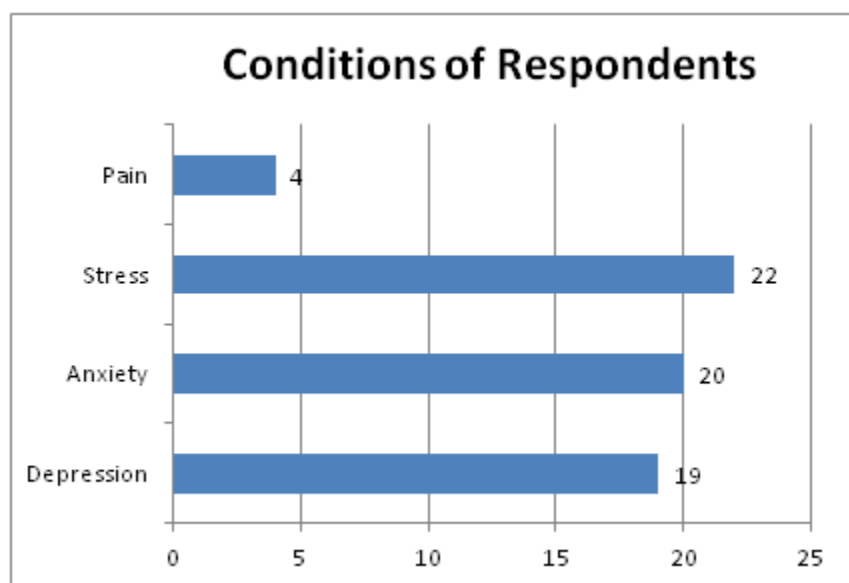


Figure 21: Conditions of the 36 MH or Chronic Pain Respondents that Finished the Survey

## Comparing All Mindfulness Options

The group of 36 respondents suffering from mental health conditions and/or chronic pain also favored the app as a means of pairing mindfulness with technology. Online exercises were a very close second, with the virtual living room coming in dead last once again. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

## Comparing Live Options

Live options followed the same pattern of preference as in the general respondent pool; a physical education class for credit scored highest, followed by a workshop, and lastly a club. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

### **Comparing Interest Moving Forward**

Like the general respondent pool, the mental health condition and chronic pain group realistically would use an app with guided exercises moving forward. The contradictory stance on Twitter is also present in this sample. Online guided exercises and YouTube exercises again came in second, with a slight preference for the exercises to be on YouTube. Facebook remained consistently low on popularity. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

### **Comparing Preference to Intent**

Comparing the rankings by score (derived from averaging the values corresponding to how likely a respondent would use said technology option) and the rankings by interest (a simple check as to if the respondent realistically would use the technology option in the future) confirms certain options while contradicting others. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

The mental health and/or chronic pain group was consistent in everything but Twitter. Like the general respondent pool, respondents supported the idea of the Twitter campaign but realistically would not use it moving forward. Meanwhile, the app came in first in terms of both support and intent to realistically use said technology in the future. Online exercises were regarded favorably, and Facebook regarded unfavorably in both cases.

### **6.1.2.3 Depression Subgroup**

Nineteen respondents reported suffering from depression. Though this is a small sample size and is not statistically significant, the team thought it might be interesting to see if the evidence suggested that those suffering from depression differed in terms of preferences compared to the mental health and chronic pain bin as a whole. Further research would have to be done to confirm any results derived from this section.

#### **Comparing All Mindfulness Options**

The respondents suffering from depression favored the app and online exercises equally. Facebook and Twitter were not terribly far behind. Live courses were not a favorite among those suffering from depression, but the virtual living room was by far the least favored option. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

#### **Comparing Live Options**

For a live option, those suffering from depression favored a gym class that offered credits as well. Differing from the general respondent pool, and the mental health condition and chronic pain pool as a whole, clubs were favored over workshops. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

#### **Comparing Interest Moving Forward**

Respondents suffering from depression showed the most interest in an app with guided meditation exercises on it, with online guided exercises and YouTube resources again being the next highest favored technology option. There was a slightly higher preference for YouTube as

the venue for the online resources. Facebook and Twitter yet again performed abysmally, with very few respondents reporting that they would realistically use those social medias alongside mindfulness. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

### **Comparing Preference to Intent**

Respondents suffering from depression favored an app above the other technologies mentioned, and verified their interest in realistically using said app. Online exercises likewise received consistent positive rankings. Facebook, ranked in the top half, with respondents reporting that they would want to join Facebook groups over Twitter, live courses, or the virtual living room. This ranking changed when respondents were asked which technologies they would realistically use, as Facebook fell to rank five behind every other technology but Twitter. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

#### ***6.1.2.4 Anxiety Subgroup***

Twenty respondents reported suffering from anxiety. Though this is a small sample size and is not statistically significant, the team thought it might be interesting to see if the evidence suggested that those suffering from anxiety differed in terms of preferences compared to the mental health and chronic pain bin as a whole. Further research would have to be done to confirm any results derived from this section.

### **Comparing All Mindfulness Options**

For those suffering from anxiety, the app remained the first choice, again followed by online exercises. Per usual, the virtual living room placed last among technologies respondents

would consider using alongside mindfulness. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

### **Comparing Live Options**

Respondents suffering from anxiety followed the preferences of the general respondent pool as well as the mental health condition and chronic pain pool as a whole. A class for credit placed above a workshop, and a club was the least favored option. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

### **Comparing Interest Moving Forward**

The anxiety group had an equal preference for an app with guided exercises and online guided exercises. Respondents had slightly less preference for the online resources if they were located on YouTube. Facebook and Twitter continued to bring up the rear, with low interest for use in the future. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

### **Comparing Preference to Intent**

The app and online exercises remained consistent, with respondents preferring them to the other technologies presented, and reporting that they would realistically use them above the other options. Facebook fared consistently poorly in terms of interest and score. Twitter again fell in ranking, with respondents initially saying they would use it over Facebook, and then that they would realistically use Facebook over Twitter. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

### ***6.1.2.5 Stress Subgroup***

Twenty-two respondents reported suffering from stress. Though this is a small sample size and is not statistically significant, the team thought it might be interesting to see if the evidence suggested that those suffering from stress differed in terms of preferences compared to the mental health and chronic pain bin as a whole. Further research would have to be done to confirm any results derived from this section.

#### **Comparing All Mindfulness Options**

For respondents suffering from stress, online exercises placed higher than the app, for the first time among any of the groups studied. Aside from the switch of position on those two options, the rest of the relative scoring is about consistent. As in all cases, the virtual living room received the worst score. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

#### **Comparing Live Options**

Consistent with all groups but the depression group, a gym class offering credits was the favored live option. A workshop was the middle option, and clubs again ranked in last place. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

#### **Comparing Interest Moving Forward**

Contradicting the earlier preference towards the online guided exercises over app, there is greater interest in the app than in online resources. Respondents have a slight preference against



YouTube for the venue of the online guided exercises. Facebook and Twitter remain unpopular. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

### **Comparing Preference to Intent**

For the stress subgroup of respondents, online exercises and the app remain as the top technologies for preference and actual intent to use. Facebook and Twitter remain on the lower end, with little intent to use. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

#### ***6.1.2.6 Chronic Pain Subgroup***

Four respondents reported suffering from chronic pain or chronic illness. Though this is a small sample size and is not statistically significant, the team thought it might be interesting to see if the evidence suggested that those suffering from chronic pain or illness differed in terms of preferences compared to the mental health and chronic pain bin as a whole. Further research would have to be done to confirm any results derived from this section.

### **Comparing All Mindfulness Options**

The chronic pain or illness subgroup ranked Twitter above all other technologies, including the app. This group also ranked Facebook above the online exercises. The only real consistency with other groups is that the virtual living room maintained last place. This subgroup is very small, and thus the data in it is not very statistically significant and subject to much change upon further research. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

### **Comparing Live Options**

The chronic pain and illness subgroup prefers a gym class for credit and a concise workshop equally. Clubs were a less popular option. With four respondents, little can be said. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

### **Comparing Interest Moving Forward**

All four respondents suffering from chronic pain report that realistically they would use the app in the future. Meanwhile, not one of them would want to couple Twitter with mindfulness in practice. All other options tied, with a slight preference for YouTube as the venue for the online guided exercises. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

### **Comparing Preference to Intent**

Being the smallest sample size, it should not be surprising that little can be drawn from the group that suffers from chronic pain or illness. Though initially claiming to be more likely to use Twitter, the respondents reported that none of them would actually use Twitter for spreading mindfulness. The app remained a choice close to the top, both in terms of preference over the other technologies and intent to use it. Little information can be drawn from the other options, though online exercises were not a popular choice for this subgroup. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

### ***6.1.2.7 No MH or Pain Group***

Forty seven respondents reported having no mental health condition nor chronic pain. Though this group is not the desired sample, it is worth studying for a point of comparison with the mental health condition group.

#### **Comparing All Mindfulness Options**

The no MH group ranked the app above all other technology options, with Twitter coming in at a close second. Online exercises were favored above live courses, Facebook, and the college room which came in dead last per usual. To compare this data to the data obtained for each group, see Figure 7: Column Chart of Scores for Mindfulness Options by Group, Low is Best.

#### **Comparing Live Options**

Like those with a mental health condition, those without one prefer a class for physical education credit in terms of a live mindfulness option. As has been the case for the most part, clubs are the least favored means of a live mindfulness option. To proportionally compare this data to the data obtained for each group, see Figure 9: Column Chart of (Interest / Size) by Group for Live Options.

#### **Comparing Interest Moving Forward**

Moving forward, many members of the no MH group could see themselves using an app with guided breathing exercises. A simpler app with just a timer tied online guided exercises for second place in terms of interest. There was a slight preference against YouTube as the venue for the online resources. For social media, Twitter fared slightly better than Facebook. To proportionally compare this data to the data obtained for each group, see Figure 8: Column Chart Depicting (Interest / Size) by Group for Technology Options.

## Comparing Preference to Intent

Initially, Twitter ranked high with the no MH group. Then, as has been the case in many of the other groups, it suffered in terms of the intent to use said technology for said purpose realistically in the future. Like the respondents who suffered from mental health conditions or chronic pain, those not suffering from such conditions also prefer an app. This may be helpful in reducing any stigma around the app, as it has a universal appeal to young adults. Likewise, online resources remained a popular option, both by score and intent to use. To see how the rank by score and rank by interest compare for all groups, see Figure 22: Ranking of Options by Relative Score, Low Rankings Best and Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best.

### 6.1.3 Summary of All Groups' Preferences

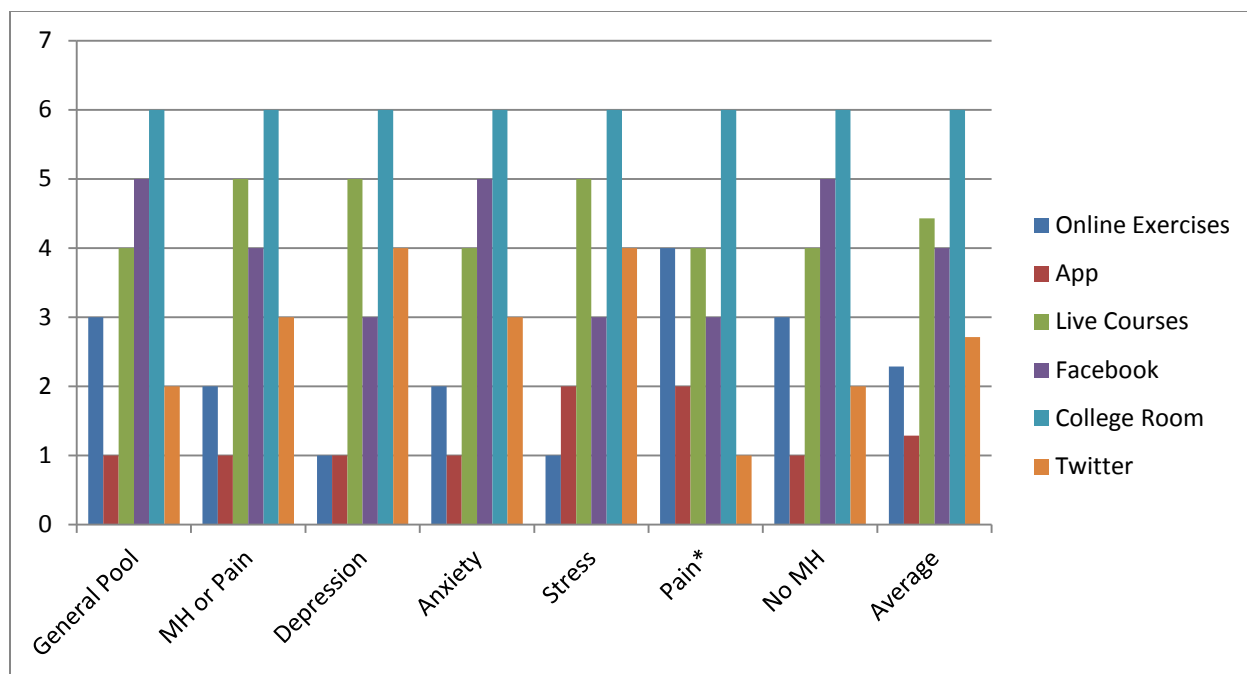
Seven groups within the surveyed sample were studied. The general pool consisted of all 104 respondents that were young adults and gave legitimate responses. From this general pool, a smaller sample of 36 was considered - those who disclosed suffering from a mental health condition or chronic pain or illness. The next four groups came from this subgroup of 36; of the 36 respondents suffering from a mental health condition or chronic pain or illness, 19 suffered from depression, 20 suffered from anxiety, 22 suffered from stress, and four suffered from chronic pain or illness. One respondent could belong in multiple groups; for instance, a respondent suffering from depression and anxiety would be among the sample for the general pool, the MH or chronic pain pool, the depression pool, and the anxiety pool. The final group was that of 47 young adults reportedly not suffering from a mental health condition or chronic pain/illness.

<b>Group</b>	<b>Sample Size</b>
<b>General Pool</b>	104
<b>MH or Chronic Pain</b>	36
<b>DEPR</b>	19
<b>ANX</b>	20
<b>STRESS</b>	22
<b>PAIN</b>	4
<b>No MH</b>	47

**Table 8: Sample Sizes Among the Seven Groupings of Respondents**

Across all groups, the app and online exercises had a high rating; the app was ranked highest for the general pool, the mental health or chronic pain pool as a whole, for the no MH group, and for the depression and anxiety pools. For those suffering from stress and chronic pain or illness, the app ranked second; those suffering from stress preferred online exercises while those suffering from pain preferred Twitter. The virtual living room (college room) ranked in last place across all seven groups of respondents. Though an average of rankings should be taken lightly, since a single respondent that belonged to more groups holds more sway in his/her opinion than a respondent that was only represented in one group, the app has the best average ranking, followed by online exercises. Performing well both in the general pool and in the subgroups, these options appear to appeal to young adults, regardless of whether or not they are suffering from a condition.

The following column chart represents these rankings in a visual format. Lower columns represent a better rank, as it is better to place first than to place second.



\*Pain group has a sample size of four.

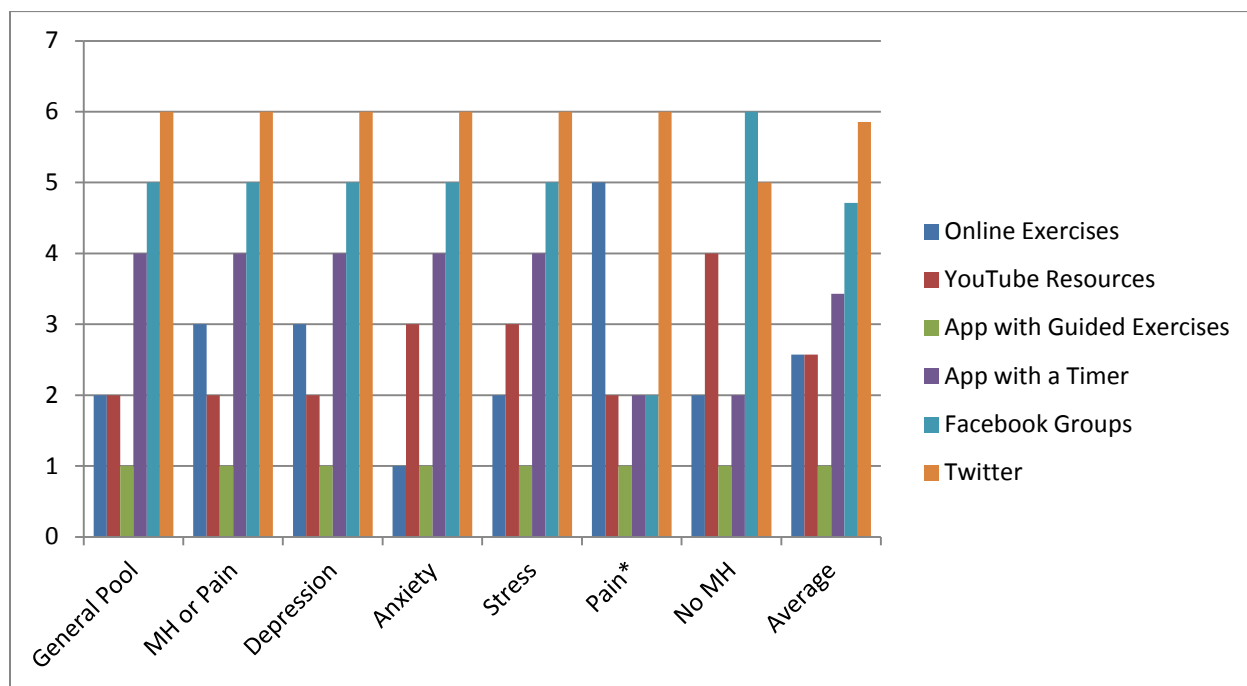
Figure 22: Ranking of Options by Relative Score, Low Rankings Best

A slightly different story is told when looking at the rankings for technologies that respondents realistically intend to use moving forward. Across every group, the app placed first; an application is definitely an avenue worth considering for coupling with mindfulness. Online resources still placed second for the most part; for those suffering from anxiety, online resources tied the app for first.

Differences crop up for the venue for the online resources. Those suffering from stress, those suffering from anxiety, and those with no MH have a slight preference against the resources being on YouTube, while the general pool of respondents, the mental health or chronic pain group as a whole, the chronic pain group, and those suffering from depression have a slight preference for YouTube. Both venues are worth pursuing, as videos can be easily uploaded to many locations online; a video could be put on the CFM's website as well as on YouTube, for instance. Yet another avenue potentially worth pursuing for the online resources might be Netflix, as two respondents suggested. Meanwhile, Twitter and Facebook do not appear to be technologies worth pursuing. Even though Twitter scored decently on its own, when placed along the other technologies, users did not check it as something that they would realistically use

in the future. Thus, respondents seem to think Twitter is a good idea, but not something they would want to use.

The following column chart represents these rankings in a visual format. Lower columns represent a better rank, as it is better to place first than to place second.



\*Pain group has a sample size of four

Figure 23: Ranking of Options by Interest Moving Forward, Low Rankings Best

### 6.1.4 One-way ANOVA Analysis

A one way ANOVA test was performed on the survey data relating to the interests for both technology supplements and live option preferences of the survey participants, as well as for the overall scores of the interests. The purpose of the ANOVA test was to investigate whether the means of interests of respondents with mental health issues and without varied significantly. A p-value of greater than .05 indicates there is not a statistically significant difference in the means, indicating that the interests do not vary across the groups of respondents.

A summary of the groups that were compared is below:

<b>Mean 1</b>	<b>↔</b>	<b>Mean 2</b>
No mental health illness	↔	Mental illness or pain
No mental health illness	↔	Stress (Subset of mental health illness or pain)
No mental health illness	↔	Anxiety (Subset of mental health illness or pain)
No mental health illness	↔	Depression (Subset of mental health illness or pain)
Anxiety	↔	Stress
Stress	↔	Depression
Depression	↔	Anxiety

**Figure 24: Summary of Groups Compared in ANOVA**

The groups above were compared in terms of (Interest/Size) by Group as well as in terms Interest by Group, and Score by Group. A summary of the conclusions is below. The table of values used and ANOVA tests supporting these summaries can be found in Appendices M-R.

If the ANOVA test showed no significant difference in the means of the two groups, i.e. p-value >.05, then that allows the team to analyze the interests of those two groups of interest as equivalent. Also, the closer the p-value is to 1 indicates a smaller difference between means of two groups i.e. the closer the interests of the groups are.

The information gathered from the ANOVA tests will be used to help the team tailor the final mockup of the application, as well as pass on the information and data collected for further development.



It is important to note that although the analysis that was performed for this study showed statistical significance, the sample size that was used is too small to make any conclusions on the population as a whole.

#### *6.1.4.1 Technology Supplements*

Groups that show no significant difference in the interests of technology supplements for mindfulness practices allow the team to conclude that those groups all prefer an application with guided exercises first, followed by online exercises, then YouTube videos, an application with a timer, Facebook, and lastly Twitter.

#### **(Interest/Size) by Group:**

The ANOVA test showed there was not a statistically significant difference in the means of any of the groups that were compared in terms of (Interest/Size) by group for technology supplements.

Also, because the team compared the means of the subsets of specific mental health illness groups to the group of respondents with no mental health illness, the team can conclude that there is no difference in the interests of technology of the respondents with different specific mental health illnesses, and with no mental health issues, with respect to the size of the group. In other words, the interests of respondents suffering from anxiety do not differ from the interests of respondents suffering from depression, and those interests do not differ from respondents who do not suffer from a mental health illness at all. A summary of the analysis of each individual ANOVA test is below.

There was not a statistically significant difference of interests in technology supplements between the respondents with mental health issues and those without at the  $p$ -value  $< .05$  level for  $F(1,10)=0.069$ ,  $p=0.798$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from depression and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,10)=0.137$ ,  $p=0.719$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from stress and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,10)=0.045$ ,  $p=0.835$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from anxiety and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,10)=0.138$ ,  $p=0.718$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from anxiety and those who suffer from stress at the p-value  $< .05$  level for  $F(1,10)=0.028$ ,  $p=0.870$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from depression and those who suffer from stress at the p-value  $< .05$  level for  $F(1,10)=0.027$ ,  $p=0.874$ .

Lastly, there was not a statistically significant difference of interests in technology supplements between the respondents who suffer from depression and those who suffer from anxiety at the p-value  $< .05$  level for  $F(1,10)=4.047 \cdot e^{-5}$ ,  $p=0.995$ .

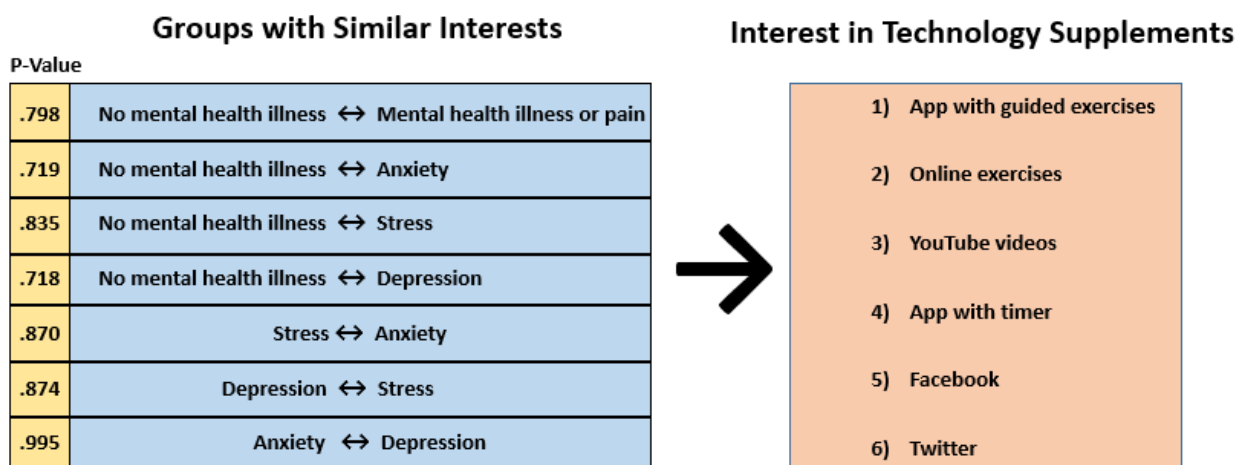


Figure 25: Interest in Technology Supplement - (Interest/Size) by Group

### Interest by Group:

The ANOVA test showed there was not a statistically significant difference in the means of the group of respondents in the general pool with a mental health illness, and the group of respondents with no mental health illness in terms of interest by group for technology supplements.

To add onto that, the ANOVA test also showed that there was a statistically significant difference in the means of the subsets of specific mental health illnesses. In other words, the interests of technology in respondents suffering from anxiety do not differ from the interests in respondents suffering from depression. As a result the team can conclude that the interests of technology supplements for the respondents with mental health illness are the same as those without a condition, and the respondents with mental health illnesses have the same interests of technology supplements regardless of the specific mental illness, when comparing in terms of interest by group. A summary of the analysis of each individual ANOVA test is below.

There was not a statistically significant difference of interests in technology supplements between the respondents with mental health issues and those without at the p-value  $< .05$  level for  $F(1,10)=0.529$ ,  $p=0.484$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from anxiety and those who suffer from stress at the p-value  $< .05$  level for  $F(1,10)=0.035$ ,  $p=0.855$

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from depression and those who suffer from stress at the p-value  $< .05$  level for  $F(1,10)=0.152$ ,  $p=0.705$ .

Lastly, there was not a statistically significant difference of interests in technology supplements between the respondents who suffer from depression and those who suffer from anxiety at the p-value  $< .05$  level for  $F(1,10)=0.038$   $p=0.849$ .

On the other hand, the ANOVA test showed there is a statistically significant difference in the means of the subsets of specific mental health illness, and the group with no mental health illness in terms of interest by group. This can be seen by the p-value being lower than  $.05$  in the ANOVA test calculations. This demonstrates that the interests of technology of the respondents suffering from one type of mental illness, such as depression, are different from the interests of technology of the respondents who do not have a mental illness.

However, this analysis is not as accurate as the analysis comparing Interest/Size by group because the size of the group is not taken into account, and therefore, the numbers that are being compared are not proportionate to each other. The groups of specific mental health illness are subsets of the mental health illness group, and therefore will be smaller than the group of respondents with no mental health illnesses. A summary of the analysis of each individual ANOVA test is below.

There was a statistically significant difference of interests in technology supplements between the respondents who suffer from depression and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,10)=6.69$ ,  $p=0.027$ .

There was a statistically significant difference of interests in technology supplements between the respondents who suffer from stress and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,10)=5.42$ ,  $p=0.042$ .

There was not a statistically significant difference of interests in technology supplements between the respondents who suffer from anxiety and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,10)=5.96$ ,  $p=0.035$ .

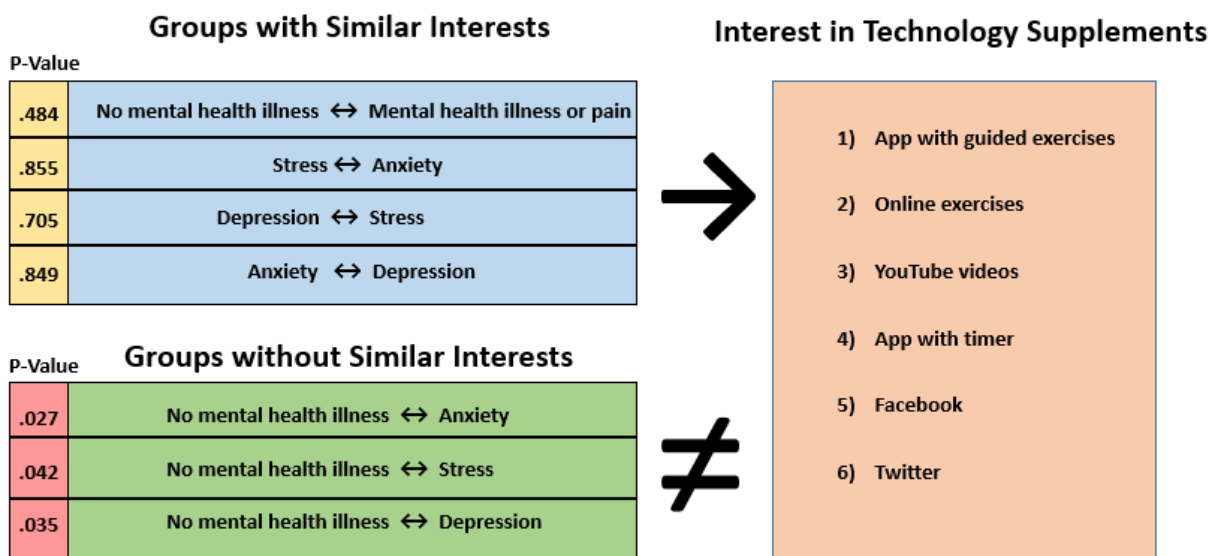


Figure 26: Interest in Technology Supplements - Interest by Group

#### 6.1.4.2 Live Option Preferences

Any groups that show no significant difference in the interests of live options for mindfulness practices allow the team to conclude that those groups all prefer the physical education class with credit first, followed by a workshop and lastly, a club.

Surprisingly, the results for the interests in technology supplements were identical to the results for the interests in live options, in terms of both Interest by Group and (Interest/Size) by group.

**(Interest/Size) by Group:**

The ANOVA test showed there was not a statistically significant difference in the means of any of the groups that were compared in terms of (Interest/Size) by group for live options. This demonstrates that there is no difference in the interest of live options of the respondents with mental health issues, regardless of specific type, than those respondents without a condition, when comparing the groups with respect to size. A summary of the analysis of each individual ANOVA test is below.

There was not a statistically significant difference of interests in live options between the respondents with mental health issues and those without at the p-value  $< .05$  level for  $F(1,4)=0.019$ ,  $p=0.897$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from depression and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,4)=0.099$ ,  $p=0.768$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from stress and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,4)=0.027$ ,  $p=0.877$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from anxiety and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,4)=0.356$ ,  $p=0.583$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from anxiety and those who suffer from stress at the p-value  $< .05$  level for  $F(1,4)=0.094$ ,  $p=0.774$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from depression and those who suffer from stress at the p-value  $< .05$  level for  $F(1,4)=0.160$ ,  $p=0.709$ .

Lastly, there was not a statistically significant difference of interests in live options between the respondents who suffer from depression and those who suffer from anxiety at the p-value  $< .05$  level for  $F(1,4)=0.535$ ,  $p=0.505$ .

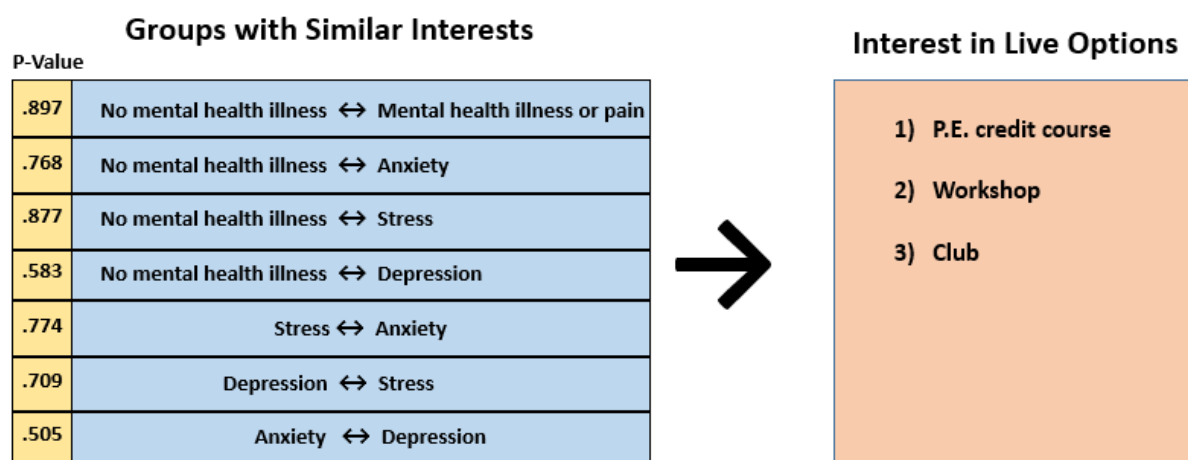


Figure 27: Interest in Live Options - (Interest/Size) by Group

### Interest by Group:

The results were also the same in terms of Interest by Group for the interests of technology and of live options. In other words, the ANOVA test showed there was not a statistically significant difference in the means of the group of respondents in the general pool with a mental health illness, and the group of respondents with no mental health illness in terms of interest by group. To add onto that, the ANOVA test also showed that there was not a statistically significant difference in the means of the subsets of specific mental health illnesses. As a result the team can conclude that the interests of live options of the respondents with mental

health illness, are the same as those without, and the respondents with mental health illnesses have the same interests of live options regardless of the specific mental illness, when comparing in terms of interest by group. A summary of the analysis of each individual ANOVA test is below.

There was not a statistically significant difference of interests in live options between the respondents with mental health issues and those without at the  $p$ -value  $< .05$  level for  $F(1,4)=3.24$ ,  $p=0.146$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from anxiety and those who suffer from stress at the  $p$ -value  $< .05$  level for  $F(1,4)=0.025$ ,  $p=0.882$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from depression and those who suffer from stress at the  $p$ -value  $< .05$  level for  $F(1,4)=0.891$ ,  $p=0.399$ .

Lastly, there was not a statistically significant difference of interests in live options between the respondents who suffer from depression and those who suffer from anxiety at the  $p$ -value  $< .05$  level for  $F(1,4)=0.923$ ,  $p=0.391$ .

On the other hand, the ANOVA test comparing the means of the Interest by Group for live options shows there is a statistically significant difference in the means of the subsets of specific mental health illness, and the group with no mental health illness. This can be seen by the  $p$ -value being lower than  $.05$  in the ANOVA test calculations. This demonstrates that the interests of technology of the respondents suffering from one type of mental illness, and not grouped together with other types of mental illnesses, such as depression, are different from the interests of technology of the respondents who do not have a mental illness.

However, this analysis is not as accurate as the analysis comparing Interest/Size by group because the size of the group is not taken into account, and therefore, the numbers that are being compared are not proportionate to each other. The groups of specific mental health illness are subsets of the mental health illness group, and therefore will be smaller than the group of



respondents with no mental health illnesses. A summary of the analysis of each individual ANOVA test is below.

There was a statistically significant difference of interests in live options between the respondents who suffer from depression and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,4)=20.25$ ,  $p=0.011$ .

There was a statistically significant difference of interests in live options between the respondents who suffer from stress and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,4)=13.61$ ,  $p=0.021$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from anxiety and those who do not suffer with a mental illness at the p-value  $< .05$  level for  $F(1,4)=18.06$ ,  $p=0.013$ .

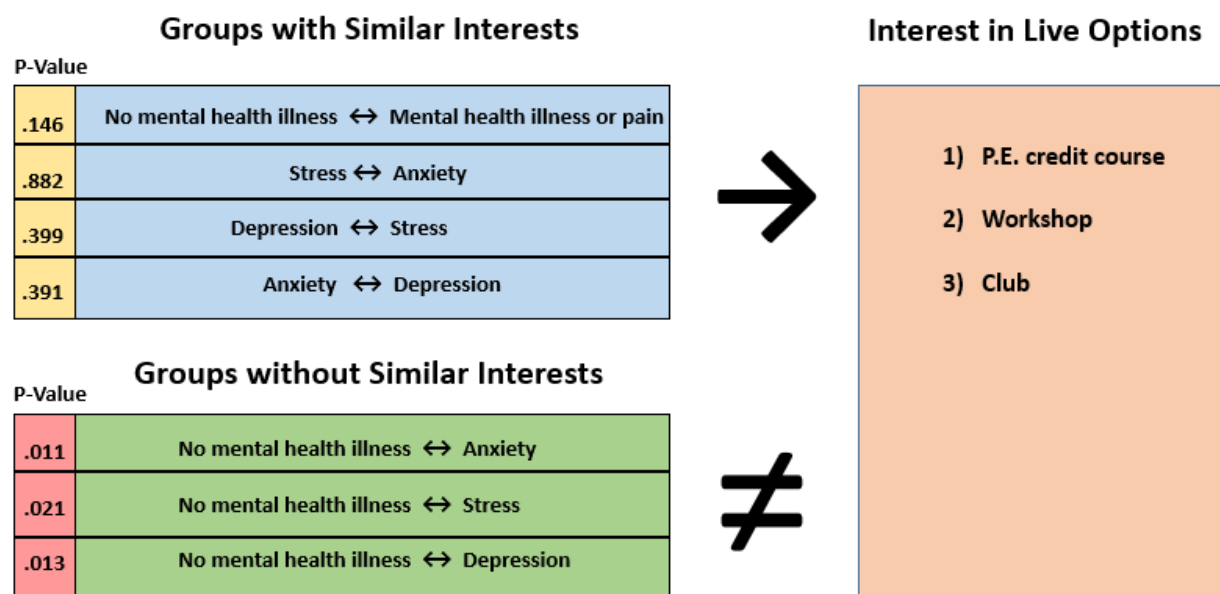


Figure 28: Interest in Live Options - Interest by Group

### 6.1.4.3 Score by Group

Any groups that show no significant difference in the overall scores of interests for mindfulness practices allows the team to conclude that those groups all prefer an application first, followed by online exercises, Twitter, live courses, Facebook, and lastly the college room.

When comparing the means of interest based on the overall score the ANOVA test showed there was not a statistically significant difference in the means of the group of respondents in the general pool compared to those with a mental health illness, and in the group with no mental health illness that were compared in terms of interest by group. To add onto that, the ANOVA test also showed that there was not a statistically significant difference in the means of the subsets of specific mental health illnesses. In other words, the scores of the interests in respondents suffering from anxiety do not differ from the interests in respondents suffering from depression. As a result, the team can conclude that the scores of the interests of respondents with mental health illness are the same as those without a condition, and the respondents with mental health illnesses have the same interests regardless of the specific mental illness. A summary of the analysis of each individual ANOVA test is below.

There was not a statistically significant difference in the scores of interests between the respondents with mental health issues and those without at the  $p$ -value  $< .05$  level for  $F(1,10)=0.535$ ,  $p=0.481$ .

There was not a statistically significant difference in the scores interests between the respondents who suffer from depression and those who do not suffer with a mental illness at the  $p$ -value  $< .05$  level for  $F(1,10)=2.13$ ,  $p=0.175$ .

