Students' Perception of the Online Self-Assessment Support Tools/Information On Depressive Related Disorders

By

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ABSTRACT

Background: Mental health issues are prevalent among students; research has found that university students experience significantly higher levels of psychological distress than the general population. However, research on help seeking behavior has found that distressed individuals are less likely to seek professional help. This study will examine Attitudes toward online mental health resources and identify the effects of external factors such as Social Influence and Online Tool Designs on its usage.

Results: We conducted a two-part survey about students' perception of online mental health resources. We modified the Technology Acceptance Model (TAM); an information system theory that models how users come to accept and use a technology.

Conclusions: Results indicate TAM-Mod predicts a substantial proportion of Intention to Use online mental health resources. Although not all external factors are significant, research indicates that external variables are contributing factors in the individual decision to access and utilize online mental health resources.

Key words

Help-seekers; e-health; mhealth; emerging adults; mental health; online mental health support tools; TAM; TAM-Mod

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1 INTRODUCTION

Depression is a debilitating illness that is estimated to affect more than 300 million people worldwide (Russoniello, Fish & O'Brien, 2013), however, the causation of major depression is complex and not completely understood (Lehne, 2013). Proper distinguishing between sadness or normal grief and major depression is vital to human well-being. In most cases, Lehne (2013) argued that grief and sadness resolve spontaneously over several weeks and do not require medical intervention. However, if symptoms are unusually intense, and if they fail to resolve within an appropriate time, a major depressive episode may have been superimposed. Lehne (2013) described major depression as an illness, whereas grief and sadness are appropriate reactions to a major life stressor (such as bereavement, loss of a job, or childbirth). Lehne (2013) further argued that for some individuals, depression seems to descend "out of the blue"; otherwise healthy people-unexpectedly and without apparent cause-find they feel profoundly depressed while for many others, depressive episodes were caused by stressful life events. According to Sharp and Lipsky, (2002) depression is a common psychiatric disorder in children, adolescents, adults, and the elderly; persons who are depressed have feelings of sadness, loneliness, irritability, worthlessness, hopelessness, agitation, and feelings of guilt that may be accompanied by an array of physical symptoms. Sharp and Lipsky, (2002) further advised that a diagnosis of major depression requires that symptoms be present for two weeks or longer.

Lehne (2013, p.354) indicated that, "the principal symptoms of depression are depressed mood and loss of pleasure or loss of interest in all or nearly all of one's usual activities and pastimes". Associated symptoms include insomnia (or sometimes hypersomnia); anorexia and weight loss (or sometimes hyperphagia and weight gain); mental slowing and loss of concentration; worthlessness, and helplessness; thoughts of death and suicide; and overt suicidal behavior (Lehne, 2013). Since depression does not affect everyone, it would appear that some people are more vulnerable than others are. According to Lehne (2013), the factors that may contribute to vulnerability include genetic heritage, a difficult childhood and chronic low self-esteem.

Studies suggest that anxiety disorders often precede depression (Starr & Davila, 2012); anxiety and depressive disorders are the most common illnesses on our school campuses. The stigma and prejudice associated with major depression in the community might create some hesitancy on the part of some students to discuss their mental health issues or to communicate their state of mind with their family or friends. Rudolf (2004) stated that identifying the symptoms of anxiety and depressive related stressors among students is critical to student well-being and their educational development; however, according to Rudolf (2004); early intervention could protect a student from a downward spiral, whether psychological, social, economic and/or academic.

The current psychiatric nomenclatures now incorporate a huge number of syndromes and problems that used to fall within the bounds of normal human variation (American Psychiatric Association, 2000). The terms *mental disorder* or *mental illness* now encompass a wide variety of behaviors and emotional styles; more forms of deviance are likely to receive stigma, related to the invocation of the mental illness label. Indeed, as noted above, the label of mental disorder exerts its strongest effects when it accompanies normal-range behavior patterns or mild disturbance (Stier & Hinshaw, 2007).

Mental health disorders account for nearly one-half of the disease burden for young adults in the United States (World Health Organization, 2008). Approximately 20% of Canadians will experience mental illness during their lifespan (Canadian Mental Health Association, 2010). Mental health related issues among students are a growing concern for educational institutions and suicide is the second cause of death on post-secondary school campuses in Canada. (COU, 2007 Report on Mental Health Issues in Universities). The risk rate may be higher for young people as Zarate (2010) reported; emerging adults 18–25 years of age have a three-fold greater risk of suicidal behavior than other age-groups. Moreover, most lifetime mental disorders have first onset by age 24 years according to Kessler, Berglund, and Demler, (2005). Early intervention could help prevent development of more serious mental health problems among students and likely result in better physical health, greater chance of academic success and better long-term outcomes (Vaez & Laflamme, 2008).