There was not a statistically significant difference in the scores of interests between the respondents who suffer from stress and those who do not suffer with a mental illness at the  $p$ -value  $< .05$  level for  $F(1,10)=0.617$ ,  $p=0.450$ .

There was not a statistically significant difference of interests in live options between the respondents who suffer from anxiety and those who do not suffer with a mental illness at the  $p$ -value  $< .05$  level for  $F(1,10)=1.56$ ,  $p=0.240$ .

There was not a statistically significant difference in the scores of interests between the respondents who suffer from anxiety and those who suffer from stress at the p-value  $< .05$  level for  $F(1,10)=0.122$ ,  $p=0.734$ .

There was not a statistically significant difference in the scores of interests between the respondents who suffer from depression and those who suffer from stress at the p-value  $< .05$  level for  $F(1, 10) =0.424$ ,  $p=0.530$ .

Lastly, there was not a statistically significant difference in the scores of interests between the respondents who suffer from depression and those who suffer from anxiety at the p-value  $< .05$  level for  $F(1,10)=0.169$ ,  $p=0.689$ .

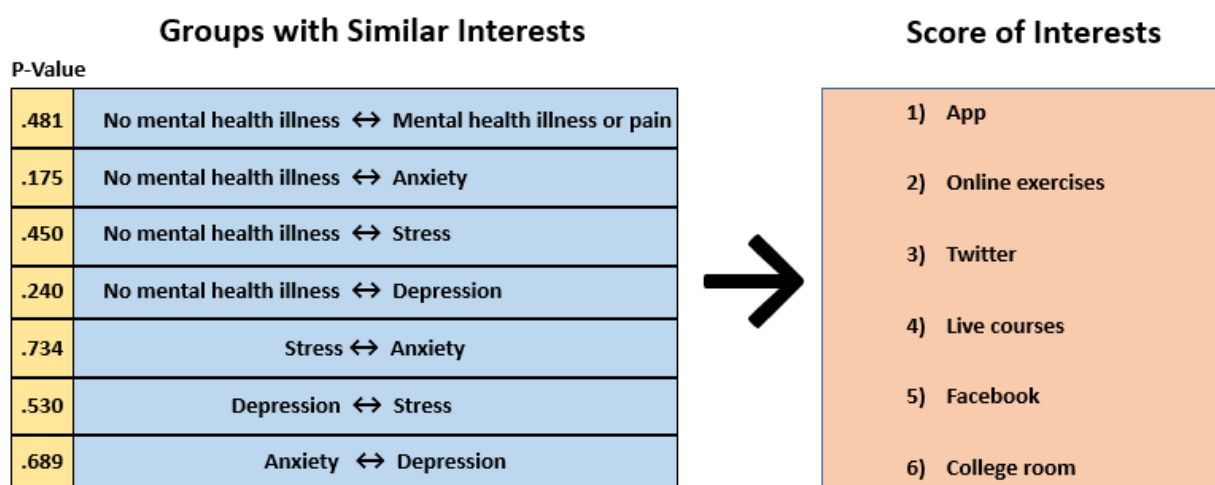


Figure 29: Score of Interests by Group

#### 6.1.4.4 Summary of Statistical Findings

In summary, the majority of the groupings that were compared did not have a statistically significant difference in the values of their means with regards to live options and technology options. What this means is that young adults, regardless of whether or not they have a mental health condition, share the same preferences. This preference, in terms of technology, is for a mobile application and online exercises. For live options, a class for physical education credit is

preferred. More research could be done to confirm this, specifically looking into individual mental health conditions as the sample sizes of those groups were smaller than desired.

## 6.2 Social Media Data

The data that the team obtained through the instructor interviews and focus groups was more qualitative in nature, opposed to the survey data, which was more quantitative. Qualitative data describes, whereas quantitative data defines. In performing the social media analysis, descriptive and definitive attributes were both present. The Twitter/Instagram campaign is more quantitative, as the numbers of followers and likes were tracked, however the different trends and avenues that the team pursued to generate support on social media were analyzed qualitatively.

### 6.2.1 Twitter

The Twitter account that the team created was named “@mbsr\_wpi15”. This name was chosen because it incorporated the project topic, Mindfulness-based Stress Reduction, as well as the origin of the project, WPI’s Major Qualifying Project (MQP) requirement.

The Twitter data was frozen as of 12PM on Tuesday, October 13th. At that time, Twitter had 20 followers, and 11 tweets had been sent out. The data was again frozen at 12PM on Tuesday, November 3rd, and dropped by one down to 19 followers, with 15 tweets sent out. Frozen for a third time at 12PM on Tuesday, November 17<sup>th</sup>, the account had 18 tweets, and dropped one more follower to 18 followers.

These tweets, which were limited to 140 characters, included original tweets that the team generated, covering general information on the MQP project, mindfulness, and daily reminders. Figure 30 shows a snippet of one of the tweets that was used as a recruitment tool for those already interested in mindfulness. The team advertised meditation in general, and gave a

link to the team's email account to recruit individuals interested in the project. Other tweets included information display about the survey and focus groups. The team also retweeted posts from other mindfulness accounts, including Jon Kabat-Zinn, shown in Figure 31. These tweets saw many more retweets and likes, as they have been established accounts of well-known mindfulness instructors. Jon Kabat-Zinn has 11.8K followers, to put it in perspective.

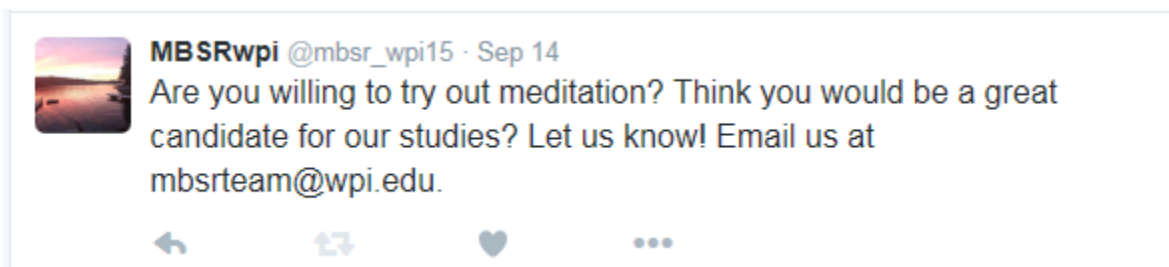


Figure 30: Tweet to recruit those interested in mindfulness as candidates for the MBSR project

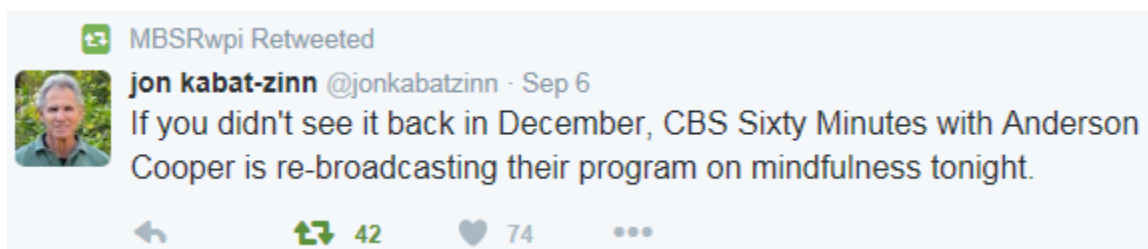


Figure 31: Retweeted tweet from Jon Kabat-Zinn, advertising a CBS 60 Minutes mindfulness show

Two images were tweeted both with captions and hashtags, which link the post to other posts with the same hashtag. The Instagram account that the team created also posted the same images, to use as a comparison, which will be discussed further in section 6.2.3. Figure 32 is an example of one of the images that was posted to the Twitter account. It is the only tweet that received any likes, shown in the bottom left corner of the tweet.

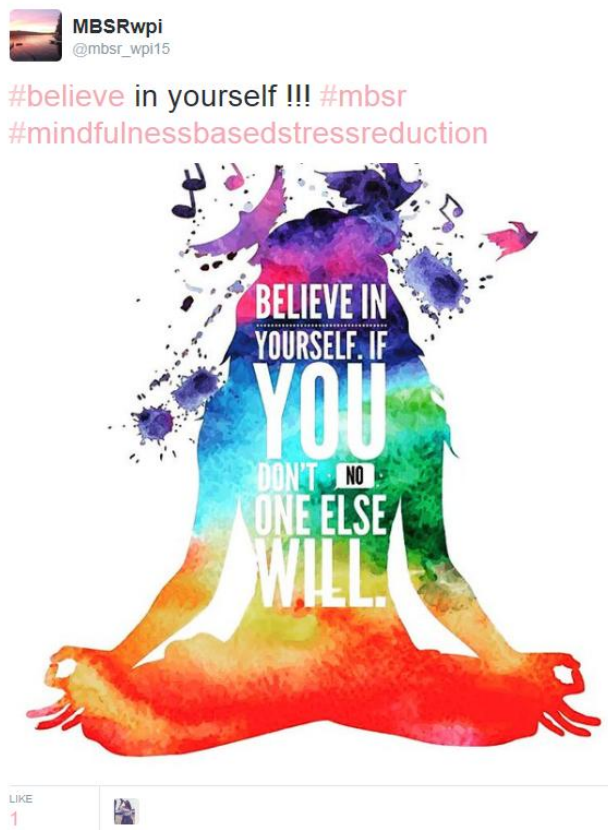


Figure 32: Tweet with an inspirational image and hashtags. The same image was also posted to the Instagram account

## 6.2.2 Facebook

The team created a Facebook group, “Mindfulness-based Stress Reduction (MBSR) & College Students.” The group was intended to recruit users to participate in the practice of MBSR and allow for communication with other college age students going through similar situations with mental health. The data was frozen as of 12PM on Tuesday, October 13th, with the group at 25 members. The data was again frozen at 12PM on Tuesday, November 3rd, and Tuesday, November 17<sup>th</sup>, however still remained at 25 members. The team believed that this stagnancy in part is due to the dying trend of Facebook. According to a study from Princeton University, Facebook is predicted to lose 80% of its users between 2015 and 2017. Melanie Ehrenkranz, author of the article covering the Princeton University study, wrote that “earlier reports indicated that Facebook is losing the attention of its teens” (Facebook Is Dying: The Social Network May Lose 80% Of Users, See Same Fate As MySpace). While more and more

adults are joining Facebook as of late, perhaps with the motive to keep an eye on their children, teenagers are escaping to social network platforms that are newer and friendlier to young adults, such as Snapchat and Instagram. The trend is that the older generation is becoming more and more familiarized with Facebook, using it to stay in touch with other family members and friends. They are insisting that their children remain on Facebook as a way to check up on them, which is only forcing teenagers off of the platform faster. Young adults and teenagers are moving away from their parents' Facebook comments and posts, and into a platform where one is able to keep their posts more private.

Figure 33 shows a post the team made to the Facebook Mindfulness group. It displays information and a direct link to the Qualtrics survey that the team created. This was viewable to the 25 group members, and aided in recruiting more volunteers for the survey.

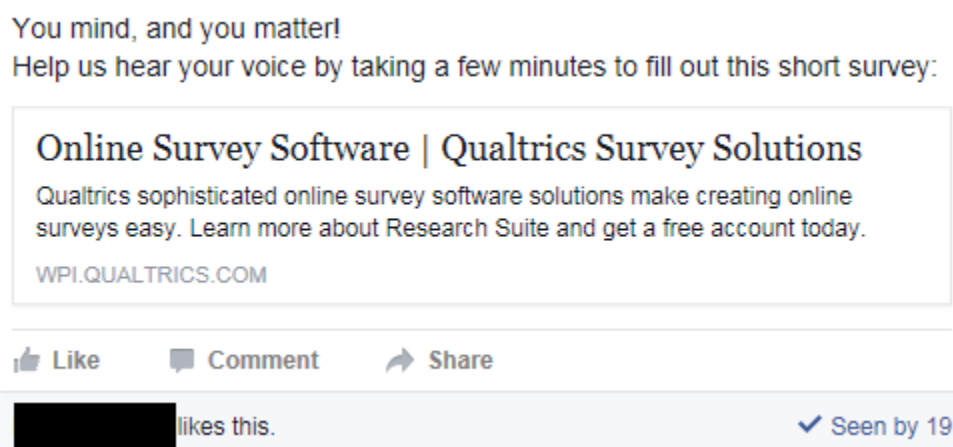


Figure 33: Facebook post advertising the survey that the team created

### 6.2.3 Instagram

The Instagram account that was a result of a survey suggestion gained increasing traction throughout the project. The account that the team created, called @doyoumindful, promoted mindfulness, wellbeing, and daily reminders to be present or breathe throughout the day, via pictures. As Instagram is a technology that reaches a vast majority of college students, teenagers, adults, and businesses, the account gained followers with the help of hashtagging and

the following of other accounts related to WPI or mindfulness. The Instagram account is indeed a platform that can help with the retention of MBSR among young adults, as well as an avenue for information display for mindfulness and the Center for Mindfulness.

Hashtags that the team used to get posts circulated on Instagram included #doyoumindful, #mbsr, #mindfulnessbasedstressreduction, #worchester, #mindfulness, #positivity, #cfm, and any other words that were related to that specific post. The team believes that the use of these hashtags helped to gain more interest in the posts, as accounts that were not already following @doyoumindful liked the post and began to follow us.

The team froze the Instagram data as of 12PM on Tuesday, October 13th. The Instagram account had gained a total of 34 followers at that time, with 9 posts. Figure 34 shows the main page of the Instagram when one clicks on the account name. A description of the project is beneath the words “MBSR WPI”, and the pictures are shown in smaller form on the page as an overview of what the account displays. The highest amount of likes that a post saw at this time was 18 likes, on the image that reads “Positive Mind. Positive Vibes. Positive Life.” The team began by posting inspirational images, linked to positivity or mindfulness, and daily reminders to stop and check your thoughts.



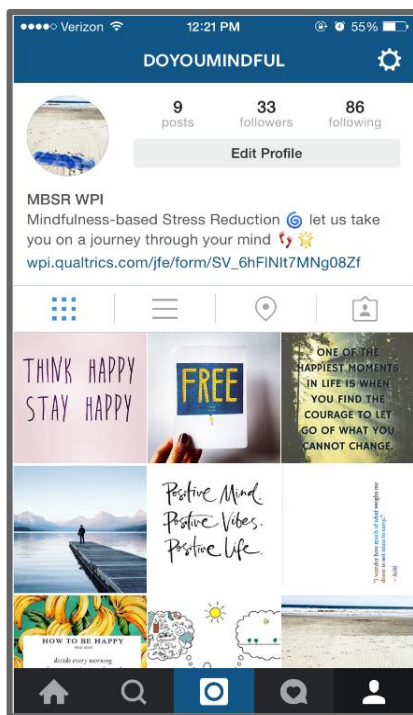


Figure 34: @doyoumindful instagram account main page

The data was again frozen at 12PM on Tuesday, November 3rd. The account made a large jump to 92 followers, and 17 posts. The increase in followers is partly because the team began to follow others at a more intense rate. From following 86 users on October 13th, the account followed 296 users by November 3rd. The tactic of following other mindfulness accounts, Worcester community accounts, and students in college, greatly increase the account's follower numbers. Figure 35 shows the same image that was also tweeted. On Instagram, it received 29 likes, much more than the 1 like from Twitter.

The Instagram data was frozen for the last time at 12PM on Tuesday, November 17<sup>th</sup>. At this time, the account had secured 111 followers, with 24 total posts. The team had followed 345 people to this date, which perhaps helped to spike the increase in followers. The post with the most amount of likes was the same image that held the most likes on the second freeze, and it remained at 29 likes.



Figure 35: Inspirational image that was posted to Instagram, the same one which was posted on Twitter

The team also began to post information for the Center for Mindfulness. Figure 36 shows one post that advertises the Movie Night occurring monthly at the CFM. It displayed information detailing the what, where, when, why, and appropriate hashtags such as #WorcesterMA and #ShrewsburyMA, among others, to get the information out to the community.



Figure 36: Instagram post advertising the CFM Movie Night.

Instagram was used in this project as a recruitment tool for mindfulness interest, as well as recruitment for the CFM events and classes. It was also used as a retention/adherence tool, with posts serving as daily reminders to think positively and be mindful.

#### 6.2.4 Twitter/Instagram Campaign Comparison

Twitter and Instagram are both current platforms that enable the use of hashtags and quick information display. The team created the accounts for the purpose of recruitment to MBSR, and further to use as a comparison of the two social medias. The team was able to see which platform generated more appeal within the young adult community, based on the follower numbers and numbers of “likes” or “comments.”

Instagram rang in as the most popular social media platform, above both Facebook and Twitter, as the Instagram account gained the most followers throughout the project. The platform greatly appeals to young adults, specifically college students, as they are accustomed to communication at their fingertips. The visual photos that Instagram offers, rather than just the 140-character word display with an optional picture that Twitter offers, appeal to students who may be mentally stressed or have anxiety. It takes minimal brainpower to simply scroll through pictures, especially if they have the potential to spark happy thoughts and emotions, rather than chat on Facebook, which takes more mental effort. Pictures are a good way to trigger emotions that have been buried, whereas Facebook and Twitter posts can sometimes be dragged on and overwhelming.

Overall, the Twitter account went from 20 followers, to 19 and then to 18 over the data collection period. Facebook remained at 25 members throughout the project. Due to both Twitter and Facebook losing followers or remaining at the same number, respectively, the team decided to put more of their efforts into the Instagram campaign. The Instagram account reached the most number of users out of the three platforms, and proved that the account had potential to keep growing as it jumped from 34 to 92 to 111 followers in about 5 weeks. Figure 37 shows a visual graph of the number of followers gained for each platform throughout the project. It is

clear that Instagram had the most success, while Facebook remained steady and Twitter saw a decline in followers.

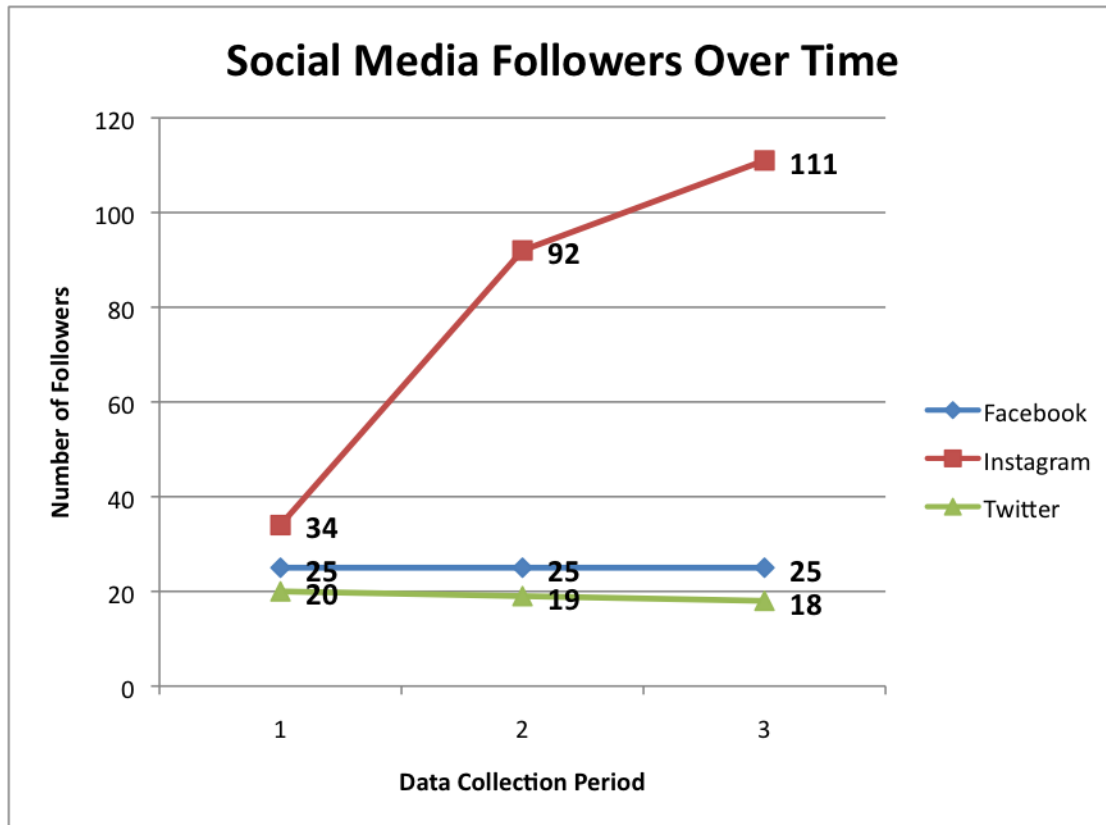


Figure 37: Social media platform comparison graph plotting the number of followers or members tracked over the different data collection periods. Period 1 refers to October 13th, 2015. Period 2 refers to November 3rd, 2015. Period 3 refers to November 17, 2015

Table 9 shows a comparison of the different social media platforms, including the number of members or followers, numbers of posts, and likes or retweets over the different data collection periods.




Social Media Comparison									
	12PM, Tuesday October 13			12PM, Tuesday November 3			12PM, Tuesday November 17		
	Followers/Members	Posts	❤️	Followers/Members	Posts	❤️	Followers/Members	Posts	❤️
 Twitter	20	11	0	19	15	most: 1	18	18	most: 1
 Facebook	25	3	n/a	25	4	n/a	25	4	n/a
 Instagram	34	9	most: 18	92	17	most: 29	111	24	most: 29

Table 9: Social media platform comparison chart including the number of followers or members, number of posts, and number of likes tracked over the different data collection periods

Images that gained the most support were those that reminded users to think positively, breath, or work on self-image. Those posts that advertised events at the CFM did not receive as many likes, however that was expected as most users typically were not familiar with the Center For Mindfulness in Shrewsbury, MA.

The hashtags that Instagram makes picture sharing much easier, as those who may already be interested in mindfulness (#mindful, #doyoumindful, #mindfulness) are able to find related images. This makes the team's account, @doyoumindful, available for other users to follow and view even if they are not related to WPI. The hashtag feature greatly allowed the team to grow the account throughout the project.

### 6.3 Qualitative Interview Data

The team interviewed with several mindfulness instructors that were recommended through the project sponsors. The majority of the instructors shared a similar background and therefore, there was a lot of overlap in the questions that the team asked during each interview. The interview questions that were asked aimed to get information about the instructors'

experience teaching mindfulness to the young adults in their classes. Below is a summary of the aggregated data that was collected from the interviews.

The length of time that instructors have been teachers of MBSR has ranged from 1992-present. However, many instructors have not been teaching MBSR full-time and typically have been teaching on and off since they first began.

The instructors were first introduced to MBSR in a variety of ways, including: yoga, meditation, Kabat-Zinn's mindfulness videos, and prior work experience that focused on health, wellness and the body.

The typical demographics of an MBSR class are white, middle-upper class individuals, mainly females, between the ages of 35-65. A typical class is usually about 30 to 40 people, and of those 30 to 40 individuals, anywhere from one to four individuals are young adults, ages 18-30.

A MBSR class almost always involves mindfulness practice. These practices can include: practices of the body, such as yoga; practices of being still, such as meditation; and conceptual practices. Conceptual practices aim to trigger emotions of the mind through hearing and seeing. MBSR classes also include small and large group communication and discussions. However, there is no obligation to speak during any point of the class, which is a comfort to those suffering from social anxiety.

The instructors have taught mindfulness in many other locations in addition to teaching at UMass Medical's CFM. These locations include colleges, companies, committees, and hospitals.

Every instructor has experience with skeptics coming into their classes. These skeptics are almost always easily identified because they are very straight-forward and will come out and say something such as "What's the point of doing this?" or "I don't get this," etc.

In a class of 30 – 40 people, there typically are two to three skeptics, and the majority of skeptics are part of the younger age range. Many times, skeptics will end up dropping the course, however the dropout rate is very low, and students who come in skeptical and do not drop the class usually change their view as the course continues.

Over the courses, there have been instances of people coming into the class with an open-mind and becoming skeptical as time goes by, but it is not often the case. Usually, if this occurs, it is because these individuals come into the class expecting the class to solve every problem that they have in their life and it does not.

Some common complaints that the students have expressed over the duration of the course include not having the time in their busy schedules to fit in mindfulness practice, not being able to feel the connection and getting bored, and that mindfulness practice is hard.

Because the instructors that were interviewed are from an older generation, where technology was not so dominant and powerful, they were unfamiliar with a lot of the newer technology that is widely used today by college students and young adults. That being said, one suggestion that was consistent across all interviews was some sort of phone application, like InsightTimer, that reminds one to take a minute for oneself.

In terms of social media, there was not one type that stood out as being very popular among their students, however, it was acknowledged that Facebook is almost “dying,” and does not seem to be used nearly as much as it used to be by college aged students.

Another source of qualitative interview data that the team collected was from a mindfulness instructor whose two daughters have been through a MBSR class when they were young adults, then ages 17 and 21. Because the background of this interview differs from the other instructor interviews, in that the answers to the questions are coming from young adults who have taken the class, rather than the instructors who have taught them, this data was analyzed separately from the aggregated summary above. An aggregated summary of this data is below.

The students were led to enrolling in the MBSR class through curiosity based on what their mother, an MBCT instructor, had discussed with them. They also hoped that the class would help them deal with stress better.

MBCT is a treatment developed by Segal, Williams and Teasdale approximately 15 years ago for patients with recurrent depression. It is similar to MBSR in the design of the class, which involves eight classes with a lot of home practice. Unlike MBSR, however, there are also cognitive therapy components woven into it.

Besides the fact that the class would take up time that could have otherwise been spent hanging out with friends or other activities, the students came into the class with an open mind and eager to learn as opposed to feeling skeptical. After the first class, the students felt rejuvenated and excited about learning about mindfulness.

Over the course of the class, the students showed informal signs of progression, and more appreciation of the smaller moments in life through meditation. The four year age difference did not show any difference in the retention of MBSR, as both students retained a lot from the course. Any difference that was noticed was not because of the age difference but because of being different human beings in general.

Although the students felt that they had a similar experience as the older adults in the class, and both retained a lot, they felt as if they did not grasp “mindfulness of thinking” to the same extent as some of the older adults. This could be explained by age or by some outside factor, such as the students both being in school at the time that they took the course.

Students get out of the course what they put in, and therefore all students will have different experiences coming out of the course based on the amount of effort that is put into the course, and the amount of time that is put into practice. Although students may not practice formally after taking the class, the course shows them the benefits of integrating practice into their daily life. As a result, they know they can integrate practice informally in their daily lives as needed.

Technology such as a phone app would make it easier for students to continue with meditations. Specifically, technology that lets students stay aware of how many people are practicing at the same time or on the same day. For young adults, the social aspect and the sense of community via technology is very important and tends to have a large impact on them.

## **6.4 Focus Group Data**

On October 22, 2015 the team received IRB approval for its focus groups. The script and questions, which are located in Appendix E as earlier mentioned, were approved. Also approved



was the consent form, which can be found in Appendix S. Appendix T features the letter of approval from the IRB, specifically for the focus groups.

Also featured in the appendices is a food budget, found in Appendix U. Though students expressed an interest in the mindfulness focus group, they would not respond to the team when the team attempted to set up the focus groups. As an extra incentive, it was advertised that there would be food, which seemingly increased the responsiveness of the potential participants. As the team learned, when all else fails, pizza/chips succeed.

#### 6.4.1 Focus Group #1

The first focus group took place on Wednesday, November 4, 2015. Notes taken by the team can be found in Appendix V. Of the five volunteers that did respond to the team to confirm their interest in attending this focus group, only two volunteers actually came. Though a small group, this focus group did help confirm some of the survey's findings as well as shed light upon some unexpected survey findings.

Of the two volunteers, one had taken the survey and been recruited through it, while the other volunteer was a fresh respondent. Both respondents fell between the age range of 18-34 years of age, and both reported suffering from at least one mental health condition. Both respondents suffered from stress, one also suffered from depression, and one also suffered from anxiety. Neither respondent reported suffering from chronic pain or a chronic illness.

<b>Suffer From A Condition</b>	2/2
<b>Depression</b>	1/2
<b>Anxiety</b>	1/2
<b>Stress</b>	2/2
<b>Pain</b>	0/2

**Table 10: Conditions of 11-4 Focus Group**

One participant opted to volunteer she was a friend of the team and wanted to help the team out. The other participant was interested in seeking stress relief, and had heard of

mindfulness, so thought the focus group might be an interesting opportunity. Both volunteers had heard of mindfulness before being introduced to it via the survey and/or focus group.

Both respondents believed yoga/meditation to be a good method for calming down, and both admitted it requires intense concentration to stop thinking, thus is difficult to do. One of the respondents doubted that he had the patience for yoga or meditation. Both respondents were forced to do yoga/meditation in high school, and neither have done it since. One respondent reported that her sports team would have to do yoga/meditation in the practice that followed a defeat, to clear the players' minds. One wonders if the association between lost matches and yoga/meditation created a negative image of yoga/meditation for some of the members of that sports team, as such an implementation could be viewed as a punishment. This was not the case for the focus group respondent from that team, as both respondents would take yoga/meditation for physical education credit and believed many others would as well.

Moving on to the topic of social media, the respondents used it primarily to keep in touch with folks. One respondent specified keeping in touch with friends from high school, the other specified that she enjoyed its utility in easily reaching out via technology instead of physically reaching out to people. Both respondents believed social media to still be going strong. One respondent specifically follows accounts for inspirational quotes (such as mindfulness quotes) as she finds the quotes to be a good way to turn her day around. The other respondent never coupled the ideas of mindfulness and social media and thus never really noticed a mindfulness presence on it.

The next topic discussed was social media in more specific terms, looking individually into Facebook, Twitter, and so on. There was mention of Snapchat for promoting events. Both respondents believed mindfulness could work with Facebook, but the response was not overwhelming: since there are groups for just about everything, there might as well be mindfulness groups as well. The respondents viewed Facebook more as a backup, for users without Twitter or Instagram accounts. Aside from groups, the respondents recommended having a mindfulness page on Facebook that could be liked and would thus pop on one's feed without having to be in a group. Having a page opposed to groups might serve to reduce stigma if the page is open to everyone. For Twitter, aside from tweeting images and texts, the only

other thing Twitter could do would be to create hashtags, which the team has done. Twitter has few options with regards to mindfulness.

The app was a popular topic in the focus group, like it had been in the survey. For features and benefits, the respondents requested videos, an inspirational quotes page, a chat room, a current events tab similar to Snapchat's discovery page, and local events. Respondents were open to the promotion of local opportunities, such as the CFM movie nights.

In terms of videos, respondents had a lot of requests for assorted exercises and information. The list generated by the group is as follows: breathing exercises to help one get out of one's own head, yoga exercises, informative videos explaining the different tools to be mindful, guided meditations consisting of people talking you through the process, the history of mindfulness, inspirational videos (specific exercises, encouraging you to go into a test and telling you that you will do well, before big sports games, and so on), and lastly success stories where people talk about their experience/story in mindfulness.

The focus group highlighted what may have been the cause for the virtual living room's poor score on the survey. The team had to further explain to the respondents what the virtual living room was - essentially a chat room / discussion board. When described as such, the respondents supported the idea. The respondent who took the survey reported that she did not support the virtual living room in her response, particularly since the word "virtual" tends to make her nervous. Simpler terminology for the virtual living room is seemingly better, and by referring to the college room as a virtual living room, survey results may have been skewed since respondents seemingly think that a virtual living room is something very different than what it actually is. Both respondents appreciate the ability to be anonymous through a username, and to be able to find a community that shares the same struggles. One respondent called such a community a "virtual therapy session," embracing the ability to talk to people going through the same situations/problems. Anonymity and knowing that one is not alone were the key takeaways.

In closing the focus group, the team made a few final queries. When asked if there were any other technologies that might work with mindfulness, the respondents reported that they would like an app with everything on it that the focus group discussed. Both respondents were

asked to rank Instagram, Twitter, and Facebook in terms of preference for sharing pictures and information. There was zero agreement between the two focus group respondents, with one respondent ranking from highest to lowest Instagram, Twitter, and Facebook; the other respondent ranked Facebook above Instagram, and ranked Twitter last. Both respondents favor a hybrid approach to mindfulness over a purely live approach or a purely technology approach. The respondents conceded that this likely depends on the person, as some people dislike interaction, and others dislike technology. They believed that a purely live approach would be overwhelming, and that a purely technology approach would be too isolationist, as one could not put a face to the people leading the guided exercises.

To summarize the findings from this particular group, the app and online exercises were strongly supported. The virtual living room was supported when it was further explained, and its complex sounding name may have skewed its survey results. Twitter and Facebook could work with mindfulness, but not superbly. The best approach to mindfulness, per this group, is that of a hybrid approach of both technology and live exercises.

#### **6.4.2 Focus Group #2**

The second focus group took place on Tuesday, November 10, 2015. Notes taken by the team can be found in Appendix W. Three volunteers came forward from WPI's mindfulness group. Though a small group, this focus group did help confirm some of the survey's findings as well as that of the other focus group.

Of the three volunteers, none had taken the survey; all three were fresh respondents. All respondents fell between the age range of 18-34 years of age, and all reported suffering from at least one mental health condition. All respondents reported suffering from depression, anxiety, and stress. One of the three respondents also reported chronic pain or a chronic illness.

<b>Suffer From A Condition</b>	3/3
<b>Depression</b>	3/3
<b>Anxiety</b>	3/3
<b>Stress</b>	3/3
<b>Pain</b>	1/3

**Table 11: Conditions of 11-10 Focus Group**

For the most part, the volunteers agreed to participate because they were already in the room, and there was food. One also volunteered because he had been through a tough time, and mindfulness helped him get through it. Another likewise wished to help out the MQP team, as she was aware how teams struggle to find volunteers for their research.

All of the respondents really enjoy yoga and meditation; one reported that she does yoga once a week. All of them have done yoga/meditation. All of them were willing to take yoga/meditation for a gym class, and would really like to see this happen. They believed it would be a very popular class. Being recruited for the focus group out of a mindfulness group, naturally all three volunteers had heard of mindfulness prior to the focus group.

Moving on to the topic of social media, the respondents used it primarily to keep in touch with folks. None of them associated social media with mindfulness. On Facebook, if they stumbled upon a post that was related to mindfulness, they would repost it, but not actively get on Facebook to seek these things. One participant reported that he used Facebook primarily for its messenger capabilities in sending pictures to friends. The participants did not agree with the first focus group on the point of a mindfulness Facebook page to like; they thought it would be very hard to find unless a user was specifically looking for it. In concluding Facebook, the participants determined it to be a good way to talk about mindfulness, but definitely not a good way to practice it.

The respondents were of the opinion that social media is still going strong, and that it will be around until the next big thing (which one participant remarked might be virtual reality). The participants believed social media to be too intertwined with too many other things to work with mindfulness, as many distractions are present. Overall, the participants viewed social media as a

platform to connect with people - which is still important to mindfulness - and not as a way to practice mindfulness. At best, social media might serve as a recruitment tool

The next topic discussed was social media in more specific terms, looking individually into Facebook, Twitter, and so on. For Facebook, the ability to join communities of people with similar mindsets that helps one grow is a benefit. Knowing that there are others around who are struggling and working to better themselves is beneficial. Facebook is a good sharing tool when in a group, and at worst Facebook groups "would not hurt." Still, Facebook is home to many distractions that can detract from the mindfulness effort.

Both Facebook and Twitter were noted to be decent forums for spreading mindfulness messages, such as by images. Other uses for Twitter could entail sending out a "mindful thought of the day." This thought could be a prompt, something to sit on and think about; the participant described it as a workout for the mind. Like Facebook, Twitter could serve as a good reminder to be mindful, but would not help with actually being mindful/practicing it.

The app was a popular topic in this focus group, like it had been in the survey and the first focus group. All of the participants had used Insight Timer before, and thus had some input to give on it. They found the user interface to not be user friendly, they did not think it looked pretty, they reported it having a higher learning curve to figure out how to use it, and they stated that it felt out of date. They enjoyed the community tab and its group features. Though Insight Timer had good content, they found the layout to be in need of an update.

In terms of videos, respondents had a lot of requests for assorted exercises and information. When the requests of the first focus group were mentioned, the second focus group agreed that all of those would be good ideas. They particularly liked the idea of motivational videos (or just audio) for occasions such as tests, sports games, and job interviews. A new suggestion was for different levels of guided meditations, such as for those new to meditation, intermediate users, and experts. The final new idea, true to WPI tradition, is for videos that incorporate both the theory behind mindfulness and then the practice via a guided meditation.

The participants supported the theory behind a virtual living room but had some concerns. A virtual living room would require monitoring, as Internet trolls/bullies might actively seek to make vulnerable individuals feel worse and harass those seeking help. For this

reason, the ability to ban users is a must. A virtual living room could couple well with an app, using a username/profile that keeps one's data safe, and allows for logging in from different devices. One participant reported a successful virtual living room: Tiny Buddha. The participant described it as a wonderful forum where the community comes together to help each other through tough times. The participant also noted that users can write articles about their mindfulness stories, submit them for review, and have them posted to share with others.

In closing the focus group, the team made a few final queries. When asked if there were any other technologies that might work with mindfulness, the respondents reported that they would like an app with everything on it that the focus group discussed, and online exercises, which went along with the survey data. The respondents were asked to rank Instagram, Twitter, and Facebook in terms of preference for sharing pictures and information. They came to a consensus, with all ranking Facebook above Twitter above Instagram. According to one respondent, on Instagram, "accounts that are just for pictures of text are dumb." All respondents favored a hybrid approach to mindfulness over a purely live approach or a purely technology approach. One respondent noted that, though a hybrid is best, live exercises are the more important component, since actually "being there" helps. Another respondent described technology as an assistive tool, but stated that it is on the person to follow through and do the exercises. The last respondent noted that people often do not know how to start their journey, and technology can help with that; he began his mindfulness journey with the help of YouTube.

To summarize the findings from this particular group, the app and online exercises were strongly supported. The virtual living room was supported, if properly regulated with user accounts and reporting options. Social media works decently for spreading mindfulness (recruitment) but not for practicing it (retention and adherence). The best approach to mindfulness, per this group, is that of a hybrid approach of both technology and live exercises, with an emphasis on the live option and technology as an assistive tool.

### 6.4.3 Summary of Focus Group Findings

Between the two focus groups, five people volunteered to discuss how mindfulness and technology could come together. Each group essentially confirmed what was said in the other, and both confirmed the results of the survey. Between the two groups, all participants suffered from at least one mental health condition, with every participant reporting stress.

<b>Suffer From A Condition</b>	5/5
<b>Depression</b>	4/5
<b>Anxiety</b>	4/5
<b>Stress</b>	5/5
<b>Pain</b>	1/5

**Table 12: Conditions of 11-4 and 11-10 Focus Groups Combined**

The preference of both groups was for an app and online exercises. They sought quite a variety of videos on mindfulness, ranging from yoga exercises to motivational exercises geared towards specific events that young adults face, such as tests and interviews. All five respondents were in agreement that a hybrid approach to mindfulness is best, incorporating both live, group practice and technology as an assistive tool. Though neither group thinks social media is dying off in the near future, they did not think it to be the best avenue for mindfulness, as it is full of distractions. An app can essentially incorporate the strengths of the various social medias - like information sharing and groups - with everything in one neat place.



## 7 Conclusions

Drawing on the analysis of all collected data, discussed in the previous chapter, the team presents its conclusions for the mindfulness study in this chapter. The team has formulated some recommendations for how best to move forward, and includes its thoughts on how the recommendations shifted throughout different points of the project. Reflections, both for each member and the team as a whole, are presented; the personal reflections consider both mindfulness and the role of social media in this project, while the team reflection details surprises and considerations that surfaced over the course of this undertaking. Finally, this report concludes on the team's hope for the future - the global impact this project may have - making mindfulness more accessible.

### 7.1 Recommendations

Before data collection began, the team envisioned the recommendations to be a ranking of technologies that resonated best with young adults. For instance, the team expected Facebook and YouTube to be top recommendations for further expansion, based on research that highlighted their popularity for young adults. The team expected another strong contender would be applications for mobile devices. Were such technologies strongly advocated by young adults, recommendations would include items like Facebook groups for mindfulness chapters and in general, YouTube videos featuring young adults discussing what mindfulness is and leading breathing exercises, or a new application for a mobile device complete with features that respondents requested via the survey and focus groups. Mockups or prototypes would be included, such as sample screens of how the mindfulness application could look, or a YouTube video created by members of the team, who are themselves young adults.

When data collection began, it became clear that the opposite outcome was a possibility: early respondents seemed to prefer live mindfulness activities, like a concise workshop, over the proposed technologies. A surprise for the team was that all eight of the first respondents reported that they would not use the virtual living room. At this point, the team began to ponder

alternatives, such as if a grant would be most useful if it were to support mindfulness workshops at places of higher education. The early respondents also gave the team a new idea and a new deliverable: an Instagram account. One respondent recommended an Instagram page that one could follow, and so the team quickly moved to implement one, which could also serve as a comparison for Twitter. Come the termination of this MQP, the team intends to hand this account over to the Center for Mindfulness for their own uses in promoting both mindfulness and activities that they are hosting.

The final recommendations were derived from the data analysis stage, when all of the data was studied more closely. Respondents in both the survey and the focus groups overwhelmingly supported a mobile application and online exercises.

### **7.1.1 Online Exercises**

Though the mobile application is the main recommendation, it does not hurt to have a backup plan, such as the online exercises by themselves. This option could also be carried out alongside the mobile application for a two-pronged technology approach, as they go hand-in-hand, and the app could feature these exercises.

Respondents favored online guided resources, with some preferring YouTube as the venue for them, and others preferring that the resources be located elsewhere online. Since it is easy to post videos on multiple sites online, posting both to YouTube and elsewhere - such as on the cfmHOME site - is easy, particularly since many of the videos in the CFM Video Room are in fact imbedded YouTube videos.

The videos in the CFM Video Room, however, are from a variety of third party YouTube accounts. The CFM may wish to consider creating its own YouTube account, and generating some mindfulness exercises of its own on the channel. These videos could be featured on YouTube, in the CFM Video Room, and on any other site that the CFM later decides to post to - perhaps even on Netflix as two respondents suggested.

The videos could feature young adults discussing mindfulness and conducting breathing exercises. This could potentially be done on a weekly basis, with the last minute of the video

dedicated to promoting upcoming events at the CFM. Other videos of interest might entail yoga exercises, the history of mindfulness, success stories (personal tales of how someone triumphed over their condition with the help of mindfulness), and specific exercises geared towards situations encountered by young adults (such as mental preparation for an exam). Videos could also have difficulty levels, with some being for users that are new to mindfulness, intermediate users, and expert users who have long practiced mindfulness.

### **7.1.2 Mobile Application**

The mobile app was well received in the survey by all seven groups studied. In other words, young adults in general approve of a mindfulness mobile application, whether or not they have a condition. Likewise, a mobile application with mindfulness exercises had greater support than a more basic application with a timer. Extending this line of thinking, an application with more functionality would be better received. The focus groups gave confirmation to this line of thought in requesting an application with everything that had been discussed.

Building everything into one app, it would have a variety of features: a local version of Insight Timer - with a new user interface that is more friendly, per the comments of the second focus group - complete with a host of mindfulness exercises, a calendar and/or timer to remind the user to take some time for him/herself, information on the benefits of mindfulness, articles on current events pertaining to mindfulness in the news, events hosted at the CFM, success stories (as a video, with a transcription), a tab of inspirational quotes and images, and a chat room where one can anonymously converse with others going through similar life situations. (Also, to regulate the app, a reporting feature may be necessary in fighting trolls - people who post negative messages or comments online for the purpose of upsetting other users and provoking a response - or bullies.)

Viewing these features as a bulleted list may be easier to follow:

- Local to Worcester version of Insight Timer (Count users using / downloaded the app)
- Mindfulness Exercises
  - Breathing Exercises
  - Yoga Exercises
  - Inspirational Preparation Exercises (Specific events, like clearing the mind for an exam)
- Calendar/Timer
- Information on the Benefits of Mindfulness
- Current Events in the News on Mindfulness
- CFM Events
- Success Stories (Videos / Transcribed)
- Inspirational Quotes and Images
- Chat Room (Virtual Living Room)

The following sections contain mockups of what the app might look like to help the reader visualize how these features could go together.

#### ***7.1.2.1 Local to Worcester Insight Timer***

An interesting feature of the Insight Timer app is its map, showing where all online users are around the world. On the local level (whether the app is developed for Massachusetts only, or for many regions but with the capability to filter down to a local level), this might be a bit much, as it could become a privacy concern if the app tracked users in detail. For a home page, the app could do as Insight Timer does, but without the map; list the number of users meditating, and the number of meditation sessions logged by all users of the app. Other information to include might be the number of people who have downloaded the app, and the cumulative

number of hours the user has meditated on the app. This might also be a good location for a "mindfulness thought of the day."



**Figure 38: Main Page of Mobile App**

### ***7.1.2.2 Mindfulness Exercises***

The “Mindfulness Exercises” tab would have at least three sub-tabs: breathing exercises, yoga exercises, and inspirational preparation exercises. These exercises could be purely audio, or audio and video. An application that worked alongside cfmHOME could be very powerful; for instance, an area of the cfmHOME video room could be the host for the videos that the app accesses, and the videos could also be available on YouTube under a CFM account.

Inspirational preparation exercises are an idea that came from the focus groups; these would be particular breathing exercises designed for situations unique to young adults, such as an upcoming college exam. Such an exercise might not differ much in terms of the breathing exercise, but differ in terms of introduction. For instance, the guide might make mention of the exam before helping the user clear it from his/her mind.



Figure 39: Mindfulness Exercises Pages on Mobile App

### *7.1.2.3 Calendar/Timer*

The “Calendar/Timer” are a basic feature of the app. Users could set the app to remind them at a certain time each day that it is time for a daily meditation. The timer could also be set to random, alerting the user at a random time over the course of the day to take minute for him/herself. A calendar, similar to the one seen in Outlook, could also be used for setting the timer to a specific setting for a certain day.



Figure 40: Calendar and Timer Functions of the App



#### ***7.1.2.4 Benefits of Mindfulness***

An "About Mindfulness" tab on the health benefits of mindfulness may help incentivize skeptics to give the exercises a chance. This tab may also help firm the resolve of users who are struggling to make time each day for mindfulness. Information featured here might cite the psoriasis study, the influenza vaccine study, and the increase in gamma activity of the brain, among any other relevant benefits.



**Figure 41: Information Tab, Including Benefits of Mindfulness**

### *7.1.2.5 Mindfulness Around the World*

The purpose of this tab is to demonstrate the global reach of mindfulness. Anytime a new article or study is released, it could be placed in this tab for reading material. If a corresponding section was created on cfmHOME, the app could retrieve the articles from there potentially.



**Figure 42: Mindfulness Around the World Page of App**

### ***7.1.2.6 Local Events***

This tab could advertise mindfulness events local to the Worcester area (or, perhaps the area of the user via entering an area code when creating the account). For example, the CFM movie nights could be advertised here. Likewise, upcoming MBSR courses could be advertised. If any interesting speakers come to the area, it could be reported here as well. This tab could potentially connect to the CFM Instagram page, which could likewise be used to advertise events.



**Figure 43: Local Events Tab of App**

### ***7.1.2.7 Mindfulness Success Stories***

People love stories. People especially love stories that they can relate to, and stories with a happy ending. Some of the people who complete mindfulness courses have done so because of extreme circumstances, like those described in the 1993 Moyers' Program. If some of the people

who have completed MBSR courses were to detail their struggles, and how they were able to overcome them with the help of mindfulness, it could empower and inspire users of the app who are still struggling with their situations. These stories could be available in video format, written format, or both. Such a section could be a nice addition to cfmHOME, and could be linked to the app.



**Figure 44: Mindfulness Success Stories Page of App**

### *7.1.2.8 Inspiration Corner*

The "Inspiration Corner" might link well to the Instagram account, or could also connect to a page on cfmHOME if a corresponding area was created. As came up in the focus groups, at least some young adults enjoy reading inspirational quotes. This section would house quotes on mindfulness, be they by Kabat-Zinn, other known mindfulness instructors, or poignant quotes just floating around the web. The quotes could be text, or a pairing of text and imagery such as has been done on the Instagram account.



Figure 45: Inspiration Corner of App

### *7.1.2.9 The College Room*

The college room did poorly in the survey, and the focus groups gave an indicator of why; calling what is essentially a chat room or discussion forum something fancy like a virtual

living room seems to confuse and turn off young adults. One focus group volunteer reported being wary of anything with "virtual" in the name. When the college room was described as a chat room or discussion forum, the focus group volunteers switched stances and got on board with the idea.

The app could give the college room a second chance, by directly connecting to it. Focus group respondents liked the idea of a chat room, where a username would make them anonymous, and they could talk to other people going through the same things that they are. Having a third party to chat with that they do not see every day in their daily activities appealed to the focus groups, as there are some things that they would want to talk about, but not to their friends who may not understand.



**Figure 46: The College Room on the App**

## 7.2 Reflections

Each member of the team wrote about her reflections of the project, and these reflections have been presented below in alphabetical order by surname. The last reflection is the least personal, as it is from the perspective of the team as a unit instead of individuals.

Amber:

As someone that does not use social media, this has been an interesting project in seeing its effectiveness for spreading information. I am particularly fond of our “grapevine” that has acquired diversity in respondents from North Dakota to Rhode Island, from Minnesota to Utah, and of course plenty of Massachusetts students.

Mindfulness has also been an interesting concept for me. On more than one occasion, the irony of this project has struck me. Shuffling out of bed in the middle of the night, searching for some sticky notes and a pen to write down new ideas, I have time and again defied the principle of mindfulness in that I should be sleeping and not thinking at that point! Regardless, I can certainly see the uses of mindfulness, and embrace the concept of being where you are (sometimes). Moving forward, I doubt I will meditate or do yoga; both have never gone well in my previous experiences with them, as they were forced upon me in high school health / physical education classes, which has colored my view I do not doubt. Taught correctly, and to a willing audience, I can definitely envision the benefits of yoga and meditation.

Meghan:

As someone who has had no experience with MBSR or prior knowledge of what mindfulness was, this project has really taught me a lot in terms of how effective mindfulness practices can be, even if it means simply setting a timer to set aside 10 minutes of your day for meditation. That being said, being a student at WPI who has just been introduced to mindfulness, it is still hard to set aside time for mindfulness practices even knowing and seeing the benefits from it.

This project has also taught me about the scope of social media in today’s world. Although I have always been a user of social media such as Facebook, Twitter, Instagram, etc. I

have always thought of them strictly for social use within a connection of friends to stay in touch, and never realized the impact that social media can have when using it in different ways, such as promoting MBSR, sharing surveys, and spreading information. It is pretty amazing to see how efficiently information can be shared through technology and social media.

Haili:

When the team was first introduced to the topic of Mindfulness-based Stress Reduction, I was very excited and eager to learn about the different methods that use mind power to reduce stress. Prior to the MQP, I had participated in Bikram yoga, YinYasa, and MYoga Hot Hatha, various invigorating and mindful series that incorporate strength, focus, and breath. The yoga instructors each took their own approach to the different classes, but all took you on a journey through your mind, which I was fascinated with. They taught you how to properly breath to maximize oxygen flow to each and every muscle, as well as encouraged you to pay attention, or *be mindful*, to your body as a whole while remaining present in the moment. The face to face interaction with instructors and the journey they set you on is what keeps yogis coming back for more classes.

The other part of our project deals with how technology can couple with mindfulness practices to reduce stress. This also greatly appealed to me, as I am an avid social media user, including Instagram, Twitter, and Facebook, to name a few. In taking the lead on the social media aspect, I am learning that social media truly can be used as a business and marketing platform to spread information. Though it is hard work to gain followers and respondents to our survey via sites like Twitter and Facebook, I have enjoyed promoting MBSR as it is something that I can see myself becoming more passionate about in the future.

The Team:

There were several things that struck the team at different times: the first being how data can suggest a conclusion that is the opposite of what was expected, the second being the importance of planning for those researchers that follow, and the third being frustration with software.

During the process of data collection, the first day of data was an indicator that the outcome might be very different than expected; respondents believed that mindfulness could



benefit them, and agreed that they would use it moving forward, were it more accessible, but overall did not care much for the proposed technologies. This surprised the team, and changed the direction of thought for recommendations, towards more availability of workshops opposed to more technology. Likewise, this influenced the development of some of the focus group questions; a question was added that asked about both technology and live mindfulness together (such as using an application while enrolled in a live course), instead of separately (asking only whether respondents think a workshop would be beneficial or only if an application would be beneficial) as the other questions had. The team was aware that the sample at that stage was not statistically significant nor analyzed thoroughly enough, but it was certainly a fascinating start.

The second item of reflection for the team was that of focus groups. Given the relatively brief window available for data collection, roughly four weeks, the busy schedules of students and the desire of some respondents to remain anonymous, the team had a strong feeling that a focus group would fall through and be unable to occur due to lack of volunteers. The team prepared a consent form as well as questions and a script for a focus group anyway. This project is a stepping stone for other work, and thus the team reasoned, even if a focus group is not done as part of this project, those that follow could utilize the material that the team created. Much to the team's surprise, within the first week of the survey, half a dozen volunteers came forward. By the end of the survey, 13 volunteers left their email.

From there, the surprises continued; the volunteers seemingly had changes of heart when it came time to actually do something. When the first email was sent to the volunteers, one enthusiastically replied, but was off-campus for project work and not in the desired sample of young adults with mental health conditions or chronic pain. When a second round of emails was sent out, one other respondent replied, and this one agreed to participate in the focus group. Meanwhile, the ODS advertised the focus group on the team's behalf, generating four volunteers who emailed the team's email alias. Though these volunteers filled out the When2Meet, only two of them replied to RSVP to the team. The focus group was an ongoing saga of surprises, where volunteers were difficult to motivate when it came to action, even with food as an extra incentive.

Lastly, there is one thing that irked the team immensely. Great care was taken when designing the survey to maintain consistency in the options. For instance, from left to right, each question would offer "definitely," "probably," "probably not," "definitely not." Somehow, some

of the options got jumbled. The team is not sure when this happened or how. One of the final things the team did was adjusting the layout of the page, displaying the bubbles horizontally instead of vertically, to save space and less overwhelm respondents on page four; the team suspects that when doing this, the software may have rearranged the options. Fervently, the team hopes this has not impacted respondents; if they did not read every option on the jumbled questions, they might have picked one option thinking it was another. Question 17 (enrolling in clubs/workshops), and question 19 (Facebook groups) were the two questions impacted by this.

### 7.2.1 Final Reflections

On December 9, 2015, the team presented its final product to the sponsors at UMass Medical School. The slides for this presentation can be found in Appendix X. The sign-off sheet, on which the sponsors signed to acknowledge that the team presented on that day, and agrees with the work that the team completed, can be found in Appendix Y. The team also delivered a digital copy of its MQP poster to the sponsors, of which a miniature version can be found in Appendix Z.

In the final sponsor meeting before the presentation, a handful of ideas were brought forward, as detailed here, regarding the next steps. Moving forward, it may be beneficial to consult with mindfulness instructors about the application that the team developed a mockup for. Since the app is intended to be used in a hybrid approach to mindfulness of both technology and live options, it is worthwhile to see what functionality instructors may want in addition to what the young adult students have requested. Further research may also need to be done, as the sample sizes of individual conditions - especially the chronic pain group - were smaller than desired. Lastly, when it is time to move forward with the project and develop the app, it may be worthwhile to contact WPI once more. This app could potentially be a joint MQP for Computer Science and Management Information Systems majors, as it will need to be configured with coding as well as user experience elements.

During and following the final presentation, more topics surfaced. There was a brief postmortem in which the team considered what it might have done differently if the project was done over. Regarding the survey, the team would have a question on Instagram, would better

explain what the virtual living room was, and would ensure that more technologies - like the virtual living room - were listed in the checkbox question for realistic use moving forward.

Meanwhile, it is believed, based on new feedback from the project advisor, that Qualtrics did indeed display the options in the correct order for those taking the survey, and only reordered the options when giving the team its report.

On the topic of social media, a few questions arose specifically with regards to the Instagram account, as it is to be handed over to those at the CFM for use in promoting mindfulness or events at the CFM. It was concluded that someone at the center must be put in charge of managing the account. This includes conducting research on which accounts to follow, and what images to post that will generate the most support and awareness for MBSR. The team has laid solid groundwork for the account already, with twenty-six images and one hundred and thirty followers to date. Switching the account over from MQP team management, to management by the CFM is rather simple. The password and account name is able to be changed in the Instagram settings, and can then be operated by the CFM at the close of this project.

Discussion broke out regarding some areas of the application. For the calendar and timer, for instance, it was pondered whether adding a feature to allow posting an image and not just text would be worthwhile. The team agrees that this would be worthwhile, as young adults have responded well to the posting of images, such as Instagram, rather than text, such as Twitter. Likewise, the local events section will differ depending on how it is developed. A pivotal question was that of who would manage the local events. This requires some amount of organization and monitoring, but certain users - such as those acting on behalf of a mindfulness center or college - could be permitted to add events. The events themselves would need some form of GPS feature so that users could find events in their nearby vicinity. Meanwhile, a server would be required to host all of this, and this begs the question of who will manage the server, and if it is worth buying a service to have someone else manage it.

Another area of heavy discussion was that of a mindfulness class to be offered at colleges to serve alongside the app. Such a course could be for physical education credit, or perhaps fit under another category such as psychology or history (if the research behind mindfulness or the history of mindfulness are major components of the class). A mindfulness class would require sponsorship with a university and would begin as an experimental class for two years. In such a

course, further data could be collected. There might be three groups studied: students participating in the class without the app, students participating in the class with the app, and students who take the course online/only with the app. Through these studies it would be worthwhile to seek such things as a mechanism or predictor for students that drop the class or do not progress in it, as well as seek measurable improvement in the students, such as a pretest and posttest on stress levels.

Upon the conclusion of this presentation, the project team has completed its objective, and has paved the way for another project team to develop the application based on this team's mockups.

### **7.3 Global Impact**

This project set out to find ways in which technology could be paired with mindfulness to increase recruitment, adherence and retention of young adults in mindfulness programs. Quickly the team realized that social media in addition to applications for mobile devices would resonate well with young adults. The team also saw the value of social media as a means for gathering data (such as by tweeting the survey link) as well as a means for conducting trials for some of the ideas (such as by tweeting mindfulness messages and tracking the number of retweets).

The team hopes that this report will serve as a stepping stone moving forward. Though much work and study of the target population has been done, there is still a long way to go. This project will likely be a catalyst in the funding of a grant which will test the described technologies, or fund workshops at places of higher education. Moving forward, this grant may help make mindfulness more accessible not only to young adult college students in Massachusetts, but to young adults across the entire country. Even should there be no grant funding, this project has demonstrated the power of social media for spreading information, and thus the Instagram account may serve to capture the attention of young adults and recruit them into any programs that the Center for Mindfulness promotes through this medium.

## Glossary of Terms and Acronyms

**B2B:** abbreviation for Business-to-business. It is defined as a business relationship where a company's customers are other businesses and trade is conducted via the Internet

**B2C:** abbreviation for Business-to-consumer. It is defined as a business relationship in which trade is conducted via the Internet between businesses and consumers

**CFM:** Center for Mindfulness

A part of UMass Medical, located in Shrewsbury, MA, dedicated to mindfulness meditation

**Dialogue:** Short for Dialogues with the Dalai Lama  
Discussions

**DMH:** Department of Mental Health

A governmental branch dedicated to mental health

**IRB:** Institution Review Board

A committee that ensures that research involving human test subjects is ethical

**MBSR:** Mindfulness-based Stress Reduction

An eight-week course with the goal of teaching participants how to cope with stress, pain, illness, and the demands of living in the 21st century, utilizing meditation

**MH:** Mental Health

Psychological well-being

**MLI:** Mind and Life Institute

A non-profit organization founded by the Dalai Lama and two others in 1987 that combines empirical science with introspective thought to try improving people's lives

**MQP: Major Qualifying Project**

A graduation requirement for students of WPI, which entails working as a team to solve a real-world problem related to one's major

**NIH: National Institutes of Health**

Part of the U.S. Department of Health and Human Services that funds medical research

**NIMH: National Institute of Mental Health**

One of 27 centers/institutes that comprise the National Institutes of Health

**PUVA: Psoralen plus ultraviolet A light**

One treatment for Psoriasis, also known as photochemotherapy

**SDCC: Student Development and Counseling Center**

The Student Development and Counseling Center at WPI, dedicated to promoting emotional health and personal growth through a supportive campus network.

**SPARC: Systems and Psychosocial Advances Research Center**

A research center that seeks to improve the mental and behavioral health of citizens via systemic interventions, research, training, and so on

**Transitions RTC: The Learning & Working During the Transition to Adulthood Rehabilitation Research & Training Center**

A center that offers support for people between the ages of 14 and 30 who are battling mental health conditions as they work to improve their lives

**Troll:**

A person who posts inflammatory or inappropriate messages or comments online for the purpose of upsetting other users and provoking a response.

UVB: Ultraviolet B Light

One method of treating Psoriasis, also known as phototherapy

WPI: Worcester Polytechnic Institute

The college which the three students conducting this research attend

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## Appendix A: MQP Schedules

Initial MQP Schedule:

Tentative MBSR MQP Schedule											
Key											
		S	M	T	W	R	F	S			
Sponsor Meeting											
Advisor Meeting											
No WPI Classes											
MBSR CLASS											
	AUG										
			30	31	1	2	3	4	5	6	7
			6	7	8	9	10	11	12	13	14
	SEP		13	14	15	16	17	18	19	20	21
			20	21	22	23	24	25	26	27	28
			27	28	29	30	1	2	3	4	5
	OCT		4	5	6	7	8	9	10	11	12
			11	12	13	14	15	16	17	18	19
			18	19	20	21	22	23	24	25	26
			25	26	27	28	29	30	31		
	NOV		1	2	3	4	5	6	7	8	9
			8	9	10	11	12	13	14	15	16
			15	16	17	18	19	20	21	22	23
			22	23	24	25	26	27	28	29	30
			29	30	1	2	3	4	5	6	7
	DEC		6	7	8	9	10	11	12	12/9	

\*Though not explicitly stated, glossary/references/appendices/etc will be added to as needed

29	Week 1: Setting up (Meetings, File Sharing, etc)
5	Week 2: Background, Lit Review, Planning, Introduction, Glossary
12	Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
19	Week 4: Methodology, Contact Disabilities Office and others, Submit Draft to advisor
26	Week 5: Edit draft, file for IRB Approval, Submit Proposal to Sponsor
3	Week 6: Address changes sponsor may request, Work on Global Impact section, Seek connections
10	Week 7: Data Collection (Interview? Survey? Focus group?), Write section on the go
17	Week 8: Data Collection (Interview? Survey? Focus group?), Write section on the go
24	A Term Break: Reserved for catch up
31	Week 9: Data Collection cont.; Start Data Analysis
7	Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
14	Week 11: Data Analysis cont.; Submit draft to advisor
21	Week 12: Complete edits, Resubmit draft to advisor
28	Week 13: Complete final edits on the paper, Begin poster
5	Week 14: Complete poster, Submit final draft to sponsor
12	12/9: Final Presentation



### MQP Schedule Post-Sponsor Meeting

Tentative MBSR MQP Schedule													
Key	S	M	T	W	R	F	S						
Sponsor Meeting													
Advisor Meeting													
No WPI Classes													
Dr. Davis Away													
*Weeks, no email contact presentation													
	AUG												
		30	31	1	2	3	4	5	6	7	8	9	10
		6	7	8	9	10	11	12	13	14	15	16	17
	SEP	13	14	15	16	17	18	19	20	21	22	23	24
		20	21	22	23	24	25	26	27	28	29	30	1
		27	28	29	30	1	2	3	4	5	6	7	8
	OCT	4	5	6	7	8	9	10	11	12	13	14	15
		11	12	13	14	15	16	17	18	19	20	21	22
		18	19	20	21	22	23	24	25	26	27	28	29
		25	26	27	28	29	30	31					
	NOV	1	2	3	4	5	6	7	8	9	10	11	12
		8	9	10	11	12	13	14	15	16	17	18	19
		15	16	17	18	19	20	21	22	23	24	25	26
		22	23	24	25	26	27	28	29	30	1	2	3
	DEC	6	7	8	9	10	11	12	12/9				

\*Though not explicitly stated, glossary/references/appendices/etc will be added to as needed

- 29 Week 1: Setting up (Meetings, file sharing, etc)
- 5 Week 2: Background, Lit Review, planning, introduction, Glossary
- 13 Week 3: Background, Lit Review cont.: First sponsor meeting (scope)
- 19 Week 4: Methodology, Contact Disabilities Office and others?, Submit Draft to advisor
- 26 Week 5: Edit draft, File for IRB Approval, Submit Proposal to Sponsor
- 3 Week 6: Address changes sponsor may request, Work on Global Impact section, Seek connections
- 10 Week 7: Data Collection (Interview? Survey? Focus group?), Write section on the go
- 17 Week 8: Data Collection (Interview? Survey? Focus group?), Write section on the go, Proposal Presentation
- 24 A Term Break: Reserved for catch up / Data Collection
- 31 Week 9: Data Collection cont.: Start Data Analysis
- 7 Week 10: Data Analysis: Write Results and Analysis, Write Conclusion
- 14 Week 11: Data Analysis cont.: Submit draft to advisor
- 21 Week 12: Complete edits, Resubmit draft to advisor
- 28 Week 13: Complete final edits on the paper, Begin poster
- 5 Week 14: Complete poster, Submit final draft to sponsor
- 12 12/9: Final Presentation - 10AM-12PM



## Appendix B: Meeting Minutes

Meeting Minutes  
9/2/15 at 2PM  
Advisor Meeting

### TODOs:

- Email Amanda to see if we can just show up for the 8AM meeting on 9/9 [Done]
- How to get the connection with people for the focus groups, etc
  - Contact the Disabilities office?
  - Do we want diversity? Ex. MH vs no MH - what do those we poll think (stigma?)
- Prepare questions for Dr. Davis
- Have a background ready for next week, even if it's just bullets - get things on paper
- Build a timeline (consider also making a calendar in Excel for illustration)
- Final presentation will likely be week of 12/7
- Will need IRB approval before long

If we need to use a phone on campus for a phone meeting, talk to Lorelle in the business office there is a conference room

### Dr. Davis:

- How does she want this done?
  - Focus groups vs interviews?
  - At UMass, at WPI?
- We will have some MBSR training: when?
- Prepare questions before meeting her
  - How are we going to scope this? What is the end goal / deliverable?
  - What are our commitments?

### People want MBSR tested before it is accepted

- Background section of paper: what has worked (ex. psoriasis)
- Other things to add to background: "participatory research"
- How to conduct a
  - focus group
  - survey
  - interview
 (each is an option, explain each option, and then why we picked what)
  - Sage publishing usually is a good resource on these

### Our task:

- What would work? What would it look like?
- Likely a "recruitment" focus - getting people into MBSR
- Make a script for connecting to other universities
- Pilot focus groups etc with WPI, getting it ready for a larger sample
- Coupling technologies

### Sections the paper will need

- Glossary of terms
- Lit Review (separate from the Background, which will be what is MBSR / where has it worked)
- Planning Phase (discussing our meeting schedule etc, timeline)
  - Weekly Reports and Meeting Minutes may be an appendix
  - Remember to redact any sensitive information

### New Ideas:

- Online classes / streams (people can tune in)
- YouTube series

We will be using APA format

## Meeting Minutes

9/9/15 at 2PM

Sponsor Meeting

## TODOs:

Contact Prof. Kent Rissmiller about IRBs at other area colleges [done]

Add further details to Tentative MBSR MQP Schedules

Get in contact with some people at UMass about how best to word IRB for mental health disclosure, most likely Dr. Davis, perhaps other folks

Contact Carl for free 31 day mindfulness program link [done]

[http://theminfulnesssummit.com/?ref=16&utm\\_medium=email&utm\\_source=affiliate&utm\\_campaign=cfm&utm\\_content=lau](http://theminfulnesssummit.com/?ref=16&utm_medium=email&utm_source=affiliate&utm_campaign=cfm&utm_content=lau)  
nch

This is an October event; may be too late to help our research

Define Mental Health illness/issue in glossary

Create a mailing list for everyone: [umasswpi-mbsr@wpi.edu](mailto:umasswpi-mbsr@wpi.edu) [done]

Set up someone(s) at UMass to meet with while Dr. Davis is away

Focus while she is gone may be IRBs/students

Consolidate project objectives into Introduction of report

Important Dates and Times:

Sponsor meetings will be from 8:30-9:30AM on Wednesdays

Wednesdays at 7:30-8:15 there is meditation with Carl

Wednesday December 9, 2015 from 10AM-12PM is final presentation

Proposal Presentation will likely be week 6 or 7 (Sept. 30 or Oct. 7)

Dr. Davis will be gone 9/11, 9-21-9/25 (week 5), 9/30-10/2, 10/7-10/9

Will also be out of email contact for week 5

May be able to Skype into meetings

Project scope:

surveys / interviews / focus groups - all of the above

sample only students with disclosed MH issues

get a mix of students, ex. WPI, Quinsig, UMass Amherst, Clark, Nichols

May be able to talk to MBSR teachers via Carl, get their perspective on younger MBSR participants that they have had

Greatest focus will be on recruitment, as without undergoing MBSR ourselves, retention and adherence are more difficult; all are interrelated, and so we will work on retention and adherence, but the main focus will be recruitment for this age group (definitely A, possibly B, in the overarching outline)

Will ask questions along the line of

What would get you in?

What would keep you going?

What would you like to see?

Not likely able to attend and participate or watch MBSR classes, alternatives:

Free 31 day mindfulness program currently available online (teaching and practice)

[http://theminfulnesssummit.com/?ref=16&utm\\_medium=email&utm\\_source=affiliate&utm\\_campaign=cfm&utm\\_content=lau](http://theminfulnesssummit.com/?ref=16&utm_medium=email&utm_source=affiliate&utm_campaign=cfm&utm_content=lau)  
nch

App: Insight Timer (has guided practices, can make groups)

Tara Brach, and Jack Kornfield (Mindfulness Breathing)

Additional items to research:

Darma Punks

Chronicle of Higher Education - colleges do not want to provide mental health help

60 Minutes: this past Sunday there was a rerun with Kabat-Zinn (check CBS 60 mins)

Additional potential contacts:

Matt Brown (meditator)

PAR - some UMass folks have experience with

Other notes:

Our IRB might not be expedited (care must be taken in the writing to make it clear we are not delving into suicidal thoughts)

IRBs with other schools are going to be a nightmare

Meeting Minutes  
9/11/15  
Advisor Meeting

Plan:

1. Request WPI IRB
2. Create "grapevine" through social media pages: Twitter & Facebook pages
3. Interview voluntary UMass adults with disclosed MH issues on their past experiences
4. Adults in mentoring program- ODS willing to consent?
5. Recommendation: MBSR offered as a PE (meditation) class? - fill out a survey

Aaron Ferguson - may be willing to facilitate (Hampshire College)

May be able to get WPI students to participate in focus groups - pilot study for universities

Laura / Jess may be good contacts with ODS (and post a flyer)

Survey Questions:

- Ask questions regarding feelings of angst/depression
    - What would be helpful to our subjects?
- Age, major, gender → include in IRB to mitigate risk  
No diagnoses  
Data kept in separate places (locked in cabinets / on password protected PCs/networks)

Goals:

- Proposal to Prof. Loiacono by next week 9/18
    - Giving her a weekend helps speed along the proofing
- Basic script ready for next week 9/16
- Demonstrate why we're putting it together the way we are
- Source citations !!

TODO:

- NIH training: Human Subject Certification → must attach to IRB
    - <https://phrp.nihtraining.com/users/login.php>
    - Go to website, take test, get certificates
- Continue to work on report  
File IRB

Meeting Minutes  
 9/16/15 at 8:30AM  
 Sponsor Meeting

- Scheduled proposal presentation for 9-10AM on 10/14/15
- UMass has contacts (students) at Assumption and Clark that Project Grapevine might be able to tap
- Third point of methodology, interviewing adult volunteers who have completed MBSR, may require an IRB through UMass, unless done by word of mouth
  - For word of mouth, making contact with [REDACTED]

Asked Carl if there are any MBSR instructors we might be able to talk to / interview next week, since Dr. Davis is away

Received advice on proper wording of the survey questions

- Young Adult Advisory Board: knows how to word things for young adults
- We are going to make changes to our survey questions and get them back to Dr. Davis today
- The Young Adult Advisory Board will try to get them back to us by 9PM on Thursday

Looking into two new literature review items: 10% Happier and cfmHOME

- cfmHOME offers potential to create a “College Room”

IRB form was scanned quickly, seems to be fine - just the actual survey questions need some rewording

Meeting Minutes  
9/18/15  
Advisor Meeting

Plan:

1. Discuss WPI IRB
2. Discuss survey questions/wording
  - Include reasoning for wording
  - Discussed “condition” vs. “challenge”
  - Ask if participants are willing to provide a name, additional info

Goals:

- Proposal to Prof. Loiacono by day’s end of 9/18
    - Plan to receive proposal back for Monday 9/21
- Source citations  
Keep scope focused  
Label project objective – keep referring back

TODO:

- Flyer must be IRB approved, attach to IRB
- Merge questions – add question about cfmHOME college room
- Continue to work on report
- File IRB
- Email Loiacono link to Google Doc

NOTES:

- Dr. Davis & Carl are to be used as references

Meeting Minutes  
9/23/15 at 8:30AM  
Sponsor Meeting

- Hoaglund-Pincus is the CFM building
  - Only [REDACTED] has an office here
- Aim with other IRBs: connections to Clark and Assumption, after WPI approval try sending the WPI form via UMass to avoid filling out an excess of IRB forms, if possible
- Carl will get back to us on some statistics on CFMhome / whether the college room can be implemented quickly
  - College room will be private with a registration code
  - Hoping to insert this as a resource at the end of the survey
  - There is a video section in CFMhome now; a similar one for YAs may be better
    - Contains videos by the BBC News, etc
    - Dan Harris “Hack Your Brain’s Default Mode”
    - Introduction to Mindfulness-based Stress Reduction
  - UMass launched a new program recently: Mindfulness and Medicine
    - This program is for patients in the medical center to get information
    - Only "older folks" talk in these videos - nothing for YAs by YAs
    - These videos could not be located on CFM's site or via YouTube searching
      - Moving ahead, may need to use many, many tags to make sure these can be found
      - As a prototype, perhaps we would make one of these videos
- Twitter: going to start thinking about hashtags for a campaign
- Of the instructors we have made contact with so far, two are adjuncts with the CFM, one is at UMass Memorial, and the other we are looking to meet in person next week at Hoaglund-Pincus



Meeting Minutes  
9/25/15 at 9AM  
Sponsor Meeting

- Contacted Prof. Rissmiller - our IRB is pending in a backlog of other time sensitive IRBs
- Added all of the team to the Qualtrics survey
  
- Conference Calls: If we need to do one, check with Lorelle in the business office
  
- Working on setting up interviews with the 4 instructors
  
- Rescheduling: advisor meeting for 10/2 moved to 10/6, same time (9AM)
  
- Early next week Prof. Loiacono will get the proposal back to us, then we can get it to UMass
  
- Proposal Presentation Notes:
- Usually an open discussion
- Leave an hour for the presentation
- Typical format:
  - what we have done
  - where we are now
  - where we are going

Make sponsor aware of what we will need and by when (ex. Assumption or Clark IRB, cfmHome) / contingency plan if we cannot get that (just WPI and those from the online grapevine)

Meeting Minutes  
 9/29/15 at 9AM  
 Advisor Meeting

- Qualtrics Survey discussion - refine survey
  - Match all fonts
  - Title each question to allow for ease of downloading to Excel
  - Multiple choice questions → Likert scale (horizontal to save space)
  - Perhaps insert a progression bar, or “Page x of z”
  - Ask Carl about providing names for a focus group
    - If not names, emails?
  
- Proposal discussion
  - Appendices must appear in progressive order within document
  - Make “Project Objectives” its own section - 1.1
  - Fill in sections 5.3 - 7.x - just a brief stub that will show what we plan to do
  - Include a reflection at the end, and a glimpse into the future
  - Wording changes: “con” = “disadvantage” / “pro” = “advantage”/”benefit”
  - 3.1.1 Psoriasis Study with Meditation
    - ~~The details follow.~~
    - “The first significant medical study to look at meditation’s effectiveness was a Psoriasis study.”
  - Social Media should be mentioned and referenced back to after being introduced
  
- Working on refining focus group questions
  
- Continue to follow and gain followers on Twitter
  - Must have accounts willing to take the survey
  
- No meeting this Friday (10/2)
- Will meet Tuesday (10/6) at 9 A.M. instead

Meeting Minutes  
9/30/15 at 8:30AM  
Sponsor Meeting

- Social Media:
  - Haili is going to work on finding followers
  - Going to tweet an image/saying a day and track retweets/favorites over data collection period
  - Following a suggestion from preliminary survey data, rolling out an Instagram page
    - Use as a comparison to Twitter
- Other IRBs:
  - Carl is going to try contacts with Assumption, Clark, Tufts, Brown
  - Odds of success, especially given data collection only lasts 4 weeks, are slim
  - Better chances at going through the "grapevine"
    - Carl knows an Assumption student very interested in mindfulness
- Instructors:
  - Need to check back in on [REDACTED]
    - Also ask if her daughters might be willing to take the survey
  - Nothing from [REDACTED] still
    - She lives far from the CFM and only comes by for classes
      - Likely going to need to do a phone interview
- Flyers
  - Print and hang around campus buildings

Meeting Minutes  
10/6/15 at 9AM  
Advisor Meeting

- Proposal edits in progress
  - Duckworth comment: specify sources on the key points

Focus group volunteers

- Even though no approval yet, can contact the volunteers and inform them we are making a schedule
- [REDACTED]
  - Likely not going to hear from her / get to interview her
  - If we do, need to let Professor Loiacono know ASAP so we can make phone arrangements
- Plan for Friday
  - Review PowerPoint / rehearse presentation
  - Add preliminary analysis - snapshot of data / some insight into it
  - Toss in Plan->Analyze->Create->Deliver waterfall graphic on transition slides
- For a final deliverable:
  - Instagram account
  - Recommendation will likely be an app of some form, mockups of the app
    - Insight Timer is the "gold standard"

Meeting Minutes  
10/7/15 at 8:30AM  
Sponsor Meeting

- Social Media:
  - Created an Instagram to use as a comparison to Twitter
    - Show off the Instagram etc at our focus group
  - Facebook interest seems to be dying out
- Survey
  - Currently at 57 responses
- Instructor Interviews:
  - Coming along
    - Need to check back in on [REDACTED]
    - Nothing from [REDACTED] still
    - Interview with [REDACTED] in SDCC completed
- cfmHOME
  - Got OK to create “The College Room”
    - Must decide on actual name:
      - “The College Room”
      - “The Quad”
      - “The Campus Center”
    - Must create “About” description
- Application
  - Interest in some type of app
  - Worcester college localization
  - CFM advertisements
- Other
  - If we need a projector for the presentation, let Robyn know and one can be set up
    - Will do so tonight via email
  - We will not be meeting the week of the 21st (WPI term break)
    - Then on the week of the 28th Carl will be unable to make it
      - Dr. Davis should be back
      - Make sure to mention about the 21st to her at proposal presentation

Scientist from Germany giving an open-public talk on Monday 10/19 @ 5PM on  
mindfulness & compassion

She has results in terms of neuroimaging  
empathic distress: doctors who feel for their patients and cannot function

Meeting Minutes  
10/9/15 at 9:00AM  
Advisor Meeting

- Focus Group: Consent / Questions
  - Cut back text
  - Be cautious on some wording around MH
  - Make it a little more clinical / a little less personal
  
- ATC
  - Consider talking to them about Adobe Connect with regards to focus group
  
- Focus Group: Volunteers
  - Check back on them again at the start of B term
  - Only 1/10 has confirmed willingness to participate
    - This is finals for us / midterms for other schools
    - Students may be too busy to reply at the moment
  
- Presentation
  - Add citations where applicable
  - Unclaimed slides: Assigning first to Meghan, second to Amber
  - Incorporate the WPI and UMass logos
  - Aim for ~20 minutes of talking
  - Visuals > Text
    - Move the text into notes and add more for imagery
    - Images are more memorable

Meeting Minutes  
10/27/15 at 9AM  
Advisor Meeting

Focus Groups: IRB Approved 10/22

Focus Groups: We have everything but the people  
3 Contingencies:

1. [REDACTED] - conduct a focus group with her students  
[REDACTED]@wpi.edu
2. Send reminder emails to those we definitely want in our study
3. Contact [REDACTED] at the ODS and see if she would pass on the focus group information  
[REDACTED]@wpi.edu

Send a blurb/flyer to both [REDACTED] and [REDACTED] describing the focus group  
Mention that there will be food

- Work out a budget for said food (pizza, water, candy, maybe fruit)
- Talk to Campus Center about pizza
- Email Prof. Loiacono when we have an approx. head count/budget
- Estimate 1 pizza for every 2-3 people
- Acquire non-pizza items outside of WPI - cheaper

Survey:

- 120+ respondents / 88 completed surveys
- ~46 respondents in the desired sample
- Comparing some groups (ex. "all MH / chronic pain" vs "no MH") will be statistically significant
- Comparing other sub-grounds (ex. chronic pain vs depression) will not be statistically significant, as too few respondents for the category
- Will note: "from the evidence...." and "further research is required as the sample is not statistically significant due to its size"

Social Media Campaign:

Over break the Instagram got ~30 more followers. Up to 74 followers, 13 posts.

The paper:

- Abstract: 1 paragraph
- Executive Summary: 1 page, with a visual (a figure of the mockup, like app home page)
- Add this section
- Adjust the order of the sections to be like so:  
Abstract -> Authorship -> Executive Summary --> Introduction

Meeting Minutes  
 10/28/15 at 8:30AM  
 Sponsor Meeting

Carl was unable to attend in person; briefly able to talk with him via phone  
 Next week, Dr. Davis cannot attend - flying to Oregon (then available until March)

Check to make sure Carl can make next week's meeting  
 CC Dr. Davis on the email

College room underway - will be set to public opposed to private

[REDACTED]:

Tuesdays 5-6PM = drop-in mindfulness class

Wednesdays 5-6PM = drop-in meditation group

She is willing to email her regulars on our behalf

Good chance this focus group would have to be pushed back to 11/10 as she did not get the email in time

There should be enough cushion time built into the project during our editing phases for this section to be slightly delayed so long as everything else proceeds apace

Email [REDACTED] and ask about people for a focus group

Email Carl and ask about people for a focus group

SDCC:

Contact someone other than [REDACTED], about hanging a flyer /spreading the word

Seeking a broader population from the SDCC

Have fringed tabs with our email address for people to pull off on a flyer

Or direct mailing via email (by the SDCC) to potential students

ODS:

Same case: more flyers

Social Media Progress:

Instagram at 76 followers vs Twitter at about 16 followers

Instagram seems to appeal to all age groups

Experiment: inquiring with Carl about any CFM events to post about

Potentially use Instagram as a tool for recruitment/raising interest

Will inquire with [REDACTED] to post about mindfulness class & drop in meditation group

Tumblr: not an avenue pursued, harder to solicit interest

As an experiment, post some event information

Check with Carl for any CFM events to post

Post something for [REDACTED]'s groups and see if it increases her numbers

Data analysis:

Can use non-parametric statistics, which do not require a normal distribution



Thought for mindfulness app:

In the CFM events tab, have an RSVP option that shows other users who have RSVP'd  
Users can see if their friends are going -> community feeling

Meeting Minutes  
 11/3/15 at 9AM  
 Advisor Meeting

Survey analysis underway

groupings:

104 general respondents

36 MH

19 depression

22 stress

20 anxiety

4 pain

50 pages of analysis so far / Qualtrics report added to appendices

\*Add a 7th group: no MH

App and online exercises winners

Go hand-in-hand

Recommendation might be an app that pulls videos from the CFM site

Help filter what is a good, legitimate resource

AND/OR a more local to Worcester version of Insight Timer - close-knit

Recommend for future research: more respondents for the subgroups, ask for gender etc

\*On the last question answered chart, note the page endings

\*Statistics: do a one-way ANOVA or a t-test on the score values

t-test on 2 groups, independent sample

want t-value of 1.96 and p value < .05

Focus Groups

Send a reminder email to [REDACTED] today, to mention 11/10 focus group to her class

Meghan acquiring candy today

PE Credit Course

Popular live option

Worth chatting with the PE department about this

[REDACTED] ([REDACTED]@wpi.edu), head F.H. coach, head of PE

Classes

Lynn from CFM might be willing to teach

Could bring this before President Leshin at her next office hours session

Misc

Take down the survey flyers

App mockups: Meghan will handle the art

In the data analysis survey summary, clean up the table

Bolding, colors, headers, limit to 2 decimals, \* on pain mentioning sample size

etc

Meeting Minutes  
11/10/15 at 9AM  
Advisor Meeting

Conducted first focus group

- College room skew - fancy name confused people

  - Support the idea of a chat room / discussion board when described as such

- MBSR practices tailored to events sought

  - Ex. going into a test or a game

- Inspirational quotes

- Success stories of resilient people

  - People who bounced back with the help of mindfulness

Statistics

- Almost done

- Will lead to another appendix, some of the Excel generated things

- App is popular for both the MH and No MH groups

  - May reduce stigma - an app for everyone!

Mockups

- Underway

- May include bullet points denoting where the tabs/features came from (ex. survey, focus group)

  - This would fit well for the mockup for the executive summary

Moving Forward

- Add the 11/4 focus group notes to an appendix

- Will need to save the entire Google Drive at the end for Prof. Loiacono

- Tuesday before Thanksgiving, may need to have the advisor meeting via Skype

Meeting Minutes  
11/17/15 at 9AM  
Advisor Meeting

#### Focus Group

Saturation: not getting new/different information, confirming the data

#### Editing

One more round

Prof. Loiacono will get phonebook back to us by THURS / FRI at latest

Resubmit it to her by Thanksgiving, seek the go-ahead to send it to UMass

#### Looking Ahead

After presenting, may add reflections of the final presentation

Will need a sign-off sheet for UMass, stating that we presented

#### To Discuss with UMass

Redaction - is there anything in the paper you do not want visible when uploaded to WPI's library?

#### Final Presentation

12/9 10AM-12PM

Emphasis on visuals, aim to be like a TED Talk (17 minutes)

Animation

Remind them of the process (waterfall graphic)

Pick up where we left off (perhaps a small recap of early chapters, focus on chapters 6 & 7)

Mention project presentation day

#### Next Week

Skype meeting with Prof Loiacono ([REDACTED]) 9AM

Meet in the Washburn sitting area

Make graphs for the social media data after third freeze

Meeting Minutes  
 11/18/15 at 8:30AM  
 Sponsor Meeting

Requested to see the list of Appendices --> sent snippet of table of contents  
 Send report to sponsors after Thanksgiving (10/26)

#### Discussion of the App

App to replace/incorporate social media  
 If it is local, be explicit that is local - ex. name it WooMindful or something  
 Preference: a way for it to adapt based on personal settings  
     Ex. when creating account, put an area code in, and get local events there  
 Some form of layering - able to look at events pertaining to an instructor's  
     particular class, message board?  
 Create groups/classes  
 Internet access to the App?

#### College Room

Perhaps rename "College Chat Room"  
 Link to App

#### Additional Recommendations Moving Forward:

Talk to instructors as a next step, to see what they might want in the app  
 Discuss survey and focus group feedback, see if there is saturation with teachers

#### On Redactions

When we send them the paper following Thanksgiving, remind them to keep an eye for  
     things to redact from the library's version  
 Chance a lot will need to be redacted, as this may have commercial value

Dr. Davis checking if there are any College Mental Health Conferences coming up near here

#### Addition to the Paper in Recommendations Section

Pew Research Survey - look for statistics on the proportion of college students  
 with smartphones, look into any available subgroupings (ex. ethnicities) or related  
 information (ex. proportion of college students with internet access)

#### December 9th Presentation

Moving to 9-11AM? 8:30-10:30AM?  
 Check with Prof. Loiacono  
 Let Robyn know

Meeting Minutes  
 11/24/15 at 9AM  
 Advisor Meeting

Aim for next Tuesday

Have a draft of PowerPoint and Poster

Sending report to UMass on Monday 11/30

Will remind them to look for things they want redacted

Poster Sections

Abstract - text

Intro - can be visual with statistics

Methods - visual, steps followed, image of a focus group, etc

Results - lots of graphics

References - available upon request

Conclusion

Reflections

----

Divvying up sections after checking out the template - primary focuses:

Abstract/References/Acknowledgments = copy / paste

Intro - Haili

Methods - Meghan

Results - All

Conclusion (App/Exercises) - All

Reflections - All

Background/Lit. Review - Amber

Planning - Waterfall graphic

Images to be used thus far:

Waterfall graphic

Mockups

Preliminary Survey Rank Summary

Waterfall graphic

Meeting Minutes  
12/1/15 at 9AM  
Advisor Meeting

Presentation

- Either have graphs pop up or make them larger to be more readable
- Move focus group slide to after survey statistics
- Remove bounce transitions; add floats instead
- Denote the App as Plan A
- Thank UMass for sponsoring us

Ran out of time to discuss poster; will cover next week  
Seems to be in good shape

Meeting Minutes  
12/2/15 at 8:30AM  
Sponsor Meeting

Nothing to redact

Can submit the paper electronically to spare a small forest

UMass will want the actual data as well

Feedback:

- Looking at the report as a medical manuscript

  - Table vs Figure - pick one, don't show both

    - Check with Prof. Loiacono on anything we might remove

  - Have the data comparatively

    - We have this already in our summary section with rankings;

    - Can do this as well with the actual score values in the introduction

    - Use hyperlinks in each section to refer back to the massive table in intro



## Meeting Minutes

12/8/15 at 9AM  
Advisor Meeting

For library copy, redact the mockup images, per Prof. Loiacono's suggestion

### Poster Adjustments:

- On gamma, add a brain

- Make text even in Results

- When presenting the poster in April, be sure to mention the next steps in the reflections

  - No need to add any more to poster for this though

### Bring material tomorrow on a USB

- Final paper

- 12-2 paper with old graphs

- Poster

- Data

- Proposal presentation

- Final presentation

### Create a folder on the Drive named "Loiacono"

- Place the above in this folder, as well as:

  - Redacted version of paper

  - Final paper, with final reflections

Email the Final paper, with final reflections, to UMass, then submit the redacted paper to library

- Fill out eCDR, and we're done!

## Appendix C: Agendas

### Agenda for 9/16 Sponsor Meeting

#### Proposal Presentation:

Tentatively scheduled for 10/14/15

\*This is the next Wednesday that Dr. Davis is present

#### Proposal Status:

63+ pages and growing

Finishing up and submitting to Prof. Loiacono late this week

Anticipate electronically submitting it to you late next week

#### IRB Conundrum:

[We want to show you what we have and get your opinion on wording etc]

Anticipating severe difficulty with IRBs; should be able to clear WPI's with care to wording/details, but expect trouble with other institutions based on communication with WPI's IRB

#### Methods:

Our approach is going to be four-pronged:

5. IRB Through WPI, work WPI as a pilot, attempt to conduct a focus group (may be unable to get enough volunteers to come forward for the focus group)
6. Project Grapevine: Through social media (Twitter, Facebook) promote our survey to general public, thus hedging the risk of relying solely on IRBs to reach other young adults
7. Attempt to interview adult volunteers who have completed the MBSR program, and might be willing to offer hindsight on their college years and technologies that might have helped them
8. Attempt to interview MBSR instructors who have had young adults in their classes, and get their view of the differences between adults and young adults in the program

### Initial Ideas for Technologies:

Idea1) Facebook groups for a community feel, with various chapters (ex. Class, Location, General) - access to likeminded people one can reach out to.

Idea2) Phone app that, on a timer, alerts you that it is time to meditate. A random prerecorded meditation tape is pulled and pulled up, on which one can tap "play" when in a location you can meditate.

Idea3) Some form of Twitter campaign #MBSR or #BeWhereYouAre for spreading awareness and reaching out to others who have never heard of MBSR. Combine peaceful images with mindfulness sayings. Prototype:



Idea4) YouTube series for online MBSR course for free. Though there is a free online MBSR course available < <http://palousemindfulness.com/selfguidedMBSR.html> > this is not necessarily a place that young adults will look, even if it is the first 2 Google results for "free online MBSR course." Likewise, they might stumble upon this on YouTube via recommended videos, if they have no idea what MBSR is.

## Agenda for 9/23 Sponsor Meeting

- Proposal Status:
  - Undergoing multiple rounds of editing; may be a slight delay in getting it to you
  - Anticipate electronically submitting it to you late next week at worst case scenario
  - This has no impact on the proposal presentation

### IRB Status:

- Submitted for IRB Approval with WPI
- Waiting to hear whether this will be a full review or expedited review

### Project Status:

- Web survey under construction using Qualtrics software, will continue tweaking it with IRB feedback
- Project Grapevine: After IRB Approval with WPI, the survey will go live, and we will post its link on our social media
  - We are going to tweet @InsightTimer among others, seeking participants

### Other IRBs:

- You mentioned having connections with the IRBs at Assumption and Clark?

### Other Instructors

- Have been in contact with [Redacted]

### Questions regarding cfmHOME:

- Do you know how many users are on the site? Or users per room?
- What is the primary audience for the site? Perhaps, teachers, students, and the community?
- Last week you had mentioned the possibility of a college room, does this remain feasible? If so, who must we contact to get the room started?

## Agenda for 9/30 Sponsor Meeting

- Proposal Status:
  - Will be submitted to you this week
  - Work on the proposal presentation underway
    - Open discussion
    - Where we were, where we are, where we are going

### IRB Status:

- Survey questions approved as of 9/29
- Survey has been launched as of 7:15PM on 9/29
- Survey found at: [http://wpi.qualtrics.com/SE/?SID=SV\\_6hFINIt7MNg08Zf](http://wpi.qualtrics.com/SE/?SID=SV_6hFINIt7MNg08Zf)
- Alternative link: <http://tinyurl.com/wpimbsr>
- Focus groups: not yet approved, more details and consent form needed

### Project Status

- Officially in the data collection stage
- Hanging flyers now that we have IRB approval
- Going to visit the student disabilities office to hang flyers and seek peer mentor volunteers
- Spreading the survey link via the project's social media accounts / friends and family

### Other IRBs:

- Now that we have WPI survey approval, if we send along our WPI IRB information, can you get it to Assumption and Clark through your contacts?

### Other instructors:

- 10/5 (MON) @2:00-2:30PM with [REDACTED]
- 10/7 (WEDS) @9:30-10:00AM with [REDACTED] (and possibly [REDACTED] and [REDACTED])
- Nothing from [REDACTED]

## Agenda for 10/7 Sponsor Meeting

### Proposal Edits

- On the influenza study:
  - Though a 2003 study, it was featured in Explore: The Journal of Science and Healing in 2005
  - Have not changed the citations, but now explicitly state it was a 2003 study so there is no confusion for readers
- Likewise, the article cited for the influenza study was a summary of the study written by a Robert Anderson
  - now specifically mention that Kabat-Zinn and Richard Davidson were coauthors of the study
- Added a new section for the 2 new articles
  - 3.1.4: Mindfulness on Anxiety, Depression, and Stress
  - Avoided going into the statistics, as they will not mean much for the average reader, and anyone that wants that much information on the study can check the citation

### WPI IRB Status

Waiting for the OK for focus groups  
Students are volunteering to participate

### Instructor Interviews

Interviewed [REDACTED] on Monday  
Interviewing [REDACTED] right after this meeting  
[REDACTED]: Awaiting email (followed up, she and her daughters are working on the questions)  
[REDACTED]: Still no response  
[REDACTED]: We think we're interviewing her at noon?  
(Any idea if there is a good place we can wait for 2 hours in this building?)

### Survey Status:

Getting a fairly good response (do not want to spoil our proposal presentation)  
People don't hate cfmHOME now!

### Social Media Status:

Instagram account up and running

### Week of 10/21

WPI Term Break

## Agenda for 10/7 Sponsor Meeting

Focus Group Status: IRB Approved 10/22

We have everything but the people

3 Contingencies:

1. [REDACTED] - possibly conduct a focus group with her students  
 Attempting to set up for next Tuesday night, Nov. 3rd  
 Food!
2. Reminder emails to those we definitely want in our study  
 Number of survey volunteers: 13  
 Number with a MH condition or chronic pain: 5  
     Number with depression: 3  
     Number with anxiety: 3  
     Number with stress: 5  
     Number with chronic pain: 0
3. Contact [REDACTED] at the ODS and see if she would pass on the focus group information

Survey:

127 respondents / 88 completed surveys (as of Tuesday before noon)

~46 respondents in the desired sample

Will see how many of this group finished the full survey after tomorrow

Comparing some groups (ex. "all MH / chronic pain" vs "no MH") will be statistically significant

Comparing other sub-groups (ex. chronic pain vs depression) will not be statistically significant, as too few respondents for the category (6 chronic pain respondents)

Will note: "from the evidence...." and "further research is required as the sample is not statistically significant due to its size"

Social Media Campaign:

Over break the Instagram got ~30 more followers. Up to 74!

## Agenda for 11/3 Sponsor Meeting

Status of the ~~phone-book~~ MQP report:

- ~250 pages and growing
- Added a lot via the preliminary data analysis
- Have appendices A-O now

Status of the Survey: Data Analysis

Preliminary data analysis

Broke the data down into 6 groups to study

\*Respondents can appear in multiple groupings

104 general respondents

36 MH

19 depression

22 stress

20 anxiety

4 pain

Averaging the likert scale values generated scores

Ranked options by their scores (lower=best) for each group

Across all 6 groups, the virtual living room placed 6th (dead last)

Twitter and Facebook unpopular

Twitter was popular when asked by itself if they would use it

Later in a check-all-that-apply for use realistically moving forward, fell far

App and online resources very popular

Favored live option: PE classes for credit

This section is 50 pages and growing - plenty of details in the report itself

Ex. where respondents who did not finish quit, major representation (55 majors), college representation, year of college representation, etc

Moving Forward:

Adding a 7th group to study: those without a condition

Findings from the prelim analysis suggest that young adults, regardless of conditions, favor the app and online resources

Statistical analysis

t-test or one-way ANOVA of the scoring values across groups

Status of the Focus Group

One to be held tomorrow

Of the 5 volunteers, 1 just had a change of heart (too busy), 2 RSVP'd, 2 have not RSVP'd (yet?) but have expressed interest and emailed back and forth (now unresponsive)

Still working on getting a second group together for next Tuesday night with [REDACTED]



## Agenda for 11/10 Sponsor Meeting

Status of the ~~phone-book~~ MQP report:

Appendices are exhausting the alphabet

275 pages and growing

Finishing up sections on the social media campaign, focus groups, statistical analysis of the survey data, and app mockups

Status of the Survey: Data Analysis - Statistical

One-way ANOVA on the scores/interest for live options /technology options for assorted groups

ex. No MH vs. MH and pain, No MH vs. Anxiety, Anxiety vs. Depression

In most groupings, the means do not significantly differ - same preferences

Young adults, whether or not a condition is present, like the app

An app that caters to young adults in general is stigma free / reaches broader audience

Status of the Focus Group

Conducted one on 11/4, conducting another this evening

Some of the interesting findings:

College room survey results may be skewed by its name

"virtual living room" - fancy name confused people

When described as a chat room / discussion board, volunteers supported it

One that took the survey even said he/she scored it poorly because he/she did not trust the word "virtual;" now likes the potential for anonymity and community

Requested features for the app / online resources:

MBSR practices tailored to events sought

Ex. going into a test or a game, specific breathing exercise

Inspirational quotes

Success stories of resilient people

People who bounced back with the help of mindfulness

Preferred approach to mindfulness: hybrid of live and technology

Live only = "overwhelming"

Tech only = "you can't put a face to the person guiding you"

Volunteers agree that this probably differs person to person, as some people hate interaction, and others hate technology, but those present preferred a mix

## Agenda for 11/18 Sponsor Meeting

Status of the ~~phone-book~~ MQP report:

Appendices A-W

355 pages

Undergoing editing - If you wish to view the document before the presentation, we can arrange to get it to you after Thanksgiving

Status of the Focus Groups

Conducted second on 11/11

Some of the interesting findings:

Saturation: Confirmed the data we already had from first focus group and survey

Had representation from all MH/pain groups via the three members

<b>Suffer From A Condition</b>	3/3
<b>Depression</b>	3/3
<b>Anxiety</b>	3/3
<b>Stress</b>	3/3
<b>Pain</b>	1/3

As students already practicing mindfulness, not overly fond of social media for coupling with mindfulness

The strengths of the assorted social medias could be built into the app

Requested features for the app / online resources:

Everything the first group wanted for exercises

Particularly liked the motivational/inspirational exercises

Suggested videos geared to skill levels (beginner, intermediate, expert)

Listed things they disliked about Insight Timer (learning curve, UI, etc)

Preferred approach to mindfulness: hybrid of live and technology

Tech is a good assistive tool, particularly for starting the journey, but actually "being there" [in a live class] is the most important part

Redaction:

Have blocked out names, except for those advising/sponsoring/working on the project

Is there anything else you want redacted when the document is uploaded to WPI's library? [Ex. specific section(s)]

Cannot get Completion of Degree Requirements form until this is uploaded

The sooner this can be settled the better for us

Next week: Thanksgiving break WEDS-FRI

Will send a status report

Final Presentation - Reminder: December 9th, 10AM-12PM

## Agenda for 11/25 Sponsor Meeting

Status of the ~~phone-book~~ MQP report:

~330 pages (is now 1.5 spaced instead of double spaced)

Appendices A-Z (X, Y, Z are currently blank)

X- Final Presentation Slides

Y- Final Presentation Sign-off (sponsor signs to signify we did present on 12/9)

Z- Miniature MQP Poster (the poster slide will be pasted in)

Will be sent to UMass on Monday 11/30

**Reminder: keep track of things you want redacted**

Current Focus: Presentation and Poster

Preparing a draft of each for Prof. Loiacono, for 12/1 advisor meeting

Will spend the week of 12/2 finalizing everything

Reminder: Final Presentation on 12/9 @9-11AM, Banks Conference Room

Have a great Thanksgiving!

## **Agenda for 12/2 Sponsor Meeting**

Status of the ~~phone-book~~ MQP report:

In your hands

Missing a few small sections, as noted in email

**Redaction: have you seen anything you want out so far?**

Current Focus: Presentation and Poster

Finalizing

Reminder: Final Presentation on 12/9 @9-11AM, Banks Conference Room

## Appendix D: Weekly Reports

### Weekly Report For the week of 9/4/15

#### Progress Report:

Read MIS MQP Guidelines  
 Watched both MBSR videos (over some period in August)  
 Filled out multiple When2Meets to determine scheduling  
     Fridays 9AM-10AM are meetings with Professor Loiacono  
     Sponsor meetings: TBD, 8AM Wednesdays?  
 Made email contact with project sponsor, Dr. Maryann Davis of UMass Medical  
 Brainstormed items of interest for the Background/Lit Review  
 Started brainstorming some ways tech/MBSR could come together  
 Set up a GoogleDrive for storing files, found at [REDACTED]  
 Set up an email alias: [REDACTED] (just for Endnote / WPI use)  
 Set up Endnote under the email alias for sharing resources and formatting citations  
     Login: [REDACTED]  
     PW: [REDACTED]  
     URL: [REDACTED]  
 Created a template of the MQP Report (see table of contents sheet for section headers      thus far)  
 Began research of items of interest for the Background/Lit Review

#### Weekly Plan:

Meet with Prof. Loiacono on 9/4  
 Meet with Dr. Davis for first meeting  
 Continue research and drafting

#### Other Meeting Notes:

Is citation format "CSE Manual Style N-Y"?

## **Weekly Report**

**For the week of 9/11/15**

### **Progress Report:**

Brainstormed questions for Dr. Davis  
 Began divvying up segments of the paper  
 Created a timeline for MQP  
 Met with Dr. Davis on 9/9/15  
 Created and began filling out many sections of the GoogleDrive

- Appendix Tracker (a log of what goes where when we assemble parts)
- Acknowledgments (keep a running tally of folks who have lent a hand)
- Authorship (keep a running tab of what we've all done)
- Background
  - 1993 Moyer's Program: Healing and the Mind [Amber]
  - Stress and its Effects [Amber]
- Transitions RTC [Amber]
- SPARC [Amber]
- Center for Mindfulness [Amber]
- Brief History of MBSR [Amber]
- Buddhism [Haili]
- Meditation [Haili]
- Technologies as a retention tool [Haili]

Glossary of Terms  
 Introduction  
 Lit. Review
 

- Participatory Research: Case Studies and Lessons Learned [Amber]

 Methodology
 

- Surveys: When to Use [Amber]
- Surveys: Pros and Cons of Different Survey Types [Amber]

 Designing Questions for a Survey or Interview [Amber]
 

- Focus Groups: About [Meghan]
- Focus Groups: Pros and Cons [Meghan]
- Focus Groups: When to Use [Meghan]
- Interviews: About [Meghan]
- Interviews: Types of Interviews [Meghan]
- Qualitative Interviews: Pros and Cons [Meghan]
- Quantitative Interviews: Pros and Cons [Meghan]
- Wording Interviews [Meghan]

 Creation of Facebook page [Haili]  
 Creation of Twitter page [Haili]  
 How to advertise MBSR through above applications [Haili]

Planning  
 Sources  
 Survey Questions (scratch work for what we might ask)  
 Edited MQP timeline given sponsor feedback

### **Weekly Plan:**

Continue work on Intro, Background, Lit. Review, Planning, Glossary, Methodology  
 Get in contact with some people at UMass about how best to word IRB for mental health disclosure, most likely Dr. Davis, perhaps other folks  
 Define Mental Health illness/issue in glossary  
 Set up someone(s) at UMass to meet with while Dr. Davis is away  
 Focus while she is gone may be IRBs/students  
 Consolidate project objectives into Introduction of report  
 Research: Dharma Punks, Chronicle of Higher Education - colleges do not want to provide MH help, 60 minutes from this past Sunday on CBS  
 Chronicle of Higher Education requires a subscription to access  
 Check into friends, family, and acquaintances that might fit our sample criteria

### **Other Items:**

On the latest MQP timeline, Proposal Presentation is later than anticipated; Dr. Davis is gone both week 6 and 7, when we initially wanted this - could present on a day of the week she is present for week 6/7, otherwise submit the proposal early as intended and just have the formal presentation a bit late. Other option: virtual presentation?  
 IRB conundrum

## **Weekly Report** For the week of 9/18/15

### **Progress Report:**

Significant progress on: Background, Lit. Review, Planning, Glossary, Methodology  
 Proposal over 70 pages long  
 Met with Carl and Dr. Davis  
     Set up someone(s) at UMass to meet with while Dr. Davis is away?  
         Focus while she is gone may be IRBs/students/instructors  
 Making contact with [REDACTED] who has done MBSR and so have her daughters  
 Seeing if Carl can get us a contact for next week by word of mouth among instructors  
 Consolidated project objectives into Introduction of report  
 Checked into friends, family, and acquaintances that might fit our sample criteria  
 Created a sample flyer  
 Created a Twitter account  
 Created a Facebook page  
 Prepared IRB approval  
 Submitted proposal to advisor  
 Edited calendar to reflect progress  
 Revised survey questions  
     Conducted brief user testing  
     Ran by Dr. Davis and Carl  
     Ran by Young Adult Advisory Board via Dr. Davis  
 Added new topics to the report: 10% Happier, CFM Home

### **Weekly Plan:**

Make edits to proposal based on advisor feedback  
 Await IRB approval, make any IRB requested changes  
 Submit proposal to sponsor when edited  
 Create an online survey like the one described in methodology  
 Look into other colleges for IRBs  
 Begin data collection  
 Follow up with Carl about instructors that may be willing to talk  
 Await a response from [REDACTED]  
 Tweet @Insight Timer when we have a running survey

### **Other Items:**

How do we get the okay to post flyers on campus?

## **Weekly Report** For the week of 9/25/15

### **Progress Report:**

Overhauled proposal paper  
 Began constructing a web survey on Qualtrics  
 Created questions for [REDACTED]  
 Followed up with [REDACTED], emailing interview questions  
 Made contact with [REDACTED], another mindfulness instructor that has volunteered to chat with us  
 Created questions for [REDACTED]  
 Made contact with [REDACTED], another mindfulness instructor that has volunteered to chat with us  
 Created questions for [REDACTED]  
 Made contact with [REDACTED], another mindfulness instructor that has volunteered to chat with us  
 Created questions for [REDACTED]

### **Weekly Plan:**

Await IRB approval, make any IRB requested changes  
 Submit proposal to sponsor when edited  
 Look into other colleges for IRBs (Assumption/Clark?)  
 Tweet @Insight Timer, among others, when we have a running survey that has been approved  
     Likewise, post link to Facebook page, and circulate it among those we know  
 Collect data (via the survey and instructor interviews)  
 All members of the team: make Qualtrics accounts with WPI credentials to collaborate on survey  
 Visit the ODS with flyer when IRB approved  
~~Likely speaking with [REDACTED] next Wednesday after meeting with Carl~~ Date/Time up in the air  
 Await responses from the other three instructors and respond accordingly  
 Send our IRB to Assumption and Clark via UMass and hopefully bypass their forms

### **Other Items:**

Continue tweets/Facebook posts, gain more followers



## **Weekly Report**

### **For the week of 10/2/15**

#### **Progress Report:**

Received IRB approval for survey  
 Made further changes to proposal  
 Submitted preliminary proposal to sponsor  
 Spoke with Carl about Assumption and Clark IRBs  
 Launched survey  
 Spread survey out over social media with project's Facebook and Twitter accounts  
 Posted flyers  
 Visited ODS  
 Worked on Global Impact section  
 Worked on proposal presentation  
 Worked on further details for Focus Groups for WPI IRB - consent form and questions  
 Reorganized the Drive to allow for more work done there before transferring to a Word doc for formatting reasons

#### **Weekly Plan:**

Interview mindfulness instructors  
     10/5 (MON) @2:00-2:30PM with [REDACTED]  
     10/7 (WEDS) @9:30-10:00AM with [REDACTED]  
     (and possibly [REDACTED] and [REDACTED])  
 Continue data collection  
 Track Twitter retweets of mindfulness images  
 Fill out the rest of chapter 5 - Methodology  
 Prepare for proposal presentation (10/14)  
 Check up on [REDACTED] / see if her daughters will take the survey  
 Roll out an Instagram account

#### **Other Items:**

Likely going to need a phone interview for [REDACTED], if/when we hear back from her (she lives far from the CFM and does not spend much time here)

**Weekly Report**  
**For the week of 10/9/15**

**Progress Report:**

Interviewed mindfulness instructors

10/5 (MON) @2:00-2:30PM with [REDACTED]

10/7 (WEDS) @9:30-10:00AM with [REDACTED]

10/7 (WEDS) @12:00-12:30PM with [REDACTED]

Made edits to proposal based on sponsor feedback

Continued data collection

Visited Student Development and Counseling Center on West Street (has mindfulness group)

Interviewed instructor there on TUES 10/6

Worked on proposal presentation

Worked on getting the College Room on cfmHome up and running

**Weekly Plan:**

Continue data collection

Track Twitter retweets of mindfulness images

Prepare for proposal presentation (10/14)

Rehearse

Snapshot the data for a preliminary analysis

Check up on [REDACTED] again

Continue making proposal edits

Contact focus group volunteers

**Other Items:**

## **Weekly Report**

### **For the week of 10/16/15**

#### **Progress Report:**

Continue data collection [continuous]  
 Track Twitter retweets of mindfulness images [continuous]  
 Contact focus group volunteers [continuous]  
 Received interview data from [REDACTED]  
 Made edits to the proposal presentation  
 Made edits to the focus group consent form  
 Made edits to the focus group questions  
 Submitted information required for cfmHOME College Room creation  
 Began summarizing qualitative interview data  
 Filed for focus group IRB approval  
 Presented to UMass on 10/14/15  
 Following Proposal Presentation, completed section 5.5: Presentation and Feedback

#### **Weekly Plan:**

Term break

- Continue data collection [continuous]
- Track Twitter retweets of mindfulness images [continuous]
- Contact focus group volunteers [continuous]
- Await focus group IRB approval

After break

- Close the survey on 10/28
- Conduct a focus group around the week of 10/28 if volunteers confirm willingness
- Fill in the blanks for the report: abstract, authorship, results and analysis, etc

#### **Other Items:**

WPI Term Break: 10/16-10/26

## Weekly Report

### For the week of 10/27/15

#### Progress Report:

Tracked social media campaign data [continuous]  
 Closed survey and began analysis  
 Created a food budget for a focus group  
 Wrote a blurb for [REDACTED] at the ODS and a blurb for [REDACTED] at the SDCC regarding focus groups  
 Contacted [REDACTED] and [REDACTED] to try recruiting students for focus groups  
 Added IRB Focus group material to appendices  
 Added an Executive Summary section to the report (to be filled in closer to the end)  
 Began drafting the abstract and authorship sections of the report  
 Contacted desired survey volunteers for the focus group again  
 Checked with Carl about next week's meeting / focus group recruitment  
 Checked with [REDACTED] about focus group recruitment  
 Contacted [REDACTED] at the ODS about spreading the word for the focus group  
 Contacted the SDCC about posting flyers for the focus group and spreading the word  
 Experimented by posting events to the social media accounts  
 Sent When2Meets to volunteers who have emailed us and inquired as to food allergies

#### Weekly Plan:

Conduct focus group(s)  
     [REDACTED]'s group: 11/**10** @ 6-7PM, in HL???  
     Other group: 11/4 @ 10-11AM, in KH111B  
 Work on chapters 6 and 7 of the report  
 Work on the Executive Summary  
 Make adjustments to authorship/abstract  
 Work on mockups of an app  
 Continue tracking social media campaign data  
 Analyze interview data  
 Analyze survey data  
 Analyze social media campaign data  
 Analyze focus group data for 11/4 group

**Other Items:**

Aim: submit a draft of the final report to Prof. Loiacono on 11/13

-> Potentially missing some of the focus group section

-> Complete edits and resubmit by 11/20

-> Settle the paper by Thanksgiving, come back and finish the poster, present on the 9th

Dr. Davis is unable to attend the meeting next week / Sending a status report only

## **Weekly Report**

**For the week of 11/3/15**

### **Progress Report:**

Conducted focus group on 11/4 @10-11AM in KH111B  
Worked on chapters 6 and 7 of the report  
Worked on the Executive Summary  
Made adjustments to authorship/abstract  
Worked on mockups of an app  
Continued tracking social media campaign data  
Analyzed interview data  
Added a 7th group (No MH) to preliminary survey data analysis  
Analyzed survey data - statistically  
Analyzed social media campaign data  
Analyzed focus group data for 11/4 group

### **Weekly Plan:**

Conduct focus group  
    [REDACTED]'s group: 11/**10** @ 6-7PM, in HL???

Analyze focus group data for 11/10 group  
Complete the draft of the final report  
Submit draft by 11/13 to Prof. Loiacono for review

### **Other Items:**

**Weekly Report**  
**For the week of 11/10/15**

**Progress Report:**

Conduct focus group

[REDACTED]'s group: 11/**10** @ 6-7PM, in HL???

Analyze focus group data for 11/10 group

Complete the draft of the final report

Mockups

Statistics

Social media campaign

Focus groups

Etc.

Submit draft by 11/13 to Prof. Loiacono for review

**Weekly Plan:**

Complete the edits to the paper as noted by Prof. Loiacono

Resubmit the paper by 11/20

Have the report settled by Thanksgiving; return and prepare poster/presentation

**Other Items:**

No sponsor meeting due to Veteran's Day; sent status report

**Weekly Report**  
**For the week of 11/17/15**

**Progress Report:**

Complete the edits to the paper as noted by Prof. Loiacono  
Freeze social media data for the last time / update it in report  
    Create a graph of the social medias over time (followers, shares/retweets)  
Prepare a sign-off sheet for final presentation  
Resubmit the paper by 11/24  
Have the report settled by Thanksgiving; return and prepare poster/presentation

**Weekly Plan:**

Begin working on the poster and presentation  
Send the report to UMass for viewing

**Other Items:**

No sponsor meeting 11/25 due to Thanksgiving break  
Advisor meeting of 11/24 to be held over Skype; gather in Washburn sitting area  
    Prof. Loiacono's Skype: [REDACTED]



**Weekly Report**  
**For the week of 11/24/15**

**Progress Report:**

Begin working on the poster and presentation - have drafts prepared for Tuesday 12/1  
Send the report to UMass on Monday 11/30  
Remind them about looking for things to redact

**Weekly Plan:**

Finalize the poster, presentation, and report  
Rehearse for the final presentation  
Following the final presentation: add

- the final reflections,
- sign-off sheet,
- slides,
- and poster

to the report; resend final version to UMass  
Submit redacted paper to the library and complete eCDR

**Other Items:**

12/2 is last sponsor meeting before the presentation; 12/1 and 12/8 are the last advisor meetings  
The sooner the poster is ready the better to avoid a problem with a printing delay

## **Weekly Report**

**For the week of 12/1/15**

### **Progress Report:**

Finalize the poster, presentation, and report  
Rehearse for the final presentation  
Note items to be redacted

### **Weekly Plan:**

Present on 12/9 from 9-11AM in the Banks Conference Room

Following the final presentation: add

- the final reflections,
- sign-off sheet,
- slides,
- and poster

to the report; resend final version to UMass

Complete redacted version of the report

Submit redacted paper to the WPI library and complete eCDR

### **Other Items:**

12/2 is last sponsor meeting before the presentation; 12/1 and 12/8 are the last advisor meetings

## Appendix E: Focus Group Questions / Script

Hello everyone and thank you for attending our focus group. The beginning of this session will be a bit more structured, and then we will open up into a discussion forum.

First, we are going to cover some consent information. We electronically submitted consent forms to you so that you would not feel rushed reading them, and asked you to bring a copy with you to the focus group. If anyone forgot their copy, we brought extras.

Thank you for considering to participate in this study conducted by a group of student researchers at Worcester Polytechnic Institute (WPI). This research looks at technology-based support for Mindfulness-Based Stress Reduction. During this study, you will be asked to answer a number of questions about yourself, the use of mindfulness practices, and your thoughts on technology that might be helpful in supporting it. We are looking to see how effective technologies, such as social media and mobile apps, can be in recruiting and retaining young adults into MBSR training, which has been found to reduce stress and anxiety in adults. Answer the questions as truthfully as you can. This is not a test. Your participation in this study is voluntary and responses will be confidential. Names will not be identified with any comments, when reporting the data in reports. All responses will be kept confidential. Again, responses will not be identified by individual name. All responses will be compiled together, aggregated, and analyzed as a group.

At this time, we will pause and allow anyone to leave who does not wish to consent to participate in this focus group. For those who remain and wish to participate, we are going to collect the signed very last page of the forms for our records now.

Note that participation in this focus group is voluntary. You may leave at any time and need not add input to every discussion. No identifying information will be disclosed with individual responses.

Thank you once again for supporting this study, and you should you have any questions pertaining to this study or your rights as a research participant, I direct you to your signed consent form where detailed contact information may be found.

Lastly, we would like to remind everyone to please respect the privacy of the other participants and avoid discussion of details from this focus group following the completion of this session. Participants may be sensitive about some of the information they volunteer, and thus whatever is discussed in this focus group should stay in this focus group.

---

To start off, we're going to count the number of participants for our records, so don't mind us.  
TOTAL:\_\_\_\_\_

Next, out of curiosity, since our survey, and the flyer promoting the survey, have been our main means of recruiting participants, we are curious as to how many of you have taken the survey.  
Please raise your hand if you have taken the survey.  
TOTAL:\_\_\_\_\_

Now, just to be certain and go through the formalities for our notes, please raise your hand if your age is within the range of 18-34 years old.  
TOTAL:\_\_\_\_\_

We are about to ask a few questions that may be a bit sensitive. **To protect participants' confidentiality, we are going to pass around blank, uniformly shaped pieces of paper, with two questions on them. There are responses to be circled for the first question, and items that can be checked in the second question if you answer yes to the first question. We would like for everyone to write something on this paper so there is no assumption that everyone who is writing has said "yes." As a reminder, your answers will in no way be linked to you in our report, assuming we could even figure out who wrote what; we will handle your data in a manner that will ensure its safety and confidentiality.**

[The paper will read like so:]

Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge? Circle one of the following.

Yes

No

Do not wish to answer

Check off each statement that applies:

- I often feel very down in the dumps and feel overwhelmed by it \_\_\_\_\_
  
- I often feel anxious, and it can even be difficult to breathe \_\_\_\_\_
  
- I often feel very stressed out and I'm not sure I can handle it \_\_\_\_\_
  
- I suffer from chronic pain or a chronic illness \_\_\_\_\_

Okay, we're done with all of that boring scripted stuff now.

**First off, we're curious; why did you guys decide to participate in this focus group?**

**Now for some discussion: what do you guys think of yoga or meditation?**

*GUIDING QUESTIONS (if needed): Have you ever done either?*

*Would you take yoga or meditation for PE credit?*

**Before the survey and the focus group, had any of you heard of mindfulness?**

To recap:

Mindfulness is defined as: a technique in which one focuses one's awareness only on the present moment, experiencing thoughts, feelings, and sensations but not judging them.

In 1979 Jon Kabat-Zinn founded a Stress Reduction program based on mindfulness. Since its founding, over 22,000 people have completed the eight-week program. The goal of the program is to teach people how to use resources that they already possess but may not be in touch with in order to combat pain, stress, and sickness. MBSR is a combination of science, medicine, psychology, and meditative practices. Mindfulness is heavily linked to meditation, as each seeks to refine one's awareness, attention, compassion, and wisdom.

**There are essentially five avenues we have been considering as means for linking mindfulness and technology: Facebook, such as forming mindfulness groups; Twitter, for spreading messages of mindfulness; mobile apps, for meditative exercises, of which there are already some good ones out there; YouTube, for giving a taste of mindfulness and easy access to all sorts of videos on it, ranging from breathing exercises to studies on mindfulness; and last but not least, a virtual living room / chat room for college students.**

**Is there a particular area anyone would like to start with, or shall we proceed down the list?**

*GUIDING QUESTIONS (if needed): what do you mainly use social media for now?*

*What are your thoughts on social media, both in general terms (is it dying off, as popular as ever, etc) and what are your thoughts with it in respect to mindfulness?*

*There are plenty of Facebook groups out there for things like breast cancer awareness and support; could you see something similar for mindfulness, where folks interested in mindfulness get together?*

*Can you see any other way Facebook might be useful in conjunction with mindfulness?*



*Whether on Twitter or Facebook, there are tons of images circulating; could you see this being a good forum for spreading the messages of mindfulness?*

*Can you see any other way Twitter might be useful in conjunction with mindfulness?*

*There is already a pretty neat mindfulness app out there called Insight Timer, which you can also find online at [insighttimer.com](http://insighttimer.com). If you guys are interested, I would definitely look it up - it is a really cool app that even tells you how many other people (complete with a map of the world) are meditating at the moment. Can you guys think of some of the features and benefits you might want in an app?*

*What kinds of mindfulness videos would you like to see on YouTube?*

*Does the idea of a virtual living room, just for college students to discuss daily with peers or mentors, appeal to you guys?*

**Are there any other technologies that you guys think would work really well with mindfulness?**

**In the world of Social Media, do you guys prefer picture/information display via Instagram, Twitter, or Facebook? Please rank these three options in order of preference.**

Raise your hand for....

Instagram: #1\_\_\_\_ #2\_\_\_\_ #3\_\_\_\_

Twitter: #1\_\_\_\_ #2\_\_\_\_ #3\_\_\_\_

Facebook: #1\_\_\_\_ #2\_\_\_\_ #3\_\_\_\_

**What do you think the best approach is for this: pure mindfulness, such as in a live class or workshop; pure technology, such as online breathing exercises you do with no one else, or a hybrid approach that incorporates both mindfulness and technology, such as attending live classes and supplementing the material with technology like the Insight Timer app?**

**Is there anything else that anyone would like to discuss before we conclude this focus group?**

That will conclude our focus group session then. Thank you again for participating in our study. Once more, should you have any questions - be it even so simple as “what was that app you mentioned called again” - you can reach us three via [mbsrteam@wpi.edu](mailto:mbsrteam@wpi.edu). Again, more detailed contact information is available on your consent form, if you want to speak one-on-one to any of us, talk to our project advisor, contact the Institutional Review Board, and so on. Thank you!

## Appendix F: Sample Flyer

### Would you ReTweet this?



Hi there! We're an MQP Team working on pairing technologies with **Mindfulness-Based Stress Reduction (MBSR)**, a program developed to combat pain, stress, and sickness. MBSR combines science, medicine, and psychology, through means such as meditation and yoga. The goal of our MQP is to combine technologies, like social media, with MBSR to aid in the recruitment of young adults; few enroll in MBSR programs.

Have a neat idea for how a technology might work with this? Or do you just think this could make a really cool gym class? Let us know, and your voice will be heard; this MQP aims to pave the way for a grant that will develop the proposed prototypes.

Have a few spare minutes? Lend us a hand by **filling out our survey!** It can be found at

\_\_\_\_\_

For any questions, comments, or concerns, or if you are willing to join a focus group, please send us an email at [mbsrteam@wpi.edu](mailto:mbsrteam@wpi.edu)

## Appendix G: List of Survey Questions

**Disclaimer: Participation in this survey is voluntary.**

**You may close the survey at any time and do not need to answer every question.**

**No identifying information will be disclosed with individual responses.**

**The first few questions are just some basic demographics.**

How old are you?

What college or university do you currently attend / did you attend?

What is/was your college major?

What year of college are you in?

Freshman

Sophomore

Junior

Senior

Recent Grad

Graduate Student

Other (Please Explain) \_\_\_\_\_

**The following questions ask a bit about your experiences in college, and your struggles with mental health. Please only answer questions you feel comfortable with.**

Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge?

Yes

No

I do not wish to answer

Check all that apply:

- I often feel very down in the dumps and feel overwhelmed by it
- I often feel anxious, and it can even be difficult to breathe
- I often feel very stressed out and I'm not sure I can handle it
- I suffer from chronic pain or a chronic illness

How often does [each checked problem] interfere with getting things done?

Always

Sometimes

Never

I do not wish to answer

[\*The survey will be designed that the above question will pop up for each box checked in the "Check all that apply"]

**The next few questions will ask about your experiences and knowledge of a technique called mindfulness.**

Have you ever practiced yoga or meditation?

Yes

No

Have you ever heard of mindfulness?

Mindfulness is defined as: a technique in which one focuses one's awareness only on the present moment, experiencing thoughts, feelings, and sensations but not judging them.

Yes

No

I'm not sure

*Optional Reading on the history of Mindfulness-Based Stress Reduction (MBSR):*

[In 1979 Jon Kabat-Zinn founded a Stress Reduction program based on mindfulness. Since its founding, over 22,000 people have completed the eight-week program. The goal of the program is to teach people how to use resources that they already possess but may not be in touch with in order to combat pain, stress, and sickness. MBSR is a combination of science, medicine, psychology, and meditative practices. Mindfulness is heavily linked to meditation, as each seeks to refine one's awareness, attention, compassion, and wisdom.]

*Optional Video describing mindfulness - snippet of a talk by the founder of MBSR:*

<https://www.youtube.com/watch?v=xoLQ3qkh0w0>

After seeing the above information, do you think mindfulness might be beneficial to you?

Yes

No

**The next few questions will ask you your thoughts on pairings of technology with mindfulness.**

If mindfulness resources, such as guided breathing exercises, were available online, would you use them?

Yes

Probably

Probably not

No

Do you think more young adults would find guided meditative exercises if they were posted on a YouTube channel?

Yes

No

If you had access to a mindfulness application on a personal device such as a Smartphone, iPod, tablet, etc would you download and use it?

Example: an app on your phone with a timer, that at a specified time would alert you that it was time for your daily meditation, and then pulled up a randomly selected pre-recorded meditation tape for you to follow

I would definitely use it

I would probably use it

I would probably not use it

I would definitely not use it

If you had access to live mindfulness courses/workshops/clubs at your school, would you enroll in them?

I would definitely enroll

I would probably enroll

I would probably not enroll

I would definitely not enroll

Which interests you most? Check all that apply

A class on mindfulness that could be taken for physical education credit

A workshop that covers the concepts behind mindfulness in a concise manner

A club dedicated to mindfulness, with a group dynamic and support

Other (Please Explain) \_\_\_\_\_



If there were Facebook groups dedicated to mindfulness, would you want to be a part of these groups, so you could connect with other like-minded people?

I would definitely want to be a part of these groups

I would probably want to be a part of these groups

I would probably not want to be a part of these groups

I would definitely not want to be a part of these groups

If there were a virtual living room / chat room to talk with others about mindfulness, would you visit it?

I would definitely visit it

I would probably visit it

I would probably not visit it

I would definitely not visit it

On a scale of 1 to 4, 1 meaning “very unlikely” and 4 meaning “very likely,” what are the odds you would Retweet something like the following image on Twitter?



- 1: Very unlikely
- 2: Somewhat unlikely
- 3: Somewhat likely
- 4: Very likely

Do you intend to utilize any of the technologies mentioned in this survey in the future? Check all that apply.

I would consider using...

- Online guided exercises (ex. guided breathing exercises on various websites)
- Online resources available on a YouTube channel
- An app that has guided meditations available for your phone
- An app with a timer that would play a randomly selected meditation tape
- The proposed mindfulness Facebook groups
- The proposed Twitter campaign for spreading mindfulness messages and images

Is there any technology other than those mentioned that you think would work well with mindfulness? What would you like to see developed? (Ex. Another phone app that does x)

If mindfulness was more accessible (ex. through a club, class, workshop, new app, etc) would you be interested in trying it moving forward?

Yes

No

Is there anything we did not ask that you feel is important for us to know?

Thank you for your time!

**In case you're interested...**

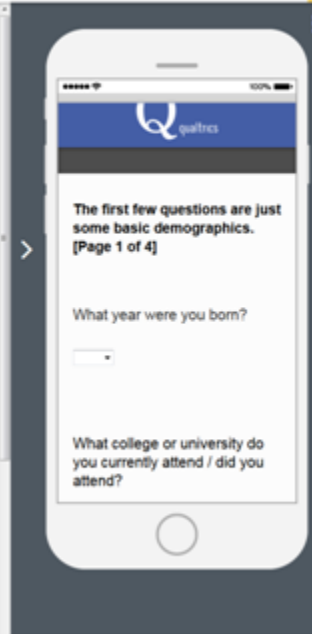
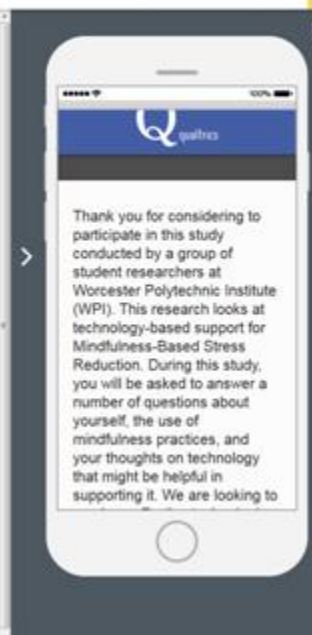
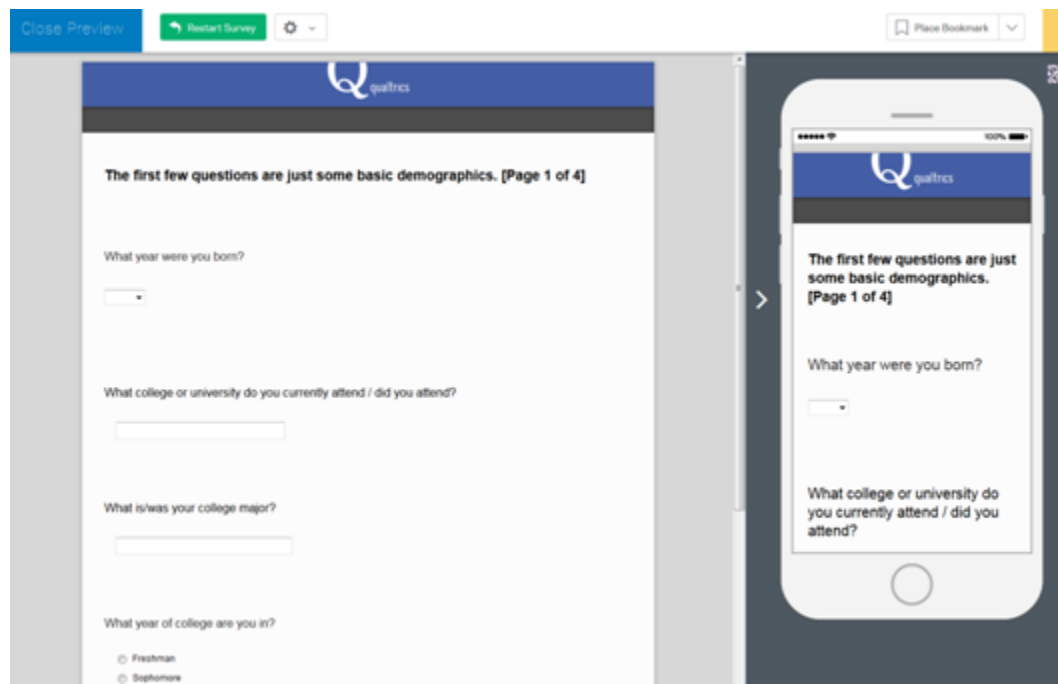
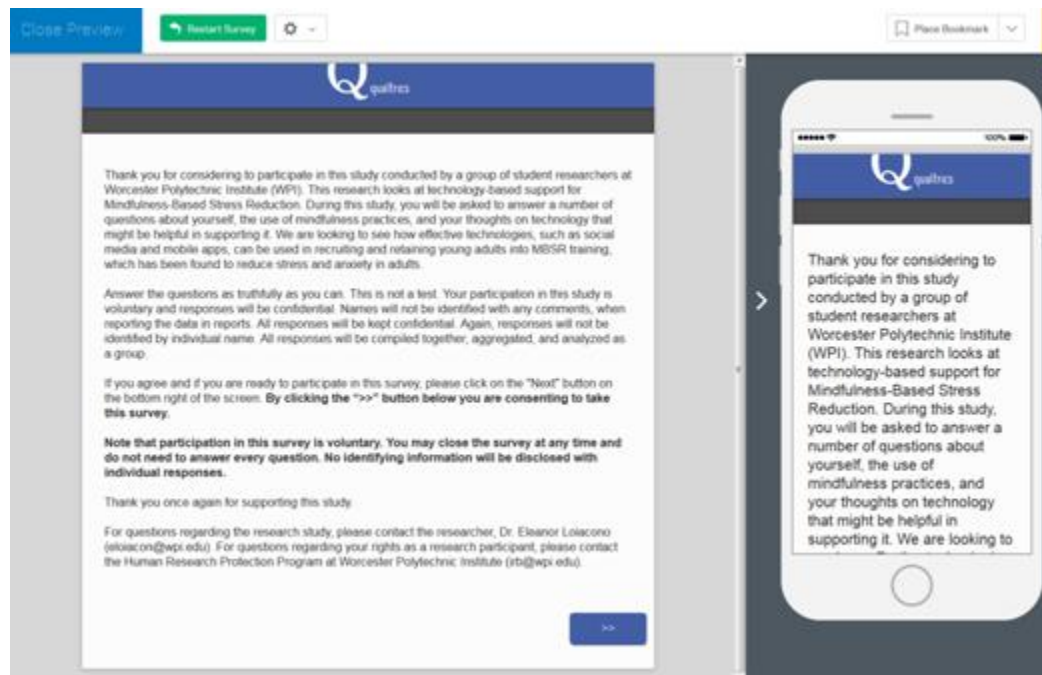
One good website for a taste of mindfulness is: <http://www.tarabrach.com/>

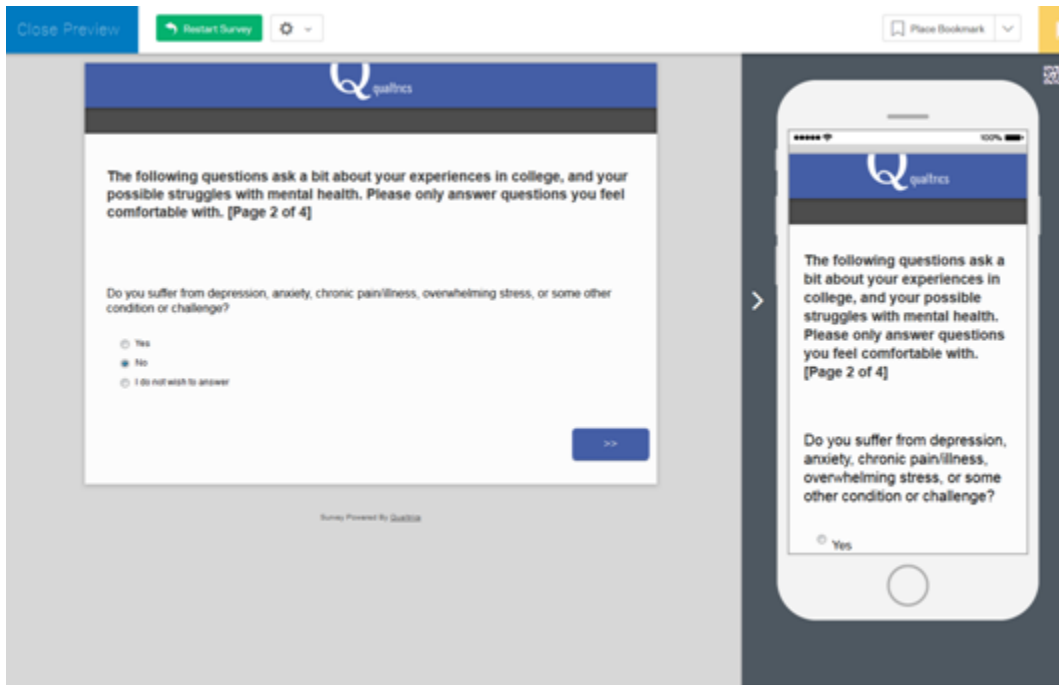
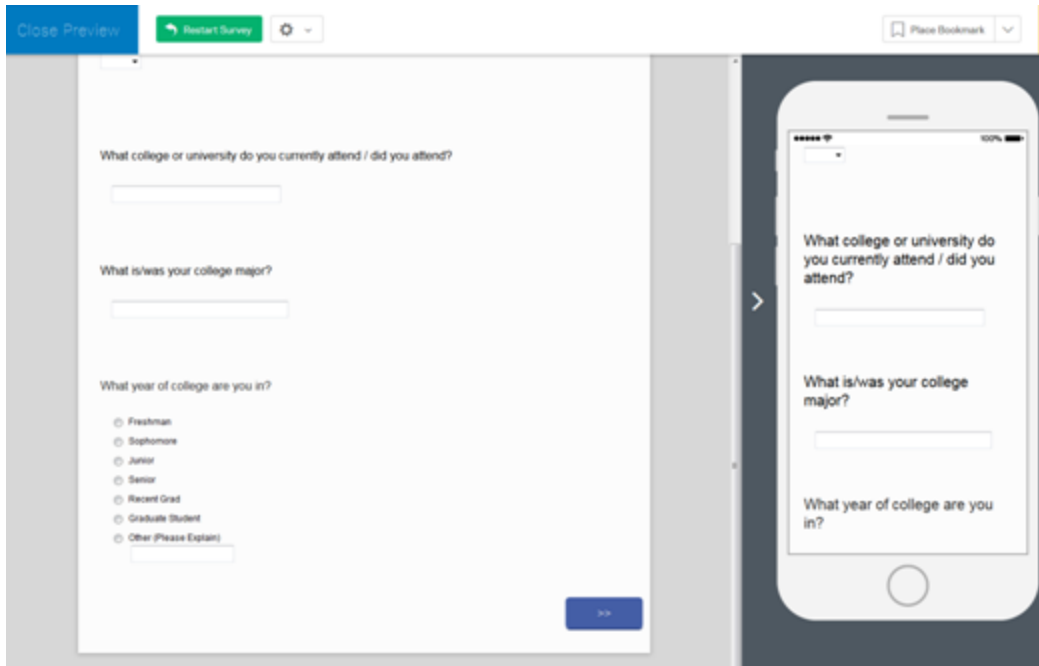
There is also an app for your Smartphone that has guided mindfulness practices: Insight Timer

You can download the app at: <https://insighttimer.com/>

**WPI Students (and others in the Worcester area):** If you are interested in participating in a focus group about how to incorporate mindfulness and technology, please contact us at:  
**[mbsrteam@wpi.edu](mailto:mbsrteam@wpi.edu)**

## Appendix H: Screenshots of Survey Preview





Close Preview Restart Survey Place Bookmark

Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge?

Yes  
 No  
 I do not wish to answer

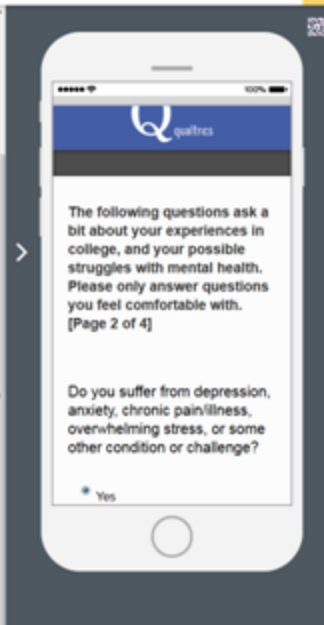
Check all that apply (you are not obligated to answer this question):

I often feel very down in the dumps and feel overwhelmed by it  
 I often feel anxious, and it can even be difficult to breathe  
 I often feel very stressed out and I'm not sure I can handle it  
 I suffer from chronic pain or a chronic illness

How often does depression interfere with getting things done?

Always  
 Sometimes  
 Never  
 I do not wish to answer

Next



Close Preview Restart Survey Place Bookmark

The next few questions will ask about your experiences and knowledge of a technique called mindfulness. [Page 3 of 4]

Have you ever practiced yoga or meditation?

Yes  
 No

Have you ever heard of mindfulness?

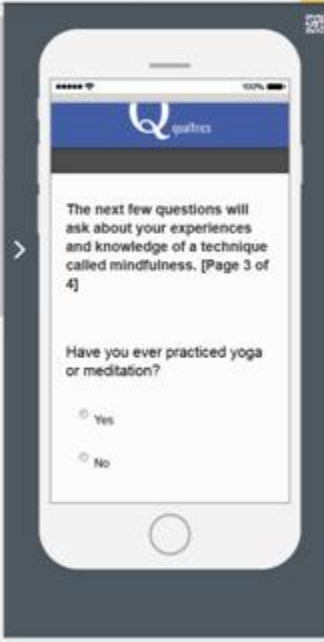
Mindfulness is defined as: a technique in which one focuses one's awareness only on the present moment, experiencing thoughts, feelings, and sensations but not judging them.

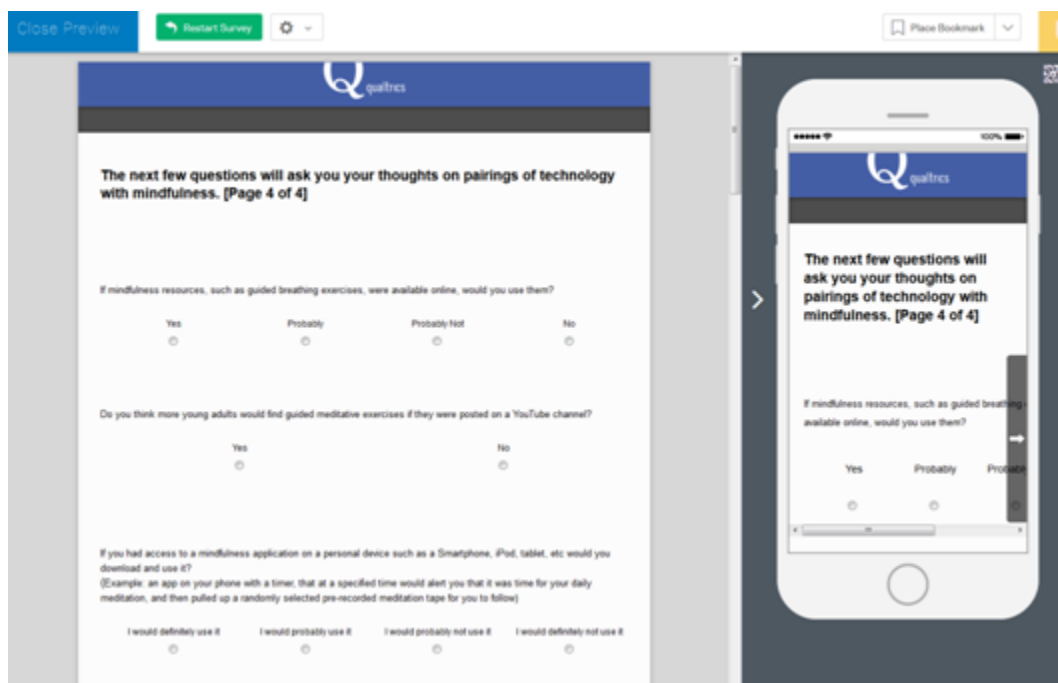
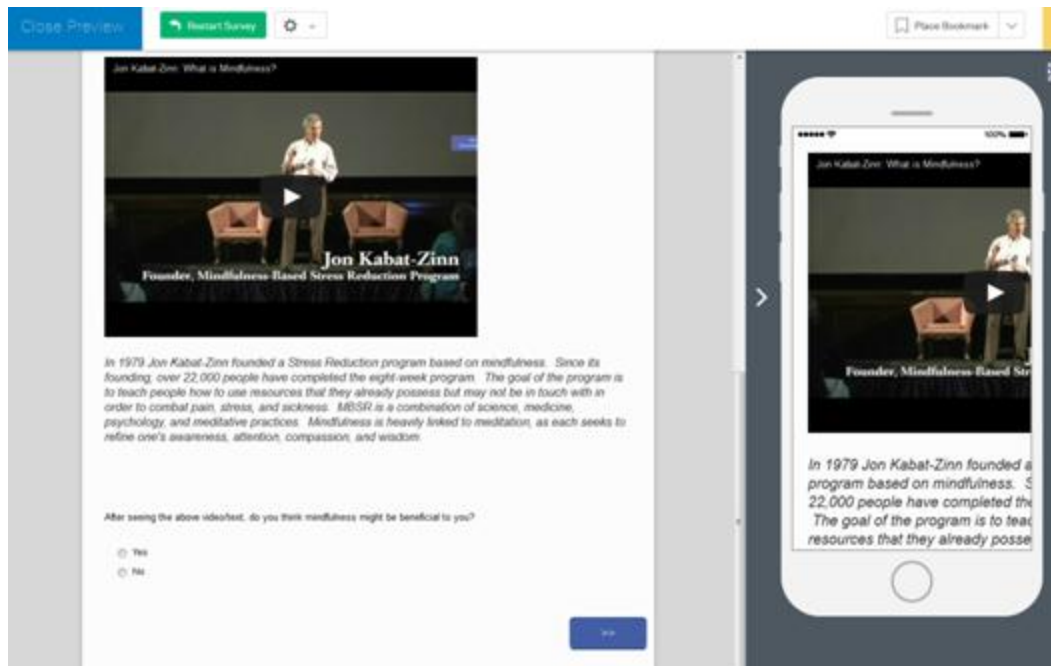
Yes  
 No  
 I'm not sure

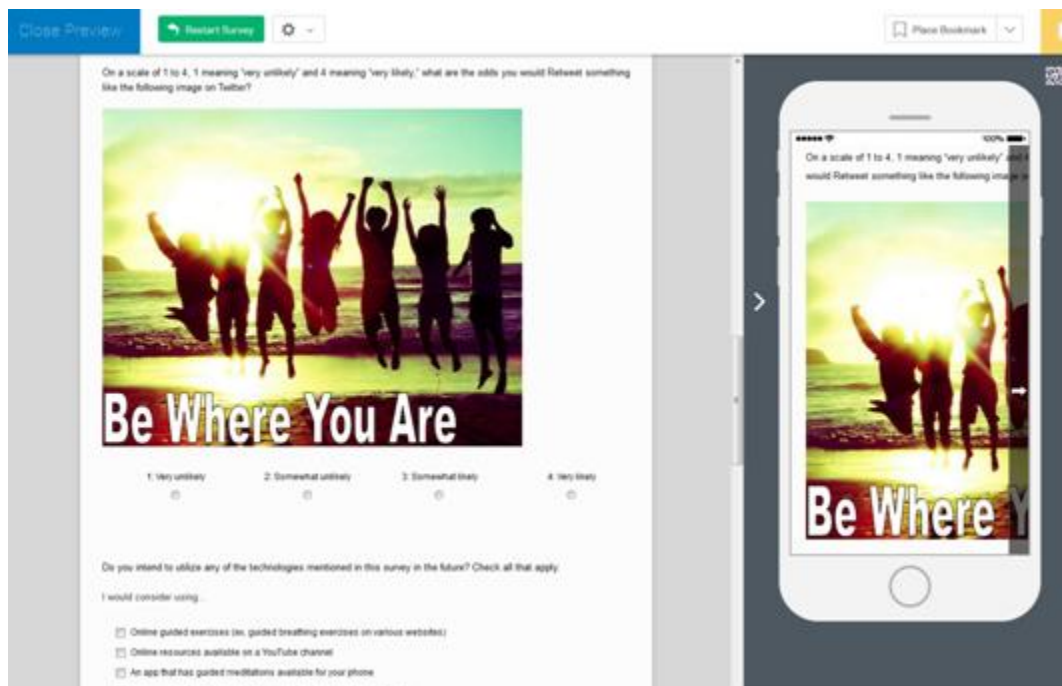
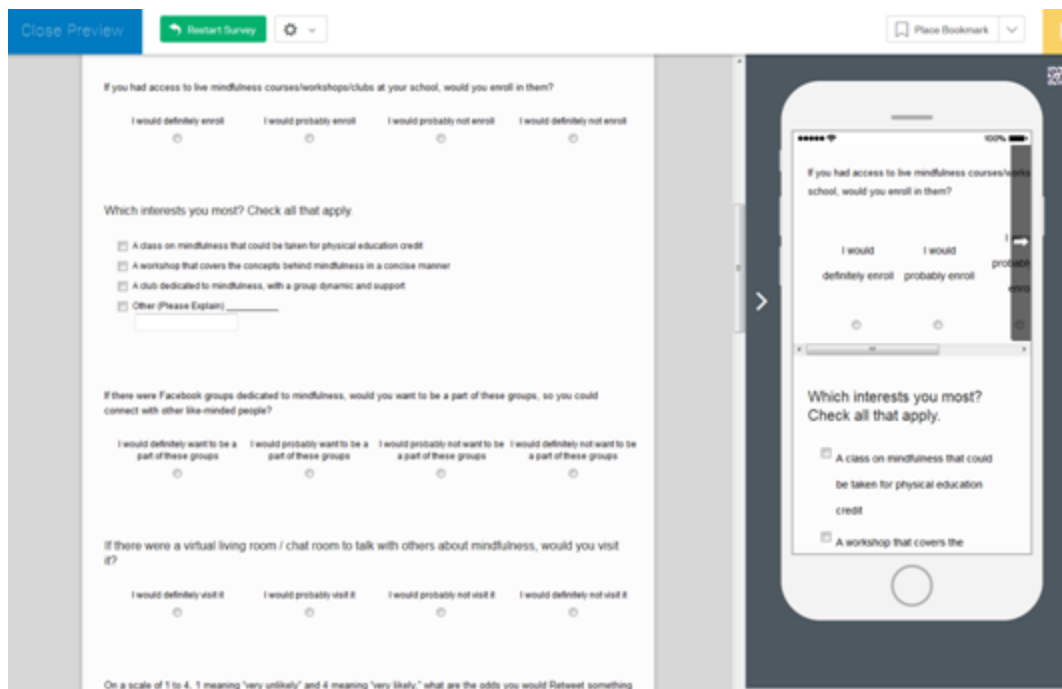
If you are unfamiliar with mindfulness, viewing the following short 2 minute video below may help you understand more about it.

Snippet of a talk by the founder of MBISR:

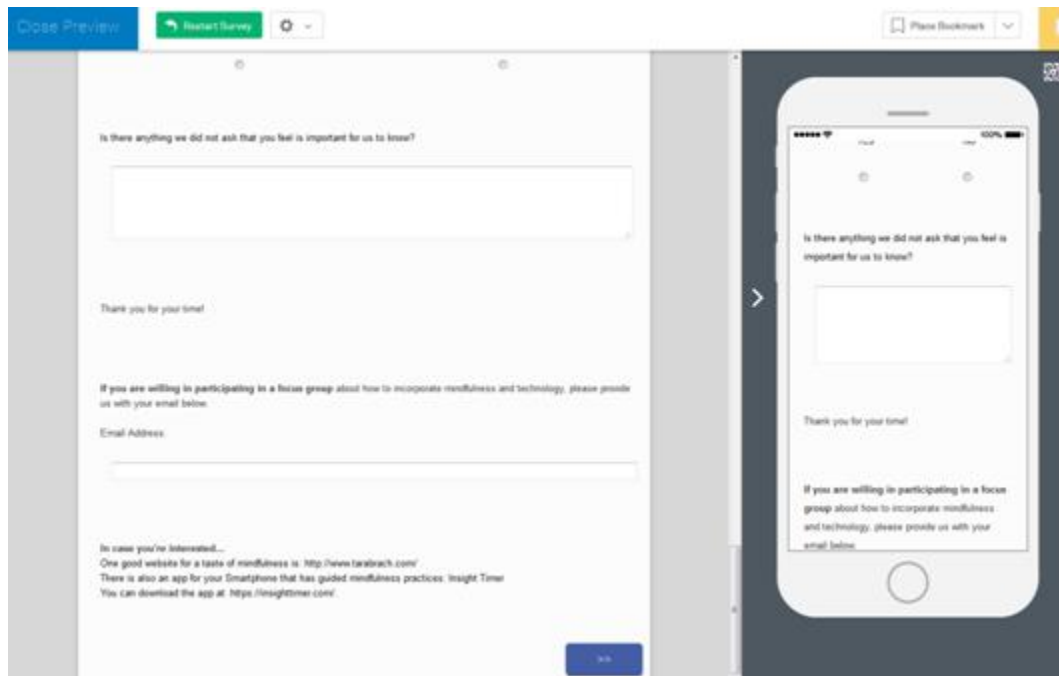
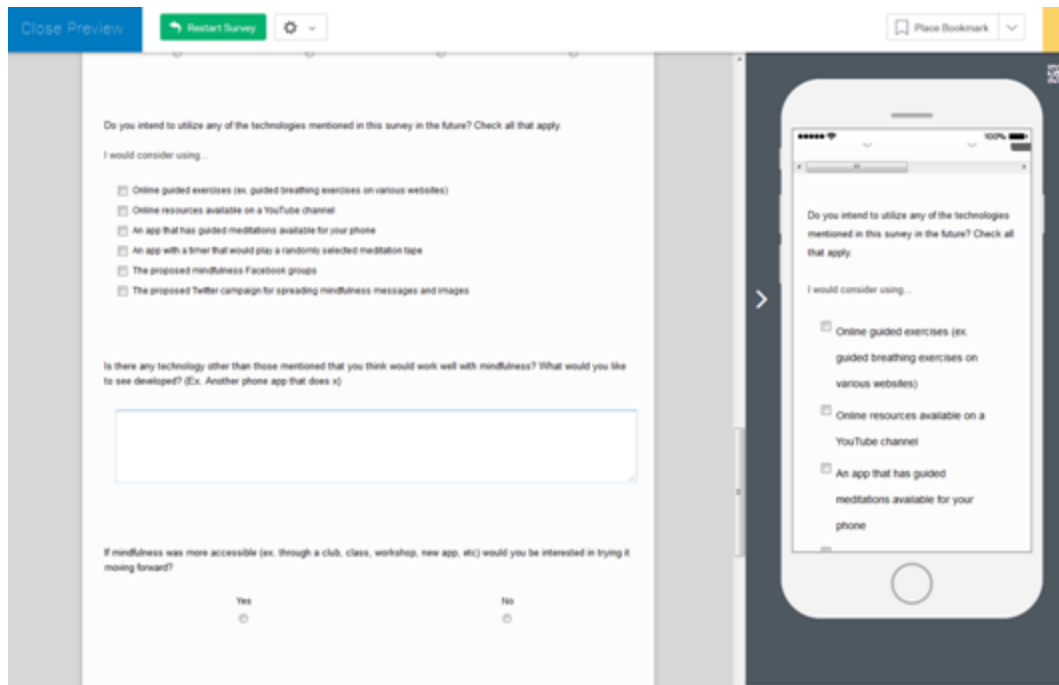
[View Video: Introduction to Mindfulness](#)











## Appendix I: WPI IRB Approval Letter: Survey

### WORCESTER POLYTECHNIC INSTITUTE

Worcester Polytechnic Institute IRB# 1  
HHS IRB # 00007374

29 September 2015  
File:15-177

Re: IRB Application for Exemption #15-177 "MQP ETL-1501: MBSR & College Students"

Dear Prof. Loiacono,

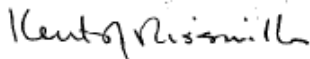
The WPI Institutional Review Committee (IRB) has reviewed the materials submitted in regards to the above mentioned study and has determined that this research is exempt from further IRB review and supervision under 45 CFR 46.101(b): (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

This exemption covers any research and data collected under your protocol from 29 September 2015 until 28 September 2016, unless terminated sooner (in writing) by yourself or the WPI IRB. Amendments or changes to the research that might alter this specific exemption must be submitted to the WPI IRB for review and may require a full IRB application in order for the research to continue.

Please contact the undersigned if you have any questions about the terms of this exemption.

Thank you for your cooperation with the WPI IRB.

Sincerely,




Kent Rissmiller  
WPI IRB Chair

## Appendix J: Sponsor Sign-off

We, the MQP sponsors, accept the work that you, the MBSR MQP team, have done to date on the MBSR & College Students Major Qualifying Project. We agree with where this project is headed with its deliverables, and formally sign off on this project.

Dr. Maryann Davis: Maryann Davis

(print)



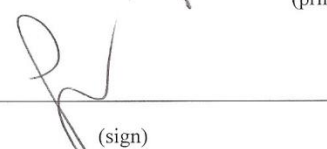
(sign)

10/14/15

(date)

Dr. Carl Fulwiler:  Carl Fulwiler

(print)



(sign)

10/14/15

(date)

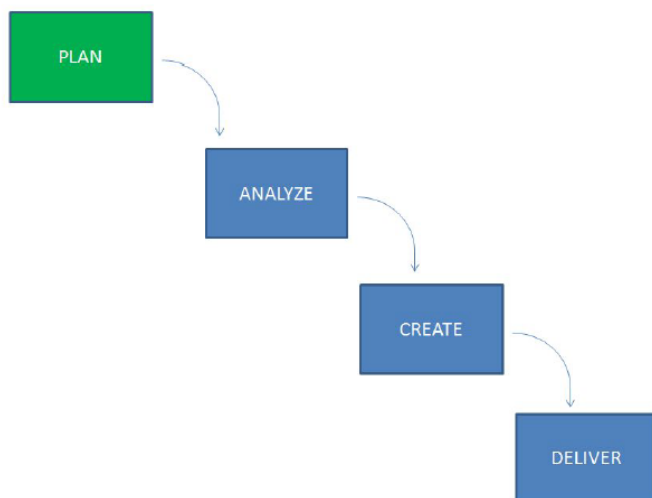
## Appendix K: Proposal Presentation Slides

# MBSR & College Students

Amber Facchini  
Meghan Lutz  
Haili Welton



## 1. Where We Were



## Introduction



H

Identify technologies (particularly social media) that may help with recruitment, adherence, and retention of MBSR among college students

- Reach out via survey, interviews, flyers and social media
  - Survey and flyers also promote a focus group
  - Social media promotes MBSR & survey
- WPI = pilot sample
  - Other schools gaining representation
- Deliverable will be some form of prototype
  - What this prototype might be is still up in the air until the data collection period has ended

## Background / Literature Review



A

- Background section: plethora of relevant material surrounding the project



- Literature Review: what others have done before



# Current Timeline



A

Key		Tentative MBSR MQP Schedule							*Though not explicitly stated, glossary/references/appendices/etc will be added to as needed	
		S	M	T	W	R	F	S		
Sponsor Meeting							27	28	29	Week 1: Setting up (Meetings, File Sharing, etc)
Advisor Meeting										Week 2: Background, Lit Review, Planning, Introduction, Glossary
No WPI Classes		30	31	1	2	3	4	5		Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
Dr. Davis Away		6	7	8	9	10	11	12		Week 4: Methodology, Submit Draft to advisor, File for IRB Approval
*Weeks, no email contact		13	14	15	16	17	18	19		Week 5: Edit draft, Resubmit Proposal to Advisor, Await IRB Approval
Presentation		20	21	22	23	24	25	26		Week 6: Submit to sponsor, Work on Global Impact section, Seek connections (Grapevine, other IRBs, flyers)
		27	28	29	30	1	2	3		Week 7: Data Collection, Write section on the go, Prepare for Presentation
		4	5	6	7	8	9	10		Week 8: Data Collection, Write section on the go, Proposal Presentation
		11	12	13	14	15	16	17		A Term Break: Reserved for catch up / Data Collection
		18	19	20	21	22	23	24		Week 9: Data Collection cont.; Start Data Analysis on 10/28
		25	26	27	28	29	30	31		Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
		1	2	3	4	5	6	7		Week 11: Data Analysis cont.; Submit draft to advisor
		8	9	10	11	12	13	14		Week 12: Complete edits, Resubmit draft to advisor
		15	16	17	18	19	20	21		Week 13: Complete final edits on the paper, Begin poster
		22	23	24	25	26	27	28		Week 14: Complete poster, Submit final draft to sponsor
		29	30	1	2	3	4	5		12/9: Final Presentation - 10AM-12PM
		6	7	8	9	10	11	12		

# Current Timeline: Presentations



A

Key		Tentative MBSR MQP Schedule							*Though not explicitly stated, glossary/references/appendices/etc will be added to as needed	
		S	M	T	W	R	F	S		
Sponsor Meeting							27	28	29	Week 1: Setting up (Meetings, File Sharing, etc)
Advisor Meeting										Week 2: Background, Lit Review, Planning, Introduction, Glossary
No WPI Classes		30	31	1	2	3	4	5		Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
Dr. Davis Away		6	7	8	9	10	11	12		Week 4: Methodology, Submit Draft to advisor, File for IRB Approval
*Weeks, no email contact		13	14	15	16	17	18	19		Week 5: Edit draft, Resubmit Proposal to Advisor, Await IRB Approval
Presentation		20	21	22	23	24	25	26		Week 6: Submit to sponsor, Work on Global Impact section, Seek connections (Grapevine, other IRBs, flyers)
		27	28	29	30	1	2	3		Week 7: Data Collection, Write section on the go, Prepare for Presentation
		4	5	6	7	8	9	10		Week 8: Data Collection, Write section on the go, Proposal Presentation
		11	12	13	14	15	16	17		A Term Break: Reserved for catch up / Data Collection
		18	19	20	21	22	23	24		Week 9: Data Collection cont.; Start Data Analysis on 10/28
		25	26	27	28	29	30	31		Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
		1	2	3	4	5	6	7		Week 11: Data Analysis cont.; Submit draft to advisor
		8	9	10	11	12	13	14		Week 12: Complete edits, Resubmit draft to advisor
		15	16	17	18	19	20	21		Week 13: Complete final edits on the paper, Begin poster
		22	23	24	25	26	27	28		Week 14: Complete poster, Submit final draft to sponsor
		29	30	1	2	3	4	5		12/9: Final Presentation - 10AM-12PM
		6	7	8	9	10	11	12		

# Current Timeline: Completed



A

Tentative MBSR MQP Schedule							
Key	S	M	T	W	R	F	S
Sponsor Meeting						27	28
Advisor Meeting							
No WPI Classes	30	31	1	2	3	4	5
Dr. Davis Away	6	7	8	9	10	11	12
*Week5, no email contact	13	14	15	16	17	18	19
Presentation	20	21	22	23	24	25	26
	27	28	29	30	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	1	2	3	4	5
	6	7	8	9	10	11	12

\*Though not explicitly stated, glossary/references/appendices/etc will be added to as needed

- Week 1: Setting up (Meetings, File Sharing, etc)
- Week 2: Background, Lit Review, Planning, Introduction, Glossary
- Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
- Week 4: Methodology, Submit Draft to advisor, File for IRB Approval
- Week 5: Edit draft, Resubmit Proposal to Advisor, Await IRB Approval
- Week 6: Submit to sponsor, Work on Global Impact section, Seek connections (Grapevine, other IRBs, flyers)
- Week 7: Data Collection, Write section on the go, Prepare for Presentation
- Week 8: Data Collection, Write section on the go, Proposal Presentation
- A Term Break: Reserved for catch up / Data Collection
- Week 9: Data Collection cont.; Start Data Analysis on 10/28
- Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
- Week 11: Data Analysis cont.; Submit draft to advisor
- Week 12: Complete edits, Resubmit draft to advisor
- Week 13: Complete final edits on the paper, Begin poster
- Week 14: Complete poster, Submit final draft to sponsor
- 12/9: Final Presentation - 10AM-12PM

# Current Timeline: Remaining



A

Tentative MBSR MQP Schedule							
Key	S	M	T	W	R	F	S
Sponsor Meeting						27	28
Advisor Meeting							
No WPI Classes	30	31	1	2	3	4	5
Dr. Davis Away	6	7	8	9	10	11	12
*Week5, no email contact	13	14	15	16	17	18	19
Presentation	20	21	22	23	24	25	26
	27	28	29	30	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	1	2	3	4	5
	6	7	8	9	10	11	12

\*Though not explicitly stated, glossary/references/appendices/etc will be added to as needed

- Week 1: Setting up (Meetings, File Sharing, etc)
- Week 2: Background, Lit Review, Planning, Introduction, Glossary
- Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
- Week 4: Methodology, Submit Draft to advisor, File for IRB Approval
- Week 5: Edit draft, Resubmit Proposal to Advisor, Await IRB Approval
- Week 6: Submit to sponsor, Work on Global Impact section, Seek connections (Grapevine, other IRBs, flyers)
- Week 7: Data Collection, Write section on the go, Prepare for Presentation
- Week 8: Data Collection, Write section on the go, Proposal Presentation
- A Term Break: Reserved for catch up / Data Collection
- Week 9: Data Collection cont.; Start Data Analysis on 10/28
- Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
- Week 11: Data Analysis cont.; Submit draft to advisor
- Week 12: Complete edits, Resubmit draft to advisor
- Week 13: Complete final edits on the paper, Begin poster
- Week 14: Complete poster, Submit final draft to sponsor
- 12/9: Final Presentation - 10AM-12PM

# Current Timeline: Data Collection



A

Tentative MBSR MQP Schedule									
Key	S	M	T	W	R	F	S		
Sponsor Meeting								29	Week 1: Setting up (Meetings, File Sharing, etc)
Advisor Meeting								5	Week 2: Background, Lit Review, Planning, Introduction, Glossary
No WPI Classes	30	31	1	2	3	4	5	12	Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
Dr. Davis Away	6	7	8	9	10	11	12	19	Week 4: Methodology, Submit Draft to advisor, File for IRB Approval
*Weeks, no email contact	13	14	15	16	17	18	19	26	Week 5: Edit draft, Resubmit Proposal to Advisor, Await IRB Approval
Presentation	20	21	22	23	24	25	26	3	Week 6: Submit to sponsor, Work on Global Impact section, Seek connections (Grapevine, other IRBs, flyers)
	27	28	29	30	1	2	3	10	Week 7: Data Collection, Write section on the go, Prepare for Presentation
	4	5	6	7	8	9	10	17	Week 8: Data Collection, Write section on the go, Proposal Presentation
	11	12	13	14	15	16	17	24	A Term Break: Reserved for catch up / Data Collection
	18	19	20	21	22	23	24	31	Week 9: Data Collection cont.; Start Data Analysis on 10/28
	25	26	27	28	29	30	31	7	Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
	1	2	3	4	5	6	7	14	Week 11: Data Analysis cont.; Submit draft to advisor
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	22	23	24	25	26	27	28	5	Week 14: Complete poster, Submit final draft to sponsor
	29	30	1	2	3	4	5	12/9	12/9: Final Presentation - 10AM-12PM
	6	7	8	9	10	11	12		

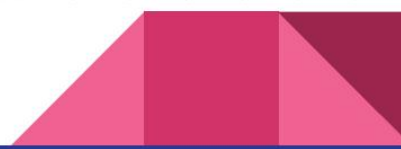


# Current Timeline: Data Analysis



A

Tentative MBSR MQP Schedule									
Key	S	M	T	W	R	F	S		
Sponsor Meeting								29	Week 1: Setting up (Meetings, File Sharing, etc)
Advisor Meeting								5	Week 2: Background, Lit Review, Planning, Introduction, Glossary
No WPI Classes	30	31	1	2	3	4	5	12	Week 3: Background, Lit Review cont.; First sponsor meeting (scope)
Dr. Davis Away	6	7	8	9	10	11	12	19	Week 4: Methodology, Submit Draft to advisor, File for IRB Approval
*Weeks, no email contact	13	14	15	16	17	18	19	26	Week 5: Edit draft, Resubmit Proposal to Advisor, Await IRB Approval
Presentation	20	21	22	23	24	25	26	3	Week 6: Submit to sponsor, Work on Global Impact section, Seek connections (Grapevine, other IRBs, flyers)
	27	28	29	30	1	2	3	10	Week 7: Data Collection, Write section on the go, Prepare for Presentation
	4	5	6	7	8	9	10	17	Week 8: Data Collection, Write section on the go, Proposal Presentation
	11	12	13	14	15	16	17	24	A Term Break: Reserved for catch up / Data Collection
	18	19	20	21	22	23	24	31	Week 9: Data Collection cont.; Start Data Analysis on 10/28
	25	26	27	28	29	30	31	7	Week 10: Data Analysis; Write Results and Analysis, Write Conclusion
	1	2	3	4	5	6	7	14	Week 11: Data Analysis cont.; Submit draft to advisor
	8	9	10	11	12	13	14	21	Week 12: Complete edits, Resubmit draft to advisor
	15	16	17	18	19	20	21	28	Week 13: Complete final edits on the paper, Begin poster
	22	23	24	25	26	27	28	5	Week 14: Complete poster, Submit final draft to sponsor
	29	30	1	2	3	4	5	12/9	12/9: Final Presentation - 10AM-12PM
	6	7	8	9	10	11	12		

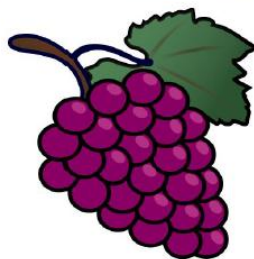
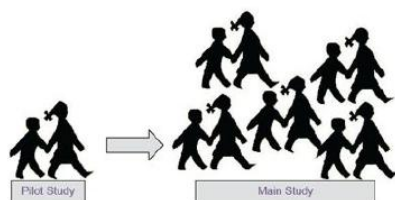




# Initial Thoughts and Supporting Research



# Initial Thoughts: Approach



## Selected Approach: Web Survey



A

## Selected Approach: Instructor Interviews

- Special case: ████████
  - MBCT instructor whose 2 young adult daughters took MBSR classes 2 years ago



Center for Mindfulness  
in Medicine, Health Care, and Society



M

## Selected Approach: Social Media Campaign

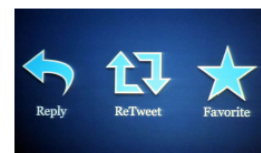


H

Most pertinent to MBSR:

- Facebook: Mindfulness-based Stress Reduction (MBSR) & College Students

- Twitter: @mbsr\_wpi15



- Instagram: @doyoumindful



## Selected Approach: cfmHOME



H

*For young adults looking to meet other young adults interested in MBSR; join a community of peers for support, guided meditations, and links to various mindfulness platforms.*

**Mindfulness. Connection. Resources.**

Come HOME to a dedicated mindfulness community.

[Learn More](#)

[Join Us Now](#)

The College Room



## Selected Approach: Social Media Campaign

Dropped Channel:



H

## Selected Approach: Focus Groups



I  
R  
B



M

# “Project Grapevine”

**Facchini**  
September 30 at 12:31pm · Auburn, MA · 🌐

Friends & Family - My daughter Amber is looking for young adults/volunteers who are currently college students to take a survey. If you could forward this to anyone that you think would help out, that would be awesome!!!! Takes but a few minutes. thanks!!!! Her request is below:  
Hello, we're a team of students from Worcester Polytechnic Institute (WPI) working on a project to find ways in which mindfulness ("living in the present moment" is the briefest way to define it)... See More

wpi.qualtrics.com  
WPI.QUALTRICS.COM

Like Comment Share

Hello, we're a team of students from Worcester Polytechnic Institute (WPI) working on a project to find ways in which mindfulness ("living in the present moment" is the briefest way to define it)... See More

wpi.qualtrics.com  
WPI.QUALTRICS.COM

Like Comment Share

and like this

3 shares

View 3 more comments

can you help Amber  
Like · Reply · September 30 at 3:30pm

I sent it to one of my students at Johnson & Wales and to my niece at U Minnesota and asked both to send to their college friends.  
Like · Reply · September 30 at 4:54pm · Edited

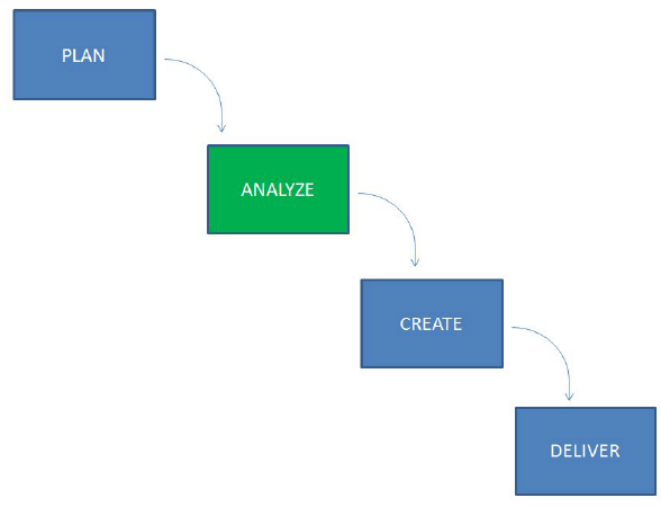
Facchini Thanks !!! You rock  
Like · Reply · September 30 at 7:55pm  
View more replies

I'll send to my students and colleagues  
Like · Reply · Yesterday at 7:28am  
View previous replies

Facchini What a great and supportive group of friends I have!!!! Thanks!!  
Like · Reply · 1 · Yesterday at 8:48am  
View more replies

I shared it with the crew at Keene State!  
Unlike · Reply · 1 · Yesterday at 8:50am

## 2. Where We Are



## Data Collection: Survey Progress



As of 8PM on Thursday 10/8:

- Number of respondents: 93 surveys started, 69 surveys completed
- Number of respondents with disclosed conditions: 30/80



Salt Lake  
Community  
College



Framingham  
State University



ELON  
UNIVERSITY



WORCESTER  
STATE  
UNIVERSITY



BECKER  
COLLEGE



KEENE STATE

## Data Collection: Survey Open Responses



Is there any technology other than those mentioned that you think would work well with mindfulness? What would you like to see developed? (Ex. Another phone app that does x)

### Text Response

[View](#) Mindfulness Instagram page to follow

[View](#) I think everything looks good!!!

[View](#) I think that a class at school for middle school students would be effective. Specifically Forrest Grove middle school. But helping college students online or on campus for credits would work.

[View](#) Maybe finding videos on Netflix or something for people to watch.

[View](#) a phone app that had multiple ways to practice mindfulness rather than just meditation

[View](#) Radio commercials could be kinda cool like on pandora.

[View](#) Smartwatches

[View](#) There could be exercises on Netflix

## Data Collection: Interview Progress

October 2015							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 1					1	2	3
					Sent Interview Questions to █████ Daughters Ages 17 and 21		
Week 2	4	5	6	7	8	9	10
		Interviewed with █████ MBSR Instructor Umass Medical	Interviewed with SDCC Mindfulness Group WPI	Interviewed with █████ and █████ MBSR Instructors Umass Medical			

## Data Collection: Social Media Progress

As of 12PM on Tuesday 10/13:



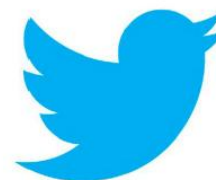
Facebook

- 25 members



Instagram

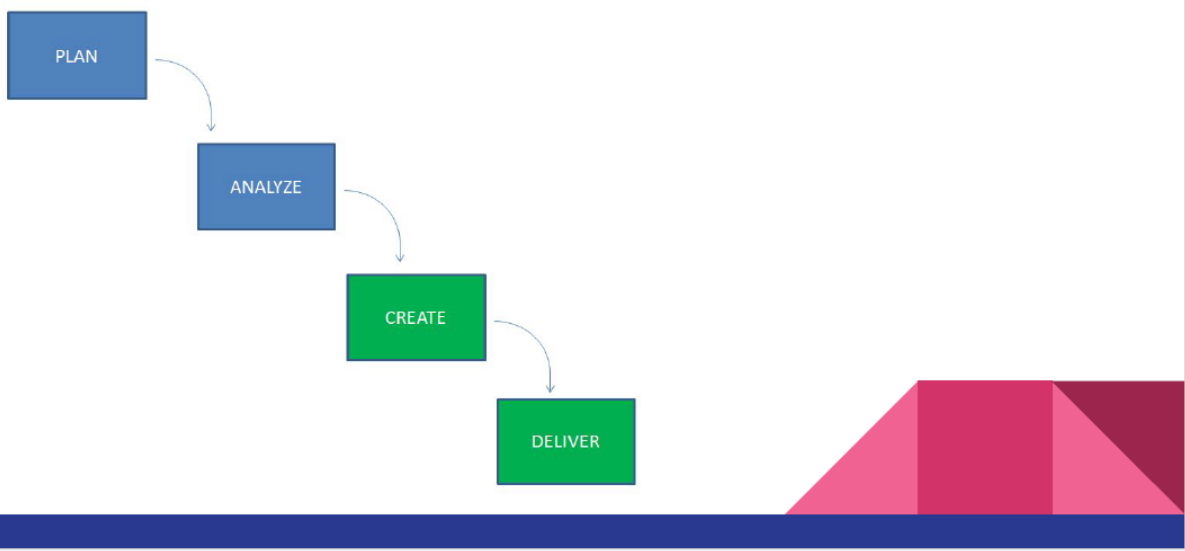
- 34 followers
- 9 posts



Twitter

- 20 followers
- 11 tweets

### 3. Where We're Going



## Data Collection: Focus Group



If you are willing in participating in a focus group about how to incorporate mindfulness and technology, please provide us with your email below.

Email Address:

To:   
 Cc: [mbsrteam@wpi.edu](mailto:mbsrteam@wpi.edu)

Thursday, October 08, 2015 9:09 AM

Good Morning,

Recently you filled out our survey on mindfulness and technology and left your email address, indicating that you would be willing to participate in a focus group. We're starting to make a schedule for when this focus group might occur (currently we think it would be near the start of B term, such as the week of 10/28).

Are you still willing to participate in a focus group? We believe it will run no longer than an hour (and anyone can leave at any time). If you have any questions/comments/concerns, let us know!

- ❖ **Tentative date for focus group session:  
Week of 10/28**
- Assuming IRB approval

Thanks,  
 -Amber Facchini (on behalf of the MBSR MQP Team)

Statistic	Value
Total Responses	10



## Deliverable: Recommendations

Oct. 8

#	Answer	
1	I would definitely use it	
3	I would probably use it	
4	I would probably not use it	
5	I would definitely not use it	

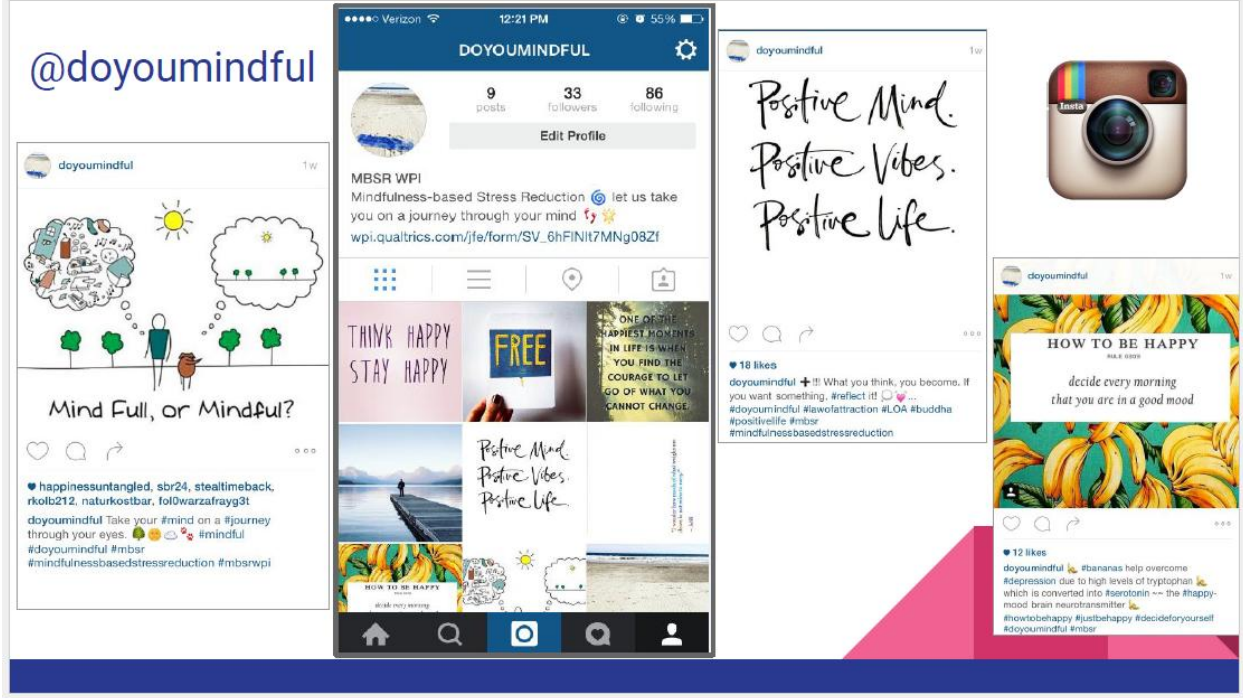
  

#	Answer	
1	I would definitely enroll	
2	I would definitely not enroll	
3	I would probably enroll	
4	I would probably not enroll	

- If applicable, the team will create mockups for how a new app might look

## Deliverable: Instagram Account

- Early survey respondent suggested an Instagram page
- The team created @doyoumindful, to use as a comparison to the Twitter account
- At the end of this project, the team intends to turn the account over to the CFM
- This may be a good means of promoting programs at the CFM to a wider audience



## Deliverable: What it Might Be



- Exercises
- Mindfulness Timer
- "About"
- Events (CFM)
- Current Events



# What We Need



Data Collection is Scheduled to End: 10/28

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31					

I  
R  
B



cfmHOME



# Any Other Questions?

H

Thank you!



## Appendix L: Qualtrics Report on the Survey Data, Before Cleaning Data

### My Report

Last Modified: 10/29/2015

#### 1. What year were you born?

#	Answer	Bar	Response	%
1	1900		0	0%
2	1901		0	0%
3	1902		0	0%
4	1903		0	0%
5	1904		0	0%
6	1905		0	0%
7	1906		1	1%
8	1907		0	0%
9	1908		0	0%
10	1909		0	0%
11	1910		0	0%
12	1911		0	0%
13	1912		0	0%
14	1913		0	0%
15	1914		0	0%
16	1915		0	0%
17	1916		0	0%
18	1917		0	0%
19	1918		0	0%
20	1919		0	0%
21	1920		0	0%
22	1921		0	0%
23	1922		0	0%
24	1923		0	0%
25	1924		0	0%
26	1925		0	0%
27	1926		0	0%
28	1927		0	0%
29	1928		0	0%
30	1929		0	0%
31	1930		0	0%
32	1931		0	0%
33	1932		0	0%
34	1933		0	0%
35	1934		0	0%
36	1935		0	0%
37	1936		0	0%
38	1937		0	0%
39	1938		0	0%
40	1939		0	0%
41	1940		0	0%
42	1941		0	0%
43	1942		0	0%
44	1943		0	0%
45	1944		0	0%
46	1945		0	0%
47	1946		0	0%
48	1947		0	0%

49	1948		0	0%
50	1949		0	0%
51	1950		0	0%
52	1951		0	0%
53	1952		0	0%
54	1953		0	0%
55	1954		0	0%
56	1955		0	0%
57	1956		0	0%
58	1957		0	0%
59	1958		0	0%
60	1959		0	0%
61	1960		1	1%
62	1961		0	0%
63	1962		0	0%
64	1963		0	0%
65	1964		0	0%
66	1965		0	0%
67	1966		0	0%
68	1967		0	0%
69	1968		0	0%
70	1969		1	1%
71	1970		0	0%
72	1971		0	0%
73	1972		0	0%
74	1973		0	0%
75	1974		0	0%
76	1975		0	0%
77	1976		0	0%
78	1977		0	0%
79	1978		0	0%
80	1979		1	1%
81	1980		0	0%
82	1981		1	1%
83	1982		0	0%
84	1983		0	0%
85	1984		0	0%
86	1985		1	1%
87	1986		0	0%
88	1987		0	0%
89	1988		0	0%
90	1989		2	2%
91	1990		3	3%
92	1991		2	2%
93	1992		4	4%
94	1993		11	10%
95	1994		11	10%
96	1995		11	10%
97	1996		26	24%
98	1997		33	30%
99	1998		0	0%
100	1999		0	0%
101	2000		0	0%
102	2001		0	0%
103	2002		0	0%

104	2003		0	0%
105	2004		0	0%
106	2005		0	0%
107	2006		0	0%
	Total		109	

Statistic	Value
Min Value	7
Max Value	98
Mean	94.37
Variance	97.33
Standard Deviation	9.87
Total Responses	109

## 2. What college or university do you currently attend / did you attend?

Text Response
Worcester Polytechnic Institute
Salt Lake Community College
University of Rhode Island
North Dakota State University
WPI
WPI
WPI
Worcester Polytechnic Institute
WPI
Becker College
University of Minnesota Duluth
Framingham state university
Johnson & Wales University
Keene State College
Worcester state university
Keene state college
Worcester Polytechnic Institute
Worcester State University
Umass Amherst
Worcester State University
Worcester Polytechnic Institute
Worcester Polytechnic Institute
Worcester State University
Worcester Polytechnic Institute
WPI
WPI
WPI
wsu
wpi
Worcester Polytechnic Institute
Worcester Polytechnic Institute
WPI
Worcester state university
WPI
gap year student...
WPI
Northeastern University
Worcester State University
Wpi
WPI
WPI
Worcester Polytechnic Institute
WPI
Worcester polytechnic institute
WPI
WPI
WPI
University of Rochester/Nazareth College
WPI
Worcester State University
Worcester Polytechnic Institute
Worcester Polytechnic Institute

Worcester Polytechnic Institute
Worcester Polytechnic Institute
worcester polytechnic institute
William & mary
wsu
WPI
Elon University
Wright State
Wright State University
Wright State University
Wright State University
Wright State University
Wright State University
Wright State University
Wright State University
Wright State University
Wright State University
Wright State University
keene state college
Keene State College
Worcester Polytechnic Institute
Worcester State University
WPI
WPI
Worcester State
Worcester Polytechnic Institute
Worcester Polytechnic Institute
Worcester Polytechnic Institute
WPI
Salem State University
worcester state university
WPI
Worcester state
Worcester State University
Fucj you
Worcester state university
Ithaca College
Worcester Polytechnic Institute
WPI
WPI
Tufts
Oberlin College
Assumption College
UMass Amherst
Curry College, Emerson College
Assumption
Tufts University
Tufts University
Assumption / Simmons

**This table has more than 100 rows. [Click here to view all responses.](#)**

Statistic	Value
Total Responses	109










## 3. What is/was your college major?

Text Response
Management Information Systems
Japanese
Kinesiology
Computer Science
mechanical engineering
Mechanical engineering
Management
Management
Mechanical Engineering
Business Management
Anthropology
Buisness
Engineering
Elementary Education
Business administration
environmental science
Management Engineering
Computer Science
Management Natural Resource Conservation
Nursing but probably changing to Health Education
Biochemistry
Aerospace Engineering
Biology
Chemical Engineering
Robotics Engineering
RBE
Chemical Engineering
elementary ed and psych
geek ed
Biology & Biotechnology
Chemical Engineering
Mechanical Engineering
Communications
Biology and biotechnology
Nursing
Physics
Business administration
Early Childhood Education
Management engineering
Masters of Science Management
Civil engineering
Biomedical Engineering
Management Engineering
biomedical engineering
Management Engineering
Biology Biotechnology
Mechanical Eng.
Psychology
Electrical and Computer Engineering
Business
Engineering undecided
Biology

Mechanical Engineering	
Physics	
management engineering	
Accounting	
Bio/Environmental science	
Biochemistry	
Psychology/Latin American Studies	
Motion Pictures	
Geography	
Materials Science and Engineering	
Electrical Engineering	
Electrical Engineering	
College of Business	
Athletic Training	
Physical Therapy	
Marketing	
Business- Marketing, Management	
elementary education	
Secondary Education and Mathematics	
Management Engineering	
Business Administration	
CS	
Aerospace Engineering	
Early childhood education	
Biomedical Engineering	
Chemical engineering	
Mechanical Engineering	
Computer Science	
Accounting	
nursing	
Physics	
Undeclared	
Health Education	
None if yah damn bisness	
Communication Disorders	
Clinical Health Studies	
Biomedical Engineering	
Business	
ECE	
Child Development	
Psychology	
Psychology	
Environmental Science	
Communication	
English literature	
Psychology	
Cognitive and Brain Sciences, Philosophy	
Human Services / Masters in severe special education	
<b>This table has more than 100 rows. <a href="#">Click here to view all responses.</a></b>	
Statistic	Value
Total Responses	109

## 4. What year of college are you in?

#	Answer	Bar	Response	%
1	Freshman		50	46%
2	Sophomore		16	15%
3	Junior		12	11%
4	Senior		9	8%
5	Recent Grad		8	7%
6	Graduate Student		5	5%
7	Other (Please Explain)		9	8%
	Total		109	

## Other (Please Explain)

Fourth year of classes but finishing generals

Accelerated Program

super senior

Gap year

Way out of school/Work at WPI

finished




No.

postdoc

graduated Ph.D.

Statistic	Value
Min Value	1
Max Value	7
Mean	2.63
Variance	3.99
Standard Deviation	2.00
Total Responses	109

## 5. Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge?

#	Answer	Bar	Response	%
1	Yes		46	43%
2	No		57	54%
3	I do not wish to answer		3	3%
	Total		106	

Statistic	Value
Min Value	1
Max Value	3
Mean	1.59
Variance	0.30
Standard Deviation	0.55
Total Responses	106

6. Check all that apply (you are not obligated to answer this question):

#	Answer	Bar	Response	%
1	I often feel very down in the dumps and feel overwhelmed by it		27	63%
2	I often feel anxious, and it can even be difficult to breathe		24	56%
3	I often feel very stressed out and I'm not sure I can handle it		29	67%
4	I suffer from chronic pain or a chronic illness		6	14%

Statistic	Value
Min Value	1
Max Value	4
Total Responses	43

7. How often does depression interfere with getting things done?

#	Answer	Bar	Response	%
1	Always		4	15%
2	Sometimes		21	78%
3	Never		2	7%
4	I do not wish to answer		0	0%
	Total		27	

Statistic	Value
Min Value	1
Max Value	3
Mean	1.93
Variance	0.23
Standard Deviation	0.47
Total Responses	27

8. How often does anxiety interfere with getting things done?

#	Answer	Bar	Response	%
1	Always		2	8%
2	Sometimes		21	88%
3	Never		1	4%
4	I do not wish to answer		0	0%
	Total		24	

Statistic	Value
Min Value	1
Max Value	3
Mean	1.96
Variance	0.13
Standard Deviation	0.36
Total Responses	24

## 9. How often does overwhelming stress interfere with getting things done?

#	Answer	Bar	Response	%
1	Always		7	24%
2	Sometimes		21	72%
3	Never		1	3%
4	I do not wish to answer		0	0%
	Total		29	

Statistic	Value
Min Value	1
Max Value	3
Mean	1.79
Variance	0.24
Standard Deviation	0.49
Total Responses	29

## 10. How often does chronic pain/illness interfere with getting things done?

#	Answer	Bar	Response	%
1	Always		3	50%
2	Sometimes		3	50%
3	Never		0	0%
4	I do not wish to answer		0	0%
	Total		6	

Statistic	Value
Min Value	1
Max Value	2
Mean	1.50
Variance	0.30
Standard Deviation	0.55
Total Responses	6

## 11. Have you ever practiced yoga or meditation?

#	Answer	Bar	Response	%
1	Yes		48	52%
2	No		44	48%
	Total		92	

Statistic	Value
Min Value	1
Max Value	2
Mean	1.48
Variance	0.25
Standard Deviation	0.50
Total Responses	92

12. Have you ever heard of mindfulness? Mindfulness is defined as: a technique in which one focuses one's awareness only on the present moment, experiencing thoughts, feelings, and sensations but not judging them.

#	Answer	Bar	Response	%
1	Yes		57	61%
2	No		30	32%
3	I'm not sure		6	6%
Total			93	

Statistic	Value
Min Value	1
Max Value	3
Mean	1.45
Variance	0.38
Standard Deviation	0.62
Total Responses	93

13. After seeing the above video/text, do you think mindfulness might be beneficial to you?

#	Answer	Bar	Response	%
1	Yes		79	87%
2	No		12	13%
Total			91	

Statistic	Value
Min Value	1
Max Value	2
Mean	1.13
Variance	0.12
Standard Deviation	0.34
Total Responses	91

14. If mindfulness resources, such as guided breathing exercises, were available online, would you use them?

#	Answer	Bar	Response	%
1	Yes		19	22%
2	Probably		33	38%
3	Probably Not		32	37%
4	No		3	3%
Total			87	

Statistic	Value
Min Value	1
Max Value	4
Mean	2.22
Variance	0.68
Standard Deviation	0.83
Total Responses	87

15. Do you think more young adults would find guided meditative exercises if they were posted on a YouTube channel?

#	Answer	Bar	Response	%
1	Yes		75	86%
2	No		12	14%
Total			87	

Statistic	Value
Min Value	1
Max Value	2
Mean	1.14
Variance	0.12
Standard Deviation	0.35
Total Responses	87

16. If you had access to a mindfulness application on a personal device such as a Smartphone, iPod, tablet, etc would you download and use it? (Example: an app on your phone with a timer, that at a specified time would alert you that it was time for your daily meditation, and then pulled up a randomly selected pre-recorded meditation tape for you to follow)

#	Answer	Bar	Response	%
1	I would definitely use it		15	17%
3	I would probably use it		48	55%
4	I would probably not use it		22	25%
5	I would definitely not use it		2	2%
Total			87	

Statistic	Value
Min Value	1
Max Value	5
Mean	2.95
Variance	1.04
Standard Deviation	1.02
Total Responses	87

17. If you had access to live mindfulness courses/workshops/clubs at your school, would you enroll in them?

#	Answer	Bar	Response	%
1	I would definitely enroll		6	7%
2	I would definitely not enroll		3	3%
3	I would probably enroll		38	44%
4	I would probably not enroll		40	46%
Total			87	

Statistic	Value
Min Value	1
Max Value	4
Mean	3.29
Variance	0.70
Standard Deviation	0.83
Total Responses	87

18. Which interests you most? Check all that apply.

#	Answer	Bar	Response	%
1	A class on mindfulness that could be taken for physical education credit		46	57%
2	A workshop that covers the concepts behind mindfulness in a concise manner		37	46%
3	A club dedicated to mindfulness, with a group dynamic and support		34	42%
5	Other (Please Explain) _____		5	6%

Other (Please Explain) _____	
Something text-based that doesn't require my presence	
TED Talk	
An app or a video	
neither	
Yoga Classes	

Statistic	Value
Min Value	1
Max Value	5
Total Responses	81

19. If there were Facebook groups dedicated to mindfulness, would you want to be a part of these groups, so you could connect with other like-minded people?

#	Answer	Bar	Response	%
1	I would definitely want to be a part of these groups		8	9%
2	I would probably not want to be a part of these groups		40	46%
3	I would definitely not want to be a part of these groups		6	7%
5	I would probably want to be a part of these groups		33	38%
Total			87	

Statistic	Value
Min Value	1
Max Value	5
Mean	3.11
Variance	2.36
Standard Deviation	1.54
Total Responses	87



20. If there were a virtual living room / chat room to talk with others about mindfulness, would you visit it?

#	Answer	Bar	Response	%
1	I would definitely visit it		5	6%
2	I would probably visit it		22	25%
3	I would probably not visit it		46	53%
4	I would definitely not visit it		14	16%
Total			87	

Statistic	Value
Min Value	1
Max Value	4
Mean	2.79
Variance	0.61
Standard Deviation	0.78
Total Responses	87

21. On a scale of 1 to 4, 1 meaning "very unlikely" and 4 meaning "very likely," what are the odds you would Retweet something like the following image on Twitter?

#	Answer	Bar	Response	%
1	1: Very unlikely		32	37%
2	2: Somewhat unlikely		20	23%
3	3: Somewhat likely		21	24%
4	4: Very likely		14	16%
Total			87	

Statistic	Value
Min Value	1
Max Value	4
Mean	2.20
Variance	1.23
Standard Deviation	1.11
Total Responses	87

22. Do you intend to utilize any of the technologies mentioned in this survey in the future? Check all that apply. I would consider using...



#	Answer	Bar	Response	%
1	Online guided exercises (ex. guided breathing exercises on various websites)		45	54%
2	Online resources available on a YouTube channel		45	54%
3	An app that has guided meditations available for your phone		62	75%
4	An app with a timer that would play a randomly selected meditation tape		43	52%
5	The proposed mindfulness Facebook groups		20	24%
6	The proposed Twitter campaign for spreading mindfulness messages and images		20	24%

Statistic	Value
Min Value	1
Max Value	6
Total Responses	83

23. Is there any technology other than those mentioned that you think would work well with mindfulness? What would you like to see developed? (Ex. Another phone app that does x)

Text Response	
No	
Mindfulness Instagram page to follow	
I think everything looks good!!!	
I think that a class at school for middle school students would be effective. Specifically Forrest Grove middle school. But helping college students online or on campus for credits would work.	
no	
Maybe finding videos on Netflix or something for people to watch.	
a phone app that had multiple ways to practice mindfulness rather than just meditation	
Radio commercials could be kinda cool like on pandora.	
Smartwatches	
none	
Not really.	
N/A	
There could be exercises on Netflix	
a website that sends email reminders and daily information	
I think mindfulness is about separating yourself from technology so I'm hesitant to bring it into my practice	
quick snapchat mindfulness exercises?	
Another phone app that does guided yoga poses.	
Statistic	Value
Total Responses	17

24. If mindfulness was more accessible (ex. through a club, class, workshop, new app, etc) would you be interested in trying it moving forward?

#	Answer	Bar	Response	%
1	Yes		69	80%
2	No		17	20%
	Total		86	
Statistic			Value	
Min Value			1	
Max Value			2	
Mean			1.20	
Variance			0.16	
Standard Deviation			0.40	
Total Responses			86	

25. Is there anything we did not ask that you feel is important for us to know?

Text Response	
No	
No!	
I do not participate in mindfulness, but I feel listening to ASMR videos seems similar enough to mention.	
No	
no	
The more exposure and access to understanding mindfulness, the better! I would like to see workshops or apps that include "why" mindfulness is important, not just exercises and such.	
I think it would be nice to have a yoga or meditation class in the rec center	
Nope	
No	
nope	
the video did not play because firefox blocked adobe flash	
Since processing mindfulness and yoga, my anxiety has been greatly decreased.	
I don't have twitter which is why I wouldn't re-tweet that photo. I don't think many young people would go to you-tube for mindfulness videos. However, I think phone apps is the best technology for this kind of stuff and would be highly used by young people. The daily reminder to do mindfulness meditation is a great idea.	
I am more likely to do something that required personal contact. I enjoyed it when my professors would start off a class with a mindful ness activity, where we would all meditate for 5 minutes in the beginning of class to clear our minds. I have been unsuccessful when I tried it on my own.	
I have practiced mindfulness in the past to cope with a generalized anxiety disorder and have found it very beneficial. I did not, however, make an effort to try mindfulness until my anxiety became severely maladaptive. It was a last resort before medication type of thing. I feel as though many people my age would be the same way, so it would be important to stress the importance of practicing mindfulness before it got to that point.	
Statistic	Value
Total Responses	15

26. If you are willing in participating in a focus group about how to incorporate mindfulness and technology, please provide us with your email below. Email Address:

Text Response	
REDACTED	
Statistic	Value
Total Responses	13

## Appendix M: Numbers Used in the ANOVA

Score by Group							
Option	General Pool	MH or Pain	Depression	Anxiety	Stress	Pain*	No MH
Online Exercises	2.20	2.08	2.00	2.10	1.95	2.75	2.30
App	2.11	2.06	2.00	2.00	2.09	2.00	2.13
Live Courses	2.44	2.42	2.37	2.30	2.41	2.75	2.47
Facebook	2.51	2.36	2.11	2.40	2.27	2.25	2.62
College Room	2.79	2.69	2.58	2.45	2.73	3.25	2.87
Twitter	2.18	2.25	2.16	2.25	2.32	1.75	2.15
*Pain had only 4 people in the group							

Interest by Group							
Option	General Pool	MH or Pain	Depression	Anxiety	Stress	Pain*	No MH
Online Exercises	44	20	11	14	13	1	24
YouTube Resources	44	21	13	13	12	2	23
App with Guided Exercises	60	26	14	14	16	4	34
App with a Timer	42	18	8	8	10	2	24
Facebook Groups	18	10	6	5	7	2	7
Twitter	17	6	3	4	3	0	11

(Interest / Size) by Group							
Option	General Pool**	MH or Pain	Depression	Anxiety	Stress	Pain*	No MH
Online Exercises	0.524	0.556	0.579	0.700	0.591	0.250	0.511
YouTube Resources	0.524	0.583	0.684	0.650	0.545	0.500	0.489
App with Guided Exercises	0.714	0.722	0.737	0.700	0.727	1.000	0.723
App with a Timer	0.500	0.500	0.421	0.400	0.455	0.500	0.511
Facebook Groups	0.214	0.278	0.316	0.250	0.318	0.500	0.149
Twitter	0.202	0.167	0.158	0.200	0.136	0.000	0.234

\*\*Using 84 as the sample size, as 20 of the 104 did not reach these questions

Live Option Interest by Group							
Option	General Pool	MH or Pain	Depression	Anxiety	Stress	Pain*	No MH
PE Credit Course	45	19	11	12	13	2	26
Workshop	36	16	5	10	11	2	20
Club	32	13	8	8	7	1	18

Live Option (Interest / Size) by Group							
Option	General Pool**	MH or Pain	Depression	Anxiety	Stress	Pain*	No MH
PE Credit Course	0.536	0.528	0.579	0.600	0.591	0.500	0.553
Workshop	0.429	0.444	0.263	0.500	0.500	0.500	0.426
Club	0.381	0.361	0.421	0.400	0.318	0.250	0.383

\*\*Using 84 as the sample size, as 20 of the 104 did not reach these questions

## Appendix N: Tech Options: (Interest/Size) ANOVAs

Anova Tests- (Interest/Size) by Group: Technology Summplements						
<b>No Mental Health and Mental Health</b>						
Hnull: $\mu$ No MH = $\mu$ MH or Pain						
H1: At least one of the means is different.						
<b>No MH</b>	<b>MH or Pain</b>					
0.511	0.556					
0.489	0.583					
0.723	0.722					
0.511	0.500					
0.149	0.278					
0.234	0.167					
Anova: Single Factor		Alpha = .05				
<b>SUMMARY</b>						
Groups	Count	Sum	Average	Variance		
Column 1	6	2.617	0.43617	0.0439202		
Column 2	6	2.806	0.46767	0.0426419		
<b>ANOVA</b>						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.003	1	0.00298	<b>0.0687773</b>	<b>0.7984</b>	<b>4.965</b>
Within Groups	0.4328	10	0.04328			
Total	0.4358	11				
<b>Conclusion:</b> If $F > F$ crit, we reject the null hypothesis. Because $F$ is not greater than $F$ crit we cannot reject the null hypothesis and the means are the same.						

**No Mental Health and Depression**Hnull:  $\mu$  No MH =  $\mu$  Depression

H1: At least one of the means is different.

No MH	Depression
0.511	0.579
0.489	0.684
0.723	0.737
0.511	0.421
0.149	0.316
0.234	0.158

Anova: Single Factor

Alpha = .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	2.617	0.43617	0.0439202
Column 2	6	2.895	0.4825	0.0502979

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0064	1	0.00644	<b>0.1367112</b>	<b>0.7193</b>	<b>4.965</b>
Within Groups	0.4711	10	0.04711			
Total	0.4775	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
 Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**No Mental Health and Stress**Hnull:  $\mu$  No MH =  $\mu$  Stress

H1: At least one of the means is different.

No MH	Stress
0.511	0.591
0.489	0.545
0.723	0.727
0.511	0.455
0.149	0.318
0.234	0.136

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	2.617	0.43617	0.0439202
Column 2	6	2.772	0.462	0.0441632

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.002	1	0.002	0.0454588	0.8354	4.965
Within Groups	0.4404	10	0.04404			
Total	0.4424	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**No Mental Health and Anxiety**Hnull:  $\mu$  No MH =  $\mu$  Anxiety

H1: At least one of the means is different.

No MH	Anxiety
0.511	0.700
0.489	0.650
0.723	0.700
0.511	0.400
0.149	0.250
0.234	0.200

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	2.617	0.43617	0.0439202
Column 2	6	2.9	0.48333	0.0526667

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0067	1	0.00667	0.1381986	0.7178	4.965
Within Groups	0.4829	10	0.04829			
Total	0.4896	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.



**Stress and Anxiety**Hnull:  $\mu$  Stress =  $\mu$  Anxiety

H1: At least one of the means is different.

Stress	Anxiety
0.591	0.700
0.545	0.650
0.727	0.700
0.455	0.400
0.318	0.250
0.136	0.200

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	2.772	0.462	0.0441632
Column 2	6	2.9	0.48333	0.0526667

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0014	1	0.00137	<b>0.0282007</b>	<b>0.87</b>	<b>4.965</b>
Within Groups	0.4841	10	0.04841			
Total	0.4855	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Stress	Depression
0.591	0.579
0.545	0.684
0.727	0.737
0.455	0.421
0.318	0.316
0.136	0.158

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	2.772	0.462	0.0441632
Column 2	6	2.895	0.4825	0.0502979

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0013	1	0.00126	<b>0.0266935</b>	<b>0.8735</b>	<b>4.965</b>
Within Groups	0.4723	10	0.04723			
Total	0.4736	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Anxiety and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Anxiety	Depression
0.700	0.579
0.650	0.684
0.700	0.737
0.400	0.421
0.250	0.316
0.200	0.158

Anova: Single Factor

Alpha = .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	2.9	0.48333	0.0526667
Column 2	6	2.895	0.4825	0.0502979

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	2E-06	1	2.1E-06	<b>4.047E-05</b>	<b>0.995</b>	<b>4.965</b>
Within Groups	0.5148	10	0.05148			
Total	0.5148	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
 Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

## Appendix O: Tech Options: Interest ANOVAs

### Anova Tests- Interest by Group: Technology Supplements

#### No Mental Health and Mental Health

Hnull:  $\mu$  No MH =  $\mu$  MH or Pain

H1: At least one of the means is different.

No MH	MH or Pain
24	20
23	21
34	26
24	18
7	10
11	6

Anova: Single Factor

Alpha = .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	123	20.5	97.1
Column 2	6	101	16.83333	55.366667

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	40.33	1	40.33333	0.5290774	0.4837	4.965
Within Groups	762.3	10	76.23333			
Total	802.7	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

#### No Mental Health and Depression

Hnull:  $\mu$  No MH =  $\mu$  Depression

H1: At least one of the means is different.

No MH	Depression
24	11
23	13
34	14
24	8
7	6
11	3

Anova: Single Factor

Alpha = .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	123	20.5	97.1
Column 2	6	55	9.166667	18.166667

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	385.3	1	385.3333	6.6859456	0.0271	4.965
Within Groups	576.3	10	57.63333			
Total	961.7	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is greater than  $F$  crit we reject the null hypothesis and the means are different.

**No Mental Health and Stress**Hnull:  $\mu$  No MH =  $\mu$  Stress

H1: At least one of the means is different.

No MH	Stress
24	13
23	12
34	16
24	10
7	7
11	3

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	123	20.5	97.1
Column 2	6	61	10.16667	21.366667

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	320.3	1	320.3333	<b>5.407991</b>	<b>0.0424</b>	<b>4.965</b>
Within Groups	592.3	10	59.23333			
Total	912.7	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is greater than  $F$  crit we reject the null hypothesis and the means are different.

**No Mental Health and Anxiety**Hnull:  $\mu$  No MH =  $\mu$  Anxiety

H1: At least one of the means is different.

No MH	Anxiety
24	14
23	13
34	14
24	8
7	5
11	4

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	123	20.5	97.1
Column 2	6	58	9.666667	21.066667

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	352.1	1	352.0833	<b>5.9590973</b>	<b>0.0348</b>	<b>4.965</b>
Within Groups	590.8	10	59.08333			
Total	942.9	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is greater than  $F$  crit we reject the null hypothesis and the means are different.

**Stress and Anxiety**Hnull:  $\mu$  Stress =  $\mu$  Anxiety

H1: At least one of the means is different.

Stress	Anxiety
13	14
12	13
16	14
10	8
7	5
3	4

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	61	10.16667	21.366667
Column 2	6	58	9.666667	21.066667

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.75	1	0.75	<b>0.0353496</b>	<b>0.8546</b>	<b>4.965</b>
Within Groups	212.2	10	21.21667			
Total	212.9	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Stress	Depression
13	11
12	13
16	14
10	8
7	6
3	3

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	61	10.16667	21.366667
Column 2	6	55	9.166667	18.166667

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	3	1	3	<b>0.1517707</b>	<b>0.705</b>	<b>4.965</b>
Within Groups	197.7	10	19.76667			
Total	200.7	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

## Anxiety and Depression

Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Anxiet	Depression
14	11
13	13
14	14
8	8
5	6
4	3

Anova: Single Factor

Alpha = .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	58	9.666667	21.066667
Column 2	6	55	9.166667	18.166667

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.75	1	0.75	<b>0.0382328</b>	<b>0.8489</b>	<b>4.965</b>
Within Groups	196.2	10	19.61667			
Total	196.9	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
 Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

## Appendix P: Live Options: (Interest/Size) ANOVAs

### Anova Tests- (Interest/Size) by Group: Live Options

#### No Mental Health and Mental Health

Hnull:  $\mu$  No MH =  $\mu$  MH or Pain

H1: At least one of the means is different.

No MH	MH or Pain
0.553	0.528
0.426	0.444
0.383	0.361

Anova: Single Factor

Alpha= .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.362	0.454	0.00781
Column 2	3	1.333	0.44433	0.00697

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00014	1	0.00014	<b>0.01896</b>	<b>0.89713</b>	<b>7.70865</b>
Within Groups	0.02957	4	0.00739			
Total	0.02971	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

#### No Mental Health and Depression

Hnull:  $\mu$  No MH =  $\mu$  Depressor

H1: At least one of the means is different.

No MH	Depression
0.553	0.579
0.426	0.263
0.383	0.421

Anova: Single Factor

Alpha= .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.362	0.454	0.00781
Column 2	3	1.263	0.421	0.02496

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00163	1	0.00163	<b>0.09967</b>	<b>0.76801</b>	<b>7.70865</b>
Within Groups	0.06555	4	0.01639			
Total	0.06719	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.



**No Mental Health and Stress**Hnull:  $\mu$  No MH =  $\mu$  Stress

H1: At least one of the means is different.

No MH	Stress
0.553	0.591
0.426	0.500
0.383	0.318

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.362	0.454	0.00781
Column 2	3	1.409	0.46967	0.01932

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00037	1	0.00037	<b>0.02714</b>	<b>0.87715</b>	<b>7.70865</b>
Within Groups	0.05427	4	0.01357			
Total	0.05464	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**No Mental Health and Anxiety**Hnull:  $\mu$  No MH =  $\mu$  Anxiety

H1: At least one of the means is different.

No MH	Anxiety
0.553	0.600
0.426	0.500
0.383	0.400

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.362	0.454	0.00781
Column 2	3	1.5	0.5	0.01

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00317	1	0.00317	<b>0.35637</b>	<b>0.58268</b>	<b>7.70865</b>
Within Groups	0.03563	4	0.00891			
Total	0.0388	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Anxiety**Hnull:  $\mu$  Stress =  $\mu$  Anxiety

H1: At least one of the means is different.

Stress	Anxiety
0.591	0.600
0.500	0.500
0.318	0.400

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.409	0.46967	0.01932
Column 2	3	1.5	0.5	0.01

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00138	1	0.00138	<b>0.09414</b>	<b>0.77429</b>	<b>7.70865</b>
Within Groups	0.05864	4	0.01466			
Total	0.06002	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Stress	Depression
0.591	0.579
0.500	0.263
0.318	0.421

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.409	0.46967	0.01932
Column 2	3	1.263	0.421	0.02496

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00355	1	0.00355	<b>0.16044</b>	<b>0.70922</b>	<b>7.70865</b>
Within Groups	0.08857	4	0.02214			
Total	0.09213	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Anxiety and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Anxiety	Depression
0.600	0.579
0.500	0.263
0.400	0.421

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	1.5	0.5	0.01
Column 2	3	1.263	0.421	0.02496

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00936	1	0.00936	<b>0.53549</b>	<b>0.50487</b>	<b>7.70865</b>
Within Groups	0.06993	4	0.01748			
Total	0.07929	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
 Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

## Appendix Q: Live Options: Interest ANOVAs

### Anova Tests- Interest by Group: Live Options

#### No Mental Health and Mental Health

Hnull:  $\mu$  No MH =  $\mu$  MH or Pain

H1: At least one of the means is different.

No MH	MH or Pain
26	19
20	16
18	13

Anova: Single Factor

Alpha= .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	64	21.33333	17.33333
Column 2	3	48	16	9

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	42.6667	1	42.66667	<b>3.24051</b>	<b>0.14621</b>	<b>7.70865</b>
Within Groups	52.6667	4	13.16667			
Total	95.3333	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

#### No Mental Health and Depression

Hnull:  $\mu$  No MH =  $\mu$  Depression

H1: At least one of the means is different.

No MH	Depression
26	11
20	5
18	8

Anova: Single Factor

Alpha= .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	64	21.33333	17.33333
Column 2	3	24	8	9

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	266.667	1	266.6667	<b>20.2532</b>	<b>0.01082</b>	<b>7.70865</b>
Within Groups	52.6667	4	13.16667			
Total	319.333	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is greater than  $F$  crit we reject the null hypothesis and the means are different.

**No Mental Health and Stress**Hnull:  $\mu$  No MH =  $\mu$  Stress

H1: At least one of the means is different.

No MH	Stress
26	13
20	11
18	7

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	64	21.33333	17.33333
Column 2	3	31	10.33333	9.33333

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	181.5	1	181.5	<b>13.6125</b>	<b>0.02103</b>	<b>7.70865</b>
Within Groups	53.3333	4	13.33333			
Total	234.833	5				

**Conclusion:** If  $F > F_{crit}$ , we reject the null hypothesis.  
Because F is greater than F crit we reject the null hypothesis and the means are different.

**No Mental Health and Anxiety**Hnull:  $\mu$  No MH =  $\mu$  Anxiety

H1: At least one of the means is different.

No MH	Anxiety
26	12
20	10
18	8

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	64	21.33333	17.33333
Column 2	3	30	10	4

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	192.667	1	192.6667	<b>18.0625</b>	<b>0.01316</b>	<b>7.70865</b>
Within Groups	42.6667	4	10.66667			
Total	235.333	5				

**Conclusion:** If  $F > F_{crit}$ , we reject the null hypothesis.  
Because F is greater than F crit we reject the null hypothesis and the means are different.

**Stress and Anxiety**Hnull:  $\mu$  Stress =  $\mu$  Anxiety

H1: At least one of the means is different.

Stress	Anxiety
13	12
11	10
7	8

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	31	10.33333	9.33333
Column 2	3	30	10	4

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.16667	1	0.166667	<b>0.025</b>	<b>0.88203</b>	<b>7.70865</b>
Within Groups	26.6667	4	6.66667			
Total	26.8333	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Stress	Depression
13	11
11	5
7	8

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	31	10.33333	9.33333
Column 2	3	24	8	9

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	8.16667	1	8.166667	<b>0.89091</b>	<b>0.39868</b>	<b>7.70865</b>
Within Groups	36.6667	4	9.166667			
Total	44.8333	5				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Anxiety and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Anxiety	Depression
12	11
10	5
8	8

Anova: Single Factor

Alpha= .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	3	30	10	4
Column 2	3	24	8	9

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6	1	6	<b>0.92308</b>	<b>0.39108</b>	<b>7.70865</b>
Within Groups	26	4	6.5			
Total	32	5				

**Conclusion:**If  $F > F_{crit}$ , we reject the null hypothesis.

Because F is not greater than F crit we cannot reject the null hypothesis and the means are the same.



## Appendix R: Scores by Group ANOVAs

### Anova Tests: Score by Group

#### No Mental Health and Mental Health

Hnull:  $\mu$  No MH =  $\mu$  MH or Pain

H1: At least one of the means is different.

No MH	MH or Pain
2.30	2.08
2.13	2.06
2.47	2.42
2.62	2.36
2.87	2.69
2.15	2.25

Anova: Single Factor

Alpha = .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	14.53191	2.4219858	0.0839143
Column 2	6	13.86111	2.3101852	0.0563014

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0375	1	0.0374981	0.5348636	0.481	4.965
Within Groups	0.70108	10	0.0701079			
Total	0.73858	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

#### No Mental Health and Depression

Hnull:  $\mu$  No MH =  $\mu$  Depression

H1: At least one of the means is different.

No MH	Depression
2.30	2.00
2.13	2.00
2.47	2.37
2.62	2.11
2.87	2.58
2.15	2.16

Anova: Single Factor

Alpha = .05

#### SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	14.53191	2.4219858	0.0839143
Column 2	6	13.21053	2.2017544	0.0525392

#### ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.14551	1	0.1455056	2.1326769	0.175	4.965
Within Groups	0.68227	10	0.0682268			
Total	0.82777	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**No Mental Health and Stress**Hnull:  $\mu$  No MH =  $\mu$  Stress

H1: At least one of the means is different.

No MH	Stress
2.30	1.95
2.13	2.09
2.47	2.41
2.62	2.27
2.87	2.73
2.15	2.32

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	14.53191	2.4219858	0.0839143
Column 2	6	13.77273	2.2954545	0.0716942

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.04803	1	0.0480305	<b>0.6173247</b>	0.45	<b>4.965</b>
Within Groups	0.77804	10	0.0778043			
Total	0.82607	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**No Mental Health and Anxiety**Hnull:  $\mu$  No MH =  $\mu$  Anxiety

H1: At least one of the means is different.

No MH	Anxiety
2.30	2.10
2.13	2.00
2.47	2.30
2.62	2.40
2.87	2.45
2.15	2.25

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	14.53191	2.4219858	0.0839143
Column 2	6	13.5	2.25	0.03

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.08874	1	0.0887374	<b>1.5579672</b>	0.24	<b>4.965</b>
Within Groups	0.56957	10	0.0569571			
Total	0.65831	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Anxiety**Hnull:  $\mu$  Stress =  $\mu$  Anxiety

H1: At least one of the means is different.

Stress	Anxiety
1.95	2.10
2.09	2.00
2.41	2.30
2.27	2.40
2.73	2.45
2.32	2.25

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	13.77273	2.2954545	0.0716942
Column 2	6	13.5	2.25	0.03

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.0062	1	0.0061983	<b>0.1219017</b>	<b>0.734</b>	<b>4.965</b>
Within Groups	0.50847	10	0.0508471			
Total	0.51467	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Stress and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Stress	Depression
1.95	2.00
2.09	2.00
2.41	2.37
2.27	2.11
2.73	2.58
2.32	2.16

Anova: Single Factor

Alpha = .05

**SUMMARY**

Groups	Count	Sum	Average	Variance
Column 1	6	13.77273	2.2954545	0.0716942
Column 2	6	13.21053	2.2017544	0.0525392

**ANOVA**

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.02634	1	0.0263392	<b>0.4240268</b>	<b>0.53</b>	<b>4.965</b>
Within Groups	0.62117	10	0.0621167			
Total	0.64751	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

**Anxiety and Depression**Hnull:  $\mu$  Stress =  $\mu$  Depression

H1: At least one of the means is different.

Anxiety	Depression
2.10	2.00
2.00	2.00
2.30	2.37
2.40	2.11
2.45	2.58
2.25	2.16

Anova: Single Factor

Alpha = .05

## SUMMARY

Groups	Count	Sum	Average	Variance
Column 1	6	13.5	2.25	0.03
Column 2	6	13.21053	2.2017544	0.0525392

## ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.00698	1	0.0069829	0.1692024	0.689	4.965
Within Groups	0.4127	10	0.0412696			
Total	0.41968	11				

**Conclusion:** If  $F > F$  crit, we reject the null hypothesis.  
 Because  $F$  is not greater than  $F$  crit we cannot reject the null hypothesis and the means are the same.

## Appendix S: Focus Group Consent Form, IRB Approved

### **Informed Consent Agreement for Participation in a Research Study**

**Investigators:** Amber Facchini; Meghan Lutz; Haili Welton

**Contact Information:** arfacchini@wpi.edu; mllutz@wpi.edu; hbwelton@wpi.edu

**Title of Research Study:** MBSR & College Students

**Sponsor:** UMass Medical

#### **Introduction**

You are being asked to participate in a research study. Before you agree, however, you must be fully informed about the purpose of the study, the procedures to be followed, and any benefits, risks or discomfort that you may experience as a result of your participation. This form presents information about the study so that you may make a fully informed decision regarding your participation.

#### **Purpose of the study:**

Medical organizations are seeking unconventional ways to help people deal with mental illness. One such method is Mindfulness-based Stress Reduction (MBSR). In 1979 Jon Kabat-Zinn founded a Stress Reduction program based on mindfulness. The goal of the program is to teach people how to use resources that they already possess, but may not be in touch with in order to combat pain, stress, and sickness. MBSR is a combination of science, medicine, psychology, and meditative practices.

Though MBSR has proven effective, training has mainly focused on adults. The goal of this Major Qualifying Project (MQP) is to identify technologies that may aid in the recruitment, adherence, and retention of college students in MBSR. The project team intends to investigate ways that technology, particularly social media, might aid training MBSR.

#### **Procedures to be followed:**

This research will be involve a focus group which will look at participants' opinions on different types of technology and social media and how they may be used in conjunction with MBSR. The focus group is expected to last approximately one hour.

**Risks to study participants:**

Participants will not be asked any details about their mental health conditions, so there is no concern for privacy or foreseen triggering of any negative emotions. The investigators will inform all participants that what is discussed in this focus group is confidential and participants should respect the privacy of their fellow participants and avoid discussing any details after the focus group has ended.

To get a feel for which bins of the sample are present, towards the start of the focus group, the investigators will ask the group two questions from the survey, slightly altered. To protect participants' confidentiality, the investigators will pass around blank, uniformly shaped, pieces of paper with the questions on them, thus participants will not need to raise their hands indicating their responses.

**Benefits to research participants and others:**

Participants taking part in this study may leave the focus group more educated about mindfulness, and better aware of some of the existing technologies that could help with reducing stress, pain, and illness. From a societal perspective, ideas generated from this focus group may help in developing technologies that support MBSR training for young adults and thus help them more effectively deal with stress.

**Record keeping and confidentiality:**

Participant records will be held confidential so far as permitted by law. However, the study investigators, the sponsor or its designee and, under certain circumstances, the Worcester Polytechnic Institute Institutional Review Board (WPI IRB) will be able to inspect and have access to confidential data that identify you by name. Any publication or presentation of the data will not identify you.

Names will not be collected to further protect participants' privacy. The notes that the investigators take over the course of the focus group will be stored in a locked cabinet in a locked room, and ultimately they will be shredded. Should the notes be scanned, they will be stored on a password protected computer on a password protected network.

When asking questions that may be considered sensitive (see above in risk to study participants,) the results shall be taken in a manner that protects the participant from the other participants. The investigators will only use information gathered in the focus group to illustrate which target populations were present. For example, the investigators may report that "three participants reported that they suffer from chronic pain or a chronic illness." Ideas presented by the focus group (such as "an app that does....") may be quoted in the MQP report, and thus later found under the "MBSR & College Students" MQP in the WPI project library.

**Compensation or treatment in the event of injury:**

The investigators do not anticipate any injury or harm in the course of this focus group. Regardless, you do not give up any of your legal rights by signing this statement.

**For more information about this research or about the rights of research participants, or in case of research-related injury, contact:**

Researcher/MQP advisor: Eleanor Loacono - [eloiacon@wpi.edu](mailto:eloiacon@wpi.edu)

Investigators (Those conducting the focus group):

Amber Facchini - [arfacchini@wpi.edu](mailto:arfacchini@wpi.edu)

Meghan Lutz - [mlutz@wpi.edu](mailto:mlutz@wpi.edu)

Haili Welton: [hbwelton@wpi.edu](mailto:hbwelton@wpi.edu)

\*All 3 investigators may be reached by emailing [mbsrteam@wpi.edu](mailto:mbsrteam@wpi.edu)

IRB Chair: Professor Kent Rissmiller

Tel. 508-831-5019, Email: [kjr@wpi.edu](mailto:kjr@wpi.edu)

University Compliance Officer: Jon Bartelson,

Tel. 508-831-5725, Email: [jonb@wpi.edu](mailto:jonb@wpi.edu)

**Your participation in this research is voluntary.** Your refusal to participate will not result in any penalty to you or any loss of benefits to which you may otherwise be entitled. You may decide to stop participating in the research at any time without penalty or loss of other benefits. The project investigators retain the right to cancel or postpone the experimental procedures at any time they see fit.

APPROVED WPI IRB 1 10/22/15 to 10/21/16
---



**PARTICIPANT COPY**

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

\_\_\_\_\_  
Study Participant Signature

Date: \_\_\_\_\_

\_\_\_\_\_  
Study Participant Name (Please print)

\_\_\_\_\_  
Signature of Person who explained this study

Date: \_\_\_\_\_

**INVESTIGATOR COPY**

By signing below, you acknowledge that you have been informed about and consent to be a participant in the study described above. Make sure that your questions are answered to your satisfaction before signing. You are entitled to retain a copy of this consent agreement.

\_\_\_\_\_  
Study Participant Signature

Date: \_\_\_\_\_

\_\_\_\_\_  
Study Participant Name (Please print)

\_\_\_\_\_  
Signature of Person who explained this study

Date: \_\_\_\_\_

## Appendix T: WPI IRB Approval Letter: Focus Groups

### WORCESTER POLYTECHNIC INSTITUTE

Worcester Polytechnic Institute IRB# 1  
HHS IRB # 00007374

22 October 2015  
File: 15-177

**Re: IRB Expedited Review Approval: File 15-177 "MQP ETL-1501: MBSR & College Students"**

Dear Prof. Loiacono,

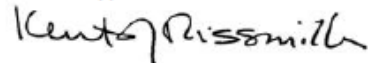
The WPI Institutional Review Committee (IRB) approves the above-referenced research activity, having conducted an expedited review according to the Code of Federal Regulations 45 (CFR46).

Consistent with 45 CFR 46.116 regarding the general requirements for informed consent, we remind you to only use the **attached stamped approved consent form** and to give a copy of the signed consent form to your subjects. You are also required to store the signed consent forms in a secure location and retain them for a period of at least three years following the conclusion of your study. You may also convert the completed consent forms into electronic documents (.pdf format) and forward them to the IRB Secretary for electronic storage.

**The period covered by this approval is 22 October 2015 until 21 October 2016**, unless terminated sooner (in writing) by yourself or the WPI IRB. Amendments or changes to the research that might alter this specific approval must be submitted to the WPI IRB for review and may require a full IRB application in order for the research to continue.

Please contact the undersigned if you have any questions about the terms of this approval.

Sincerely,



Kent Rissmiller  
WPI IRB Chair

## Appendix U: Focus Group Food Budget

Item	Unit Cost	Units Required	Total of Units	Notes
Pizza	10	2	20	3 People/Pizza
24pk/Water	2.48	1	2.48	
Candy	6.99	1	6.99	
24pk/Chips	6.12	1	6.12	
<b>Total:</b>			<b>35.59</b>	

## Appendix V: Focus Group Notes, 11/4

To start off, we're going to count the number of participants for our records, so don't mind us.  
TOTAL: 2

Next, out of curiosity, since our survey, and the flyer promoting the survey, have been our main means of recruiting participants, we are curious as to how many of you have taken the survey. Please raise your hand if you have taken the survey.  
TOTAL: 1

Now, just to be certain and go through the formalities for our notes, please raise your hand if your age is within the range of 18-34 years old.  
TOTAL: 2

We are about to ask a few questions that may be a bit sensitive. **To protect participants' confidentiality, we are going to pass around blank, uniformly shaped pieces of paper, with two questions on them. There are responses to be circled for the first question, and items that can be checked in the second question if you answer yes to the first question. We would like for everyone to write something on this paper so there is no assumption that everyone who is writing has said "yes." As a reminder, your answers will in no way be linked to you in our report, assuming we could even figure out who wrote what; we will handle your data in a manner that will ensure its safety and confidentiality.**

[The paper will read like so:]

Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge? Circle one of the following.

Yes - 2/2

No - 0/2

Do not wish to answer - 0/2

Check off each statement that applies:

- I often feel very down in the dumps and feel overwhelmed by it 1/2
  
- I often feel anxious, and it can even be difficult to breathe 1/2
  
- I often feel very stressed out and I'm not sure I can handle it 2/2
  
- I suffer from chronic pain or a chronic illness 0/2

Okay, we're done with all of that boring scripted stuff now.

**First off, we're curious; why did you guys decide to participate in this focus group?**

One participant was a friend of one member of the team / interested in mindfulness

The other was very interested in stress relief / had heard of mindfulness

“Stress relief sounds nice.”

**Now for some discussion: what do you guys think of yoga or meditation?**

Good way to calm yourself down, takes you out of your own mind

Have to really focus on not thinking - hard to do

Other respondent believes he lacks the patience for it

*GUIDING QUESTIONS (if needed): Have you ever done either?*

Both were forced to do it in high school and have not done it since

One: after a bad sports game, the next practice would involve yoga/meditation to "get over it." One wonders if this association between lost matches and yoga gives it a negative image for some of the members of that sports team, ie. a punishment

*Would you take yoga or meditation for PE credit?*

Both: yes, and believe it would be popular

**Before the survey and the focus group, had any of you heard of mindfulness?**

Both heard of mindfulness



**There are essentially five avenues we have been considering as means for linking mindfulness and technology: Facebook, such as forming mindfulness groups; Twitter, for spreading messages of mindfulness; mobile apps, for meditative exercises, of which there are already some good ones out there; YouTube, for giving a taste of mindfulness and easy access to all sorts of videos on it, ranging from breathing exercises to studies on mindfulness; and last but not least, a virtual living room / chat room for college students.**

**Is there a particular area anyone would like to start with, or shall we proceed down the list?**

At the mention of the images/text, one respondent said she always reads those kinds of things

Uses Instagram, Twitter, FB, and Snapchat

*GUIDING QUESTIONS (if needed): what do you mainly use social media for now?*

Way of staying in touch with people from high school

Good for sharing what's happening in life, an easier way to reach out via technology than physically reaching out

*What are your thoughts on social media, both in general terms (is it dying off, as popular as ever, etc) and what are your thoughts with it in respect to mindfulness?*

Both see it still going strong

One follows accounts for inspirational quotes

Good way to turn your day around

The other never noticed anything relating to mindfulness out on social media / never coupled the thoughts

Mention of Snapchat for events

*There are plenty of Facebook groups out there for things like breast cancer awareness and support; could you see something similar for mindfulness, where folks interested in mindfulness get together?*

There are groups for everything, so sure, can see it  
Good backup for people who do not have Twitter or Instagram

*Can you see any other way Facebook might be useful in conjunction with mindfulness?*

Posting images

Mindfulness page -> like it, it will pop on your feed

No need to be in a group this way, potentially avoiding any stigma

*Whether on Twitter or Facebook, there are tons of images circulating; could you see this being a good forum for spreading the messages of mindfulness?*

Skipped question - covered circulating images already

*Can you see any other way Twitter might be useful in conjunction with mindfulness?*

No, Twitter is pretty straightforward.

Can start your own hashtag.

*There is already a pretty neat mindfulness app out there called Insight Timer, which you can also find online at insighttimer.com. If you guys are interested, I would definitely look it up - it is a really cool app that even tells you how many other people (complete with a map of the world) are meditating at the moment. Can you guys think of some of the features and benefits you might want in an app?*

Videos, inspirational quotes page, chat room

Weekly schedule for meditation / timer

Current events tab, like Snapchat discovery

Local CFM events - approve of local things being promoted

*What kinds of mindfulness videos would you like to see on YouTube?*

breathing exercises (helps you get out of your own head), yoga exercises, informative videos explaining the different tools to be mindful, guided meditations of people talking you through the process, history of mindfulness, inspirational videos (ex. specific exercises, encouraging you to go into a test and telling you that you will do well, before big sports games), success stories / people talking about their experience/story in mindfulness

*Does the idea of a virtual living room, just for college students to discuss daily with peers or mentors, appeal to you guys?*

Had to explain it - calling the college room a "virtual living room" seems to confuse people. When explained that it is essentially a chat room / discussion board, people support the idea

\*Potentially didnt describe enough in the survey, could have skewed answers

Both appreciate the ability to be anonymous through a username

Community feel/struggle: ability to talk to people who are going through the same thing

Keys: anonymity (username) and knowing you are not alone

"virtual therapy session"

**Are there any other technologies that you guys think would work really well with mindfulness?**

an app with everything in it

**In the world of Social Media, do you guys prefer picture/information display via Instagram, Twitter, or Facebook? Please rank these three options in order of preference.**

Raise your hand for....

Instagram: #1\_1\_\_\_ #2\_2\_\_\_ #3\_0\_\_\_

Twitter: #1\_0\_\_\_ #2\_1\_\_\_ #3\_2\_\_\_

Facebook: #1\_2\_\_\_ #2\_0\_\_\_ #3\_1\_\_\_

\*1= Person 1 / 2 = Person 2

**What do you think the best approach is for this: pure mindfulness, such as in a live class or workshop; pure technology, such as online breathing exercises you do with no one else, or a hybrid approach that incorporates both mindfulness and technology, such as attending live classes and supplementing the material with technology like the Insight Timer app?**

Hybrid: Both agree combo of both, but concede it depends on the person  
Some people dislike interaction, others dislike technology

Purely in-person = overwhelming

Purely technology = can't put a face to the people in the guided exercises, etc

## Appendix W: Focus Group Notes, 11/10

To start off, we're going to count the number of participants for our records, so don't mind us.

TOTAL: 3

Next, out of curiosity, since our survey, and the flyer promoting the survey, have been our main means of recruiting participants, we are curious as to how many of you have taken the survey.

Please raise your hand if you have taken the survey.

TOTAL: 0

Now, just to be certain and go through the formalities for our notes, please raise your hand if your age is within the range of 18-34 years old.

TOTAL: 3

Do you suffer from depression, anxiety, chronic pain/illness, overwhelming stress, or some other condition or challenge? Circle one of the following.

Yes - 3/3

No - 0/3

Do not wish to answer - 0/3

Check off each statement that applies:

- I often feel very down in the dumps and feel overwhelmed by it 3/3
- I often feel anxious, and it can even be difficult to breathe 3/3
- I often feel very stressed out and I'm not sure I can handle it 3/3
- I suffer from chronic pain or a chronic illness 1/3

Okay, we're done with all of that boring scripted stuff now.

**First off, we're curious; why did you guys decide to participate in this focus group?**

-Already in the room / there was food

-One had a tough time, mindfulness helped with that

-Trying to help MQP team out - knows finding people can be hard

**Now for some discussion: what do you guys think of yoga or meditation?**

All three really enjoy yoga/meditation, one does yoga once a week

*GUIDING QUESTIONS (if needed): Have you ever done either?*

Yes

*Would you take yoga or meditation for PE credit?*

YES! All three really wanted this

**Before the survey and the focus group, had any of you heard of mindfulness?**

Yes - the team recruited them out of a mindfulness group

*GUIDING QUESTIONS (if needed): what do you mainly use social media for now?*

- connecting with friends
- do not associate social media with mindfulness
- On Facebook they would repost stuff, but not actively seek it out / get on Facebook just for mindfulness
- One's primary use of Facebook is its messenger, for sending friends pictures
- It would be hard to go to a mindfulness page on facebook unless specifically looking for it
- Facebook is a good way to talk about mindfulness but not for practice

*What are your thoughts on social media, both in general terms (is it dying off, as popular as ever, etc) and what are your thoughts with it in respect to mindfulness?*

- Don't think it's dying - will be around until the next big thing, like virtual reality
- Use it to communicate with people / communicate ideas

-Social media is too intertwined with other things - many distractions that can hinder mindfulness

-View mindfulness/meditation as a lifestyle --> need to become accustomed to it before trying to use Facebook for it

-Social media is about who you surround yourself with

-See Facebook as a good recruitment tool at best - not good for the actual mindfulness "doing"

-See social media more as a platform to connect and not a way to practice mindfulness or be mindful

*There are plenty of Facebook groups out there for things like breast cancer awareness and support; could you see something similar for mindfulness, where folks interested in mindfulness get together?*

-Nice to know others are around that are struggling and working on it

-Nice to be in a community with others who have similar mindsets to help you grow

-At worst, Facebook groups "wouldn't hurt"

-When in a group, a good sharing tool

*Can you see any other way Facebook might be useful in conjunction with mindfulness?*

-Sharing tool / groups

-Facebook can distract from mindfulness

*Whether on Twitter or Facebook, there are tons of images circulating; could you see this being a good forum for spreading the messages of mindfulness?*

-Yes

*Can you see any other way Twitter might be useful in conjunction with mindfulness?*

-getting the message out

-mindful thought of the day [this may be good to put on the front of the app]

-inspirational quotes

- "daily workout for your mind" -> "prompts to sit on" -> get you thinking
- Good way to be reminded to be mindful but not for practice

*There is already a pretty neat mindfulness app out there called Insight Timer, which you can also find online at [insighttimer.com](http://insighttimer.com). If you guys are interested, I would definitely look it up - it is a really cool app that even tells you how many other people (complete with a map of the world) are meditating at the moment. Can you guys think of some of the features and benefits you might want in an app?*

Insight Timer - good content, bad layout

According to focus group (users of it) the UI is not user friendly, not pretty, has a higher learning curve, and feels out of date

- like the community tab
- like the groups
- Content is good but the layout is offsetting, needs to be updated

*What kinds of mindfulness videos would you like to see on YouTube?*

- guided meditations
- all the things listed by the other group
  - really like the idea of motivational video/audio (before a test, a game, an interview, etc)
- mindful yoga
- different levels (ex. new to mindfulness, intermediate, expert)
- Theory and practice

*Does the idea of a virtual living room, just for college students to discuss daily with peers or mentors, appeal to you guys?*

- In theory, yes; have to monitor it and beware trolls
- Could couple well with an app: have a username/profile that keeps your info safe
- Ability to ban people (trolls)
- One participant mentioned Tiny Buddha having a virtual living room that works well
  - wonderful forum



- community comes together to help others who are having tough times
- people can write articles about their mindfulness stories, etc -> submit it for review and it gets posted
- Need to regulate it
- Be password protected so you can access it on different devices

**Are there any other technologies that you guys think would work really well with mindfulness?**

Make sure there is a reporting button on the app, because trolls/bullies happen

Respondents liked the app and online exercises

Want the app to have everything in one location - combines all the strengths of social media and cuts down on trolls, as making a user account may be too much hassle for some trolls

**In the world of Social Media, do you guys prefer picture/information display via Instagram, Twitter, or Facebook? Please rank these three options in order of preference.**

Raise your hand for....

unanimous -

Instagram: #1\_0\_\_\_ #2\_0\_\_\_ #3\_3\_\_\_

Twitter: #1\_0\_\_\_ #2\_3\_\_\_ #3\_0\_\_\_

Facebook: #1\_3\_\_\_ #2\_0\_\_\_ #3\_0\_\_\_

"Accounts that are for just pictures of text are dumb"

**What do you think the best approach is for this: pure mindfulness, such as in a live class or workshop; pure technology, such as online breathing exercises you do with no one else, or a hybrid approach that incorporates both mindfulness and technology, such as attending live classes and supplementing the material with technology like the Insight Timer app?**

Hybrid - but live exercises are better/the more important part - actually being there helps

Hybrid - tech is good for an assistive tool, but it's on you to do the rest

Hybrid - people do not know how to begin their journey - tech can help with that (YouTube started this respondent's journey)

## Appendix X: Final Presentation Slides

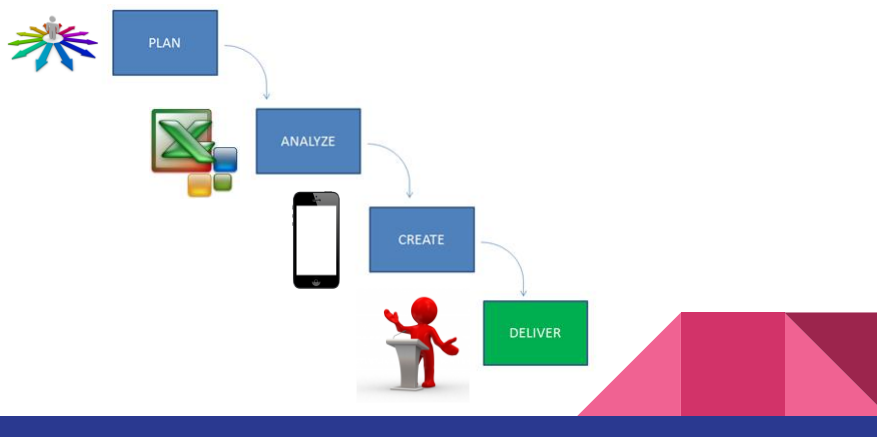
# MBSR & College Students

Amber Facchini  
Meghan Lutz  
Haili Welton



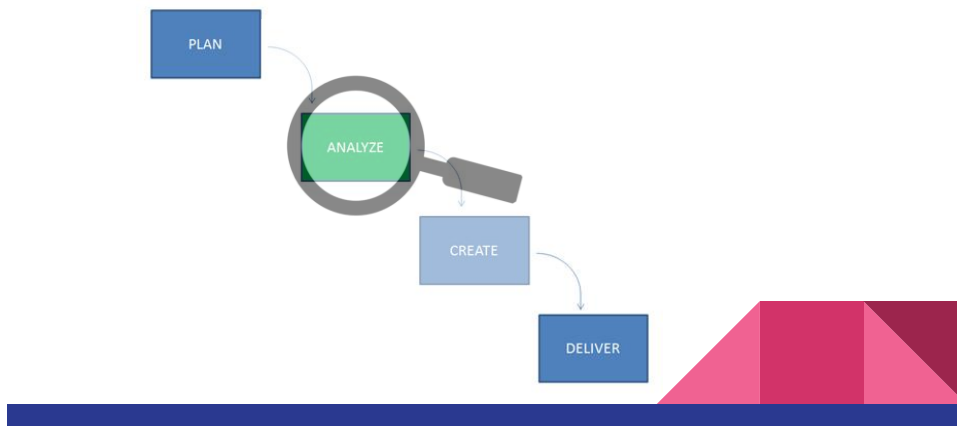
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### 1. The Process



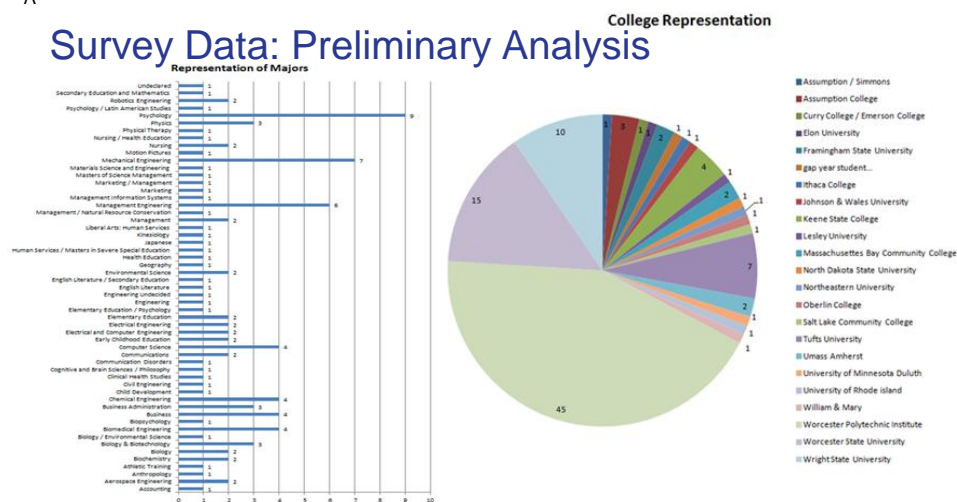
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## 2. Stepping Back: Results & Analysis



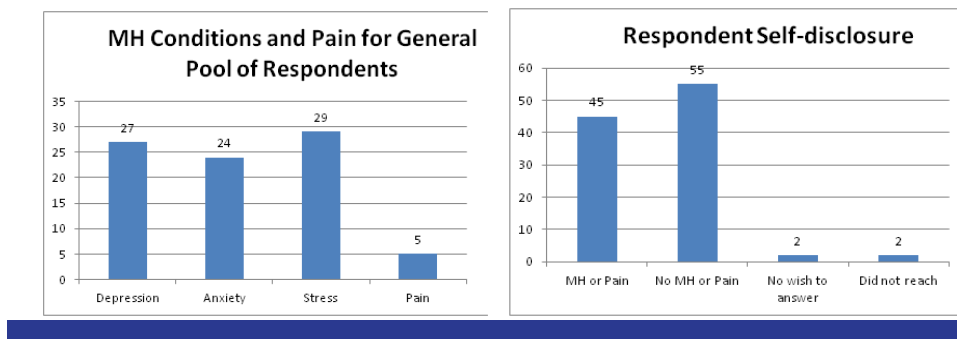
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### Survey Data: Preliminary Analysis



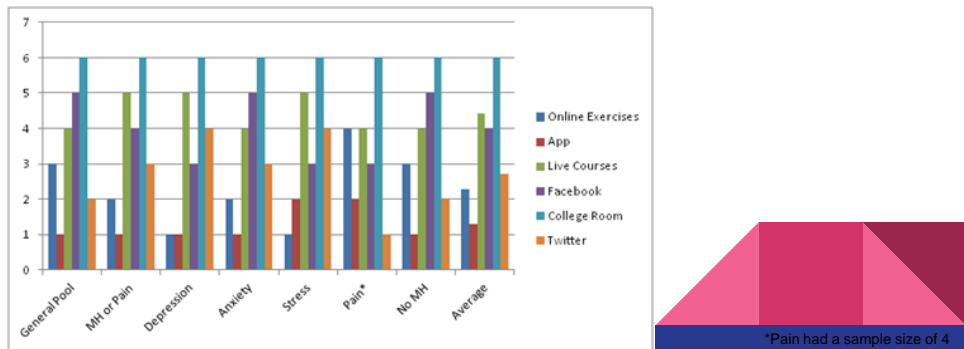
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### Survey Data: Preliminary Analysis



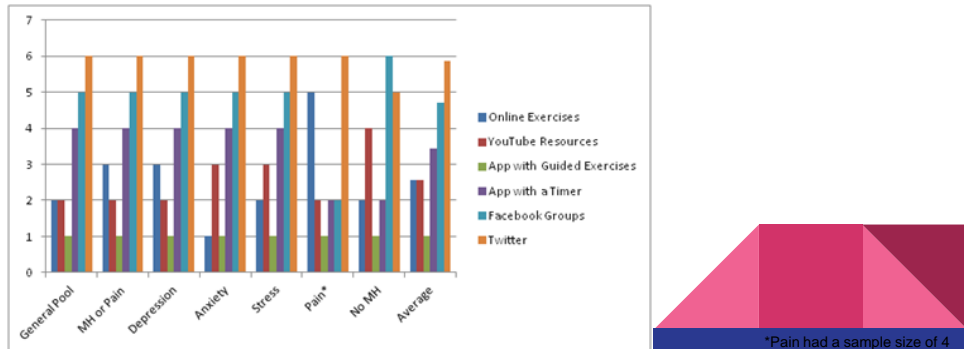
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**Survey Data: Preliminary Analysis**

Ranking of Options by Relative Score, Low Rankings Best



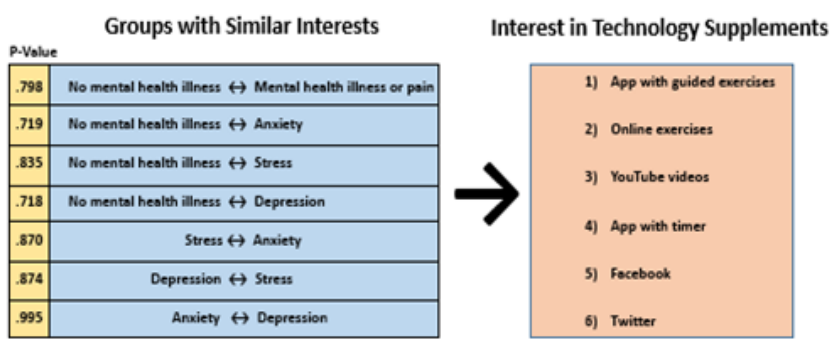
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**Survey Data: Preliminary Analysis**

Ranking of Options by Interest Moving Forward, Low Rankings Best



M  
**Survey Data: Statistical Analysis**

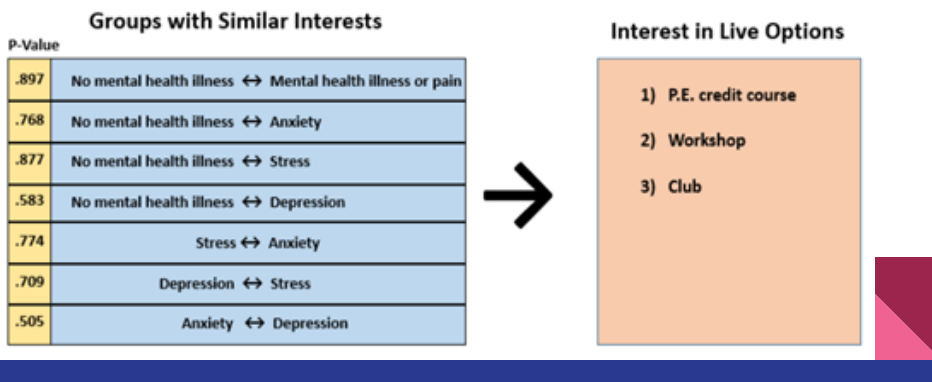
(Interest/Size) by Group



M

## Survey Data: Statistical Analysis

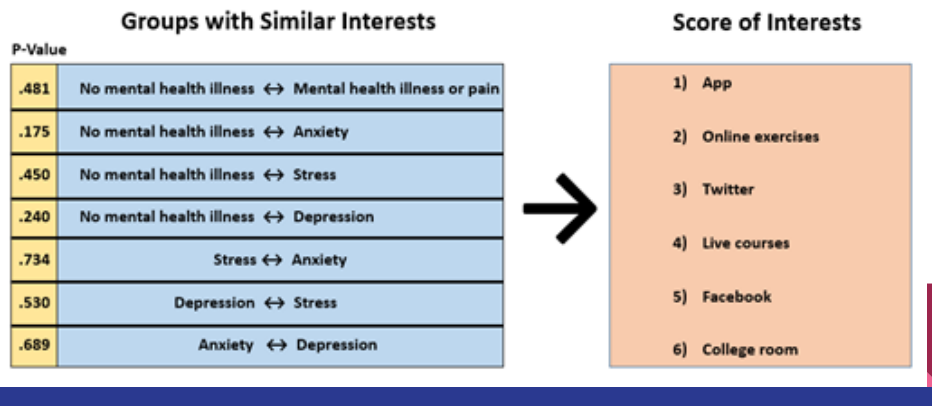
(Interest/Size) by Group



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## Survey Data: Statistical Analysis

Score by Group



A

## Focus Group Data Analysis



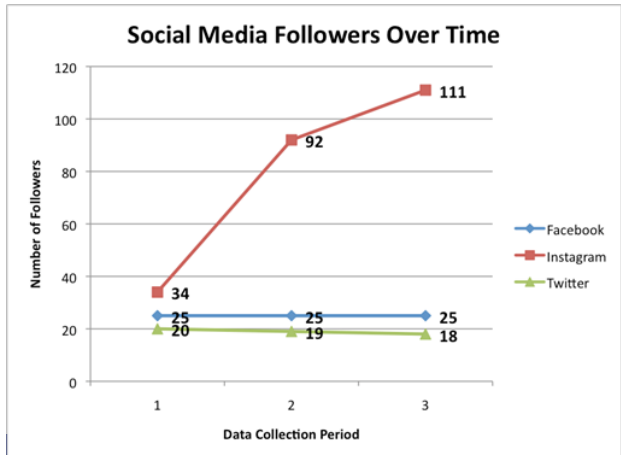
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# Social Media Campaign Data Analysis

Social Media Comparison									
	12PM, Tuesday October 13			12PM, Tuesday November 3			12PM, Tuesday November 17		
	Followers/Members	Posts	♥	Followers/Members	Posts	♥	Followers/Members	Posts	♥
Twitter	20	11	0	19	15	most: 1	18	18	most: 1
Facebook	25	3	n/a	25	4	n/a	25	4	n/a
Instagram	34	9	most: 18	92	17	most: 29	111	24	most: 29

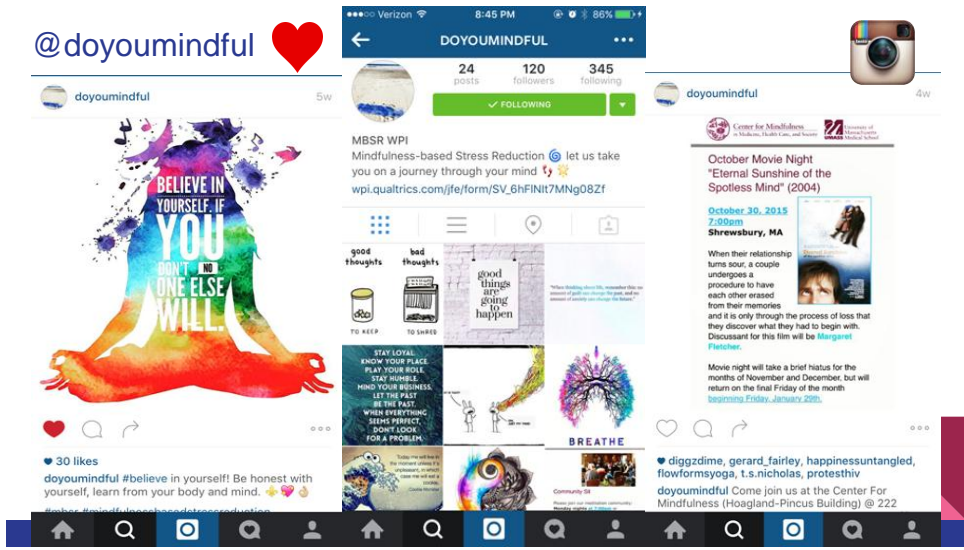
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# Social Media Campaign Data Analysis



Instagram currently:

- Followers: 127
- Most likes: 34



M

## Qualitative Interview Data Analysis

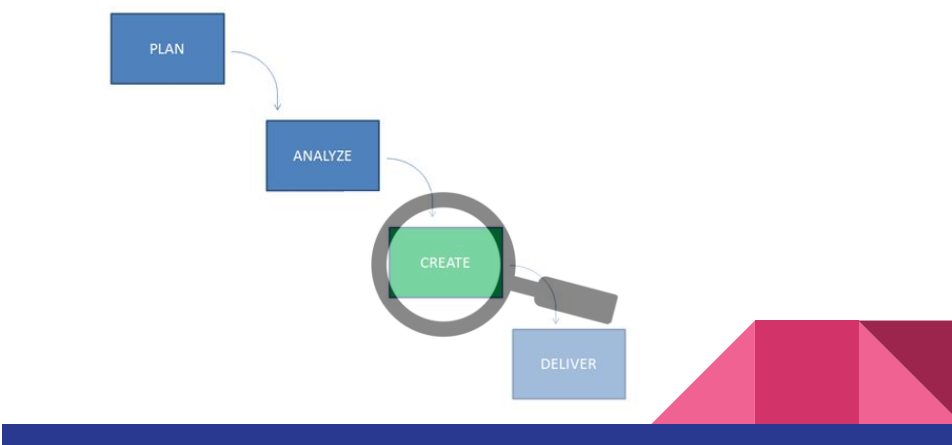


Health & Wellness




H

## 3. Create: Recommendations



A

## Recommendations: Online Exercises



YouTube

PLAN: B

NETFLIX

PANDORA

Mindfulness. Connection. Resources.  
Come HOME to a dedicated mindfulness community.

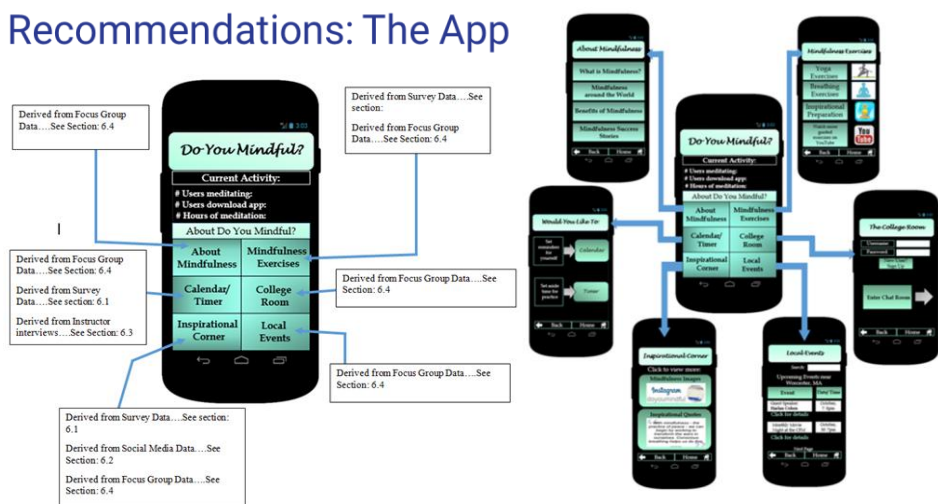


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## Recommendations: The App

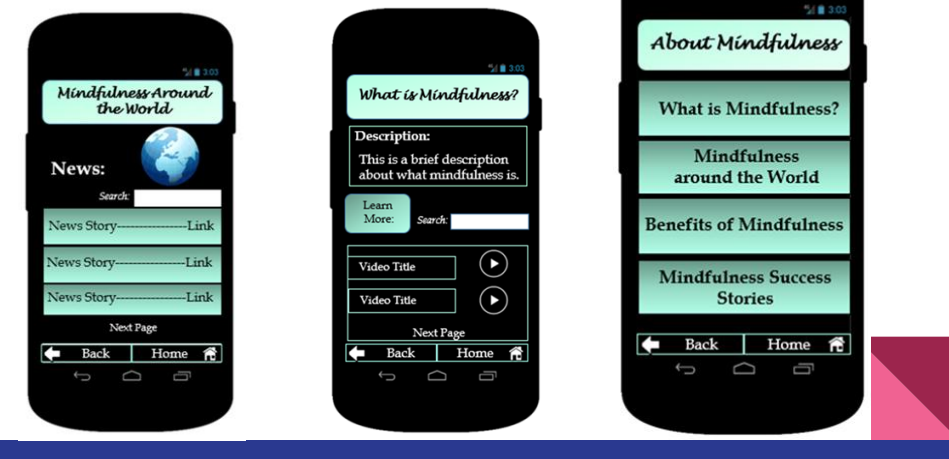


## Recommendations: The App



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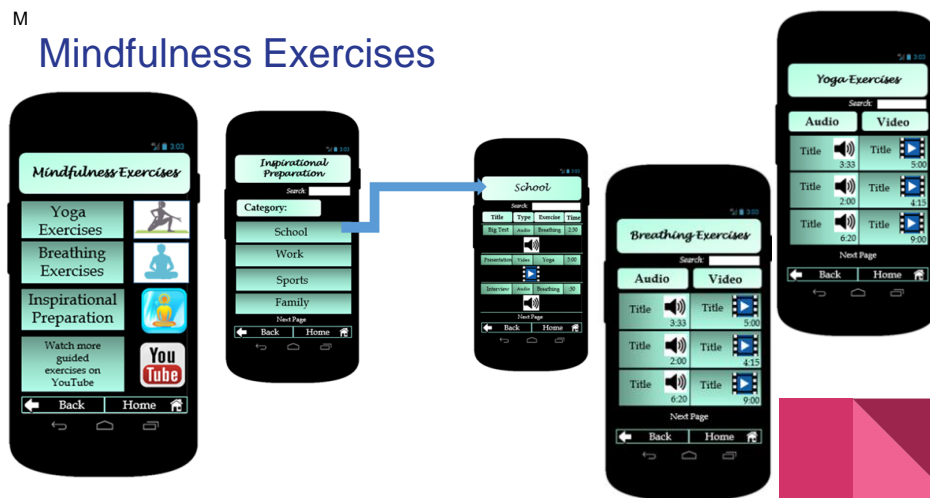
## About Mindfulness



## About Mindfulness



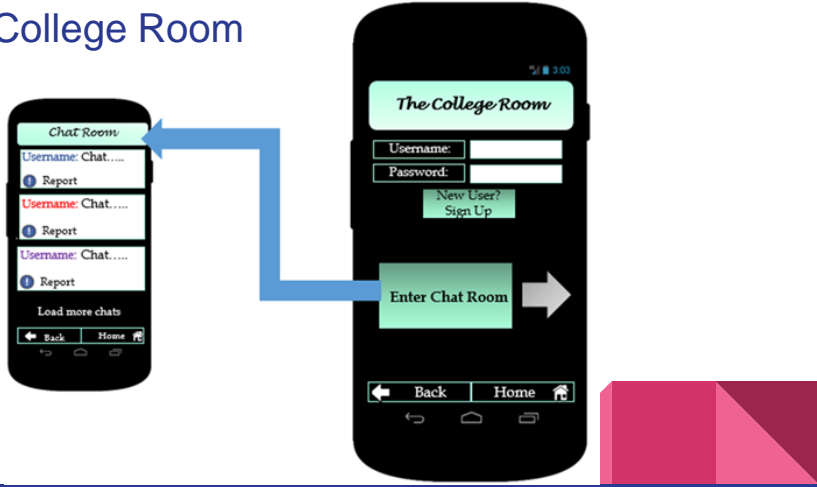
## M Mindfulness Exercises



## Calendar/Timer



M  
The College Room



M  
Inspirational Corner



M  
Local Events

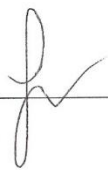




## Appendix Y: Final Presentation Sign-off

We, the MQP sponsors, accept what you, the MBSR MQP team, have done to date on the MBSR & College Students Major Qualifying Project. We formally sign off below to acknowledge that on December 9, 2015, the MQP team delivered a final presentation between the hours of 9AM and 11AM.

Dr. Maryann Davis:  Maryann Davis 12/9/15  
(print) (sign) (date)

Dr. Carl Fulwiler: CARL FULWILER  12/9/15  
(print) (sign) (date)

# Appendix Z: Miniature MQP Poster



**MBSR & College Students**  
 Amber Facchini (MIS), Meghan Lutz (MIS), Haili Welton (MIS)  
 Advisor: Professor Eleanor Loiacono (MIS)



### Abstract

The MQP team's goal was to determine technologies that would aid in the recruiting, adherence, and retention of MBSR training with college students. To accomplish these goals, the team surveyed young adults from across the country, interviewed mindfulness instructors, conducted several focus groups, and studied the effectiveness of social media campaigns. Based on the analysis of the resulting data, mockups for a prototype mobile application were developed. Ownership of the social media accounts was also transferred to the CFM.

### Introduction

Mental illness is prevalent in the country and statistics serve well to illustrate the phenomenon. From 2013 data, 1 in 4 Americans experience a mental health (MH) problem in a given year, and 1 in 17 live with a serious MH issue (NIH, n.d.a).

- 6.7% of American adults suffer from major depression
- 18.1% live with some form of anxiety disorder

Combined, that is 56.8 million lives (Duckworth, 2015).

Though this snapshot of adult mental health is startling, the picture of youth mental health is even starker.

- 1 in 5 youths from the ages of 13 to 18 suffer from a severe MH disorder in a given year
- The age group of 8 to 13 is estimated at 13% (NIH, n.d.b)

Comparing the two groups - adults and youths - the results are troublesome.

- 60% of adults and about 50% of youths between the ages of 8 and 15 receive no treatment (NIH, n.d.c)
- For chronic MH issues, 50% crop up by age 14, and 75% by age 24 (Kessler, 2005)

One remedy to combat MH is Mindfulness-based Stress Reduction (MBSR), a combination of science, medicine, psychology, and Buddhist Dharma (meditative practices). In 1979, Jon Kabat-Zinn founded a Stress Reduction program based on mindfulness. Since its founding, over 22,000 people have completed the eight-week program. The goal of the program is to teach participants how to use the resources that they already possess but may not be in touch with in order to combat pain, stress, and sickness.

### Conclusions

### Background

Technologies to Help with Retention

Organizations Supporting Mindfulness

Successes of Mindfulness

### Methods

### Reflections

Mindfulness-based Stress Reduction let us take you on a journey through your mind

### Planning

### Results

Ranking of Options by Interest Moving Forward (Low is Best)

Social Media Followers Over Time

Platform	Initial	Final
Facebook	10	25
Twitter	5	15
Instagram	2	8

### Acknowledgments

The MQP Team would like to extend a thank you to everyone who aided in the success of this project, including:

- Professor Loiacono for advising the project and providing the team with guidance.
- Dr. Davis and Dr. Fuhwiler of UMass Medical School for meeting with the team.
- Amanda and Robyn of UMass for helping schedule weekly sponsor meetings and reserving a location to meet.
- Everyone who helped spread the word about the survey and/or focus groups.
- All mindfulness instructors at UMass and WPI that volunteered to be interviewed for this project, as well as to everyone that took the survey or joined the focus groups.

### Project Objective

The goal of this Major Qualifying Project (MQP) was to identify technologies that may aid in the recruitment, adherence, and retention of MBSR with college students. The project team intended to conduct research on ways that technology, particularly social media, might pair well with MBSR. The team initially believed that these technologies would entail apps for personal devices that play guided meditative tapes, Facebook groups to build a sense of community, and so on; towards the end of the project, it became clear that an app and online exercises were the leading options.

### References

Available upon request.