The study (Wright, Jorm, Harris, & McGorry, 2007) described the stigma attached to mental health in the community as a significant barrier to seeking help. Importantly, controlled research indicates that the negative impacts of stigmatization outweigh the impairments related to various forms of mental disorder themselves, in that stigma processes predict poor outcomes even when initial levels of symptomatology or functioning are statistically controlled (Wright, Jorm, & Mackinnon, 2011). As stated by Hinshaw and Stier (2008), the pain engendered by mental illness is searing enough, but the devastation of being invisible, shameful, and toxic can make the situation practically unbearable for every individual. Prominent information seeking behavior theories suggest that people seek the help of their peers before trying other avenues (Talja & Hansen, 2006; Veinot, 2009). However, in the current context, the stigma attached to mental health disorders and the related lack of knowledge among the students may discourage the full use of that path. A high percentage of emerging adults prefer Internet as their source of information, including health related ones (Fox & Jones, 2009). In the last decade, the Internet has become a predominant source of health information according to Wood, Benson, LaCroix, Siegel, and Fariss, (2005), particularly for students (Rickwood, Deane, & Wilson, 2007).

In their study (Rickwood, Deane, Wilson, & Ciarrochi, 2005) described help-seeking as an important first step in improving mental health and accessing appropriate avenues of care. Kauer, Mangan and Sanci, (2014) in their own study defined help-seeking as the process of actively seeking out and utilizing social relationships, either formal or informal, to help with personal problems. Rickwood et al. (2005) further defined help-seeking as a complex process involving awareness and appraisal of the problem, the ability to express the problem and need for support, as well as relying on accessible and available sources of help, and a willingness to seek out and disclose relevant information.

Perhaps the next best approach to reach those in mental distress is by online resources. Many online mental health self-assessment tools are available to cater to those in need. According to Kauer et al. (2014) various online services are readily available for students including self-directed, web-based mental health support (e.g., Mindsight), online counseling services (e.g., Psychcentral), repositories for health information and resources

concerning mental health (e.g., Somazone), and structured self-directed online therapy (e.g., Moodgym). Online mental health resources may conceivably assist in all elements of the help-seeking process according to Kauer et al. (2014).

Online resources often include information about mental health literacy according to Jorm and Griffiths, (2006); these resources also provide information on mental illness, avenues to get help, and what type of services to expect. This type of information may increase readiness for care and motivation to seek help (Jorm & Griffiths, 2006). Improvements in mental health literacy are likely to assist the students in recognition and management of mental health and may significantly reduce the self-stigma associated with mental illness (Jorm et al., 1997). Mental health literacy according to Wright et al. (2007) is associated with seeking help from appropriate treatment and professional services. A recent meta-analysis demonstrated that interventions with a focus on mental health literacy significantly improved help-seeking intentions (Kauer et al., 2014). This study aims to evaluate the perception of emerging adults of the available online mental health support resources and self-assessment tools.

In order to understand students' perception of the available online mental health resources, a research model was developed by extending the Technology Acceptance Model-TAM (Davis, 1986) and the Theory of Planned Behavior-TPB (Ajzen, 1991; Mathieson, 1991) to explain the factors affecting users' perception and acceptance of the online mental health support tools. Davis (1986), who proposed the Technology Acceptance Model (TAM), suggested that the Ease of Use and Usefulness of a technology affect users' Intention to Use it. Therefore, users' willingness to accept and access technology based on their perception could be predicted by using the TAM model. In this study, a two-part survey about students' perception of the online mental health support tools was conducted. The Technology Acceptance Model (TAM), an information system theory that models how users come to accept and use a technology, was adopted as study framework. The adopted TAM was modified to exclude the actual usage construct, while other possible factors that may affect the Intention to Use online mental health support tools were added to the model (Venkatesh & Davis, 2000). For the purpose of this study, the modified model will be referred to as TAM-Mod.

Due to the stigma attached to mental illness in the community, Social Influence is included as one of the external variables. Furthermore, it is recognized that for students, the design of the online support tools is the most important determinant of effective usage (Fink, 2005). Therefore, it is crucial that the designers of the online resources adopt the proper pedagogical strategy and technology when designing online support tools. From another perspective, a good interface design helps users resolve technical problems that may arise when using a system (Metros & Hedberg, 2002). The interface design will not facilitate better online experience if it is not comprehensive or it does not meet users' needs (Wang & Yang, 2005). Based on the above observations, the proposed research model considers the influence of the following two external variables of Intention to Use an online mental health support tool: Online Tool Designs and Social Influence. Based on the TAM, as well as the extension and modification of the model in accordance with related literature, a new conceptual model that can predict students' intentions to use the online mental health support tools is proposed. The model includes external variables (Online Tool Designs- Psychcentral, Moodgym, Mindsight and Social Influence), perceived variables (Perceived Usefulness and Perceived Ease of Use), and outcome variables (Attitude and Intention to Use). This study aims to enable the students to bridge the gap between access to mental health related information and information understanding- i.e. to help students understand health related web-based resources so that they can access them, whenever there is a need. Educating the student participants on the Ease of Use of the online mental health support tools might influence the perception of Usefulness of these support tools. The causal relationships between the identified variables are discussed and the real-world phenomena are explained.

The remainder of this research study is organized as follows. Section 2 presents the review of literature on online mental health support tools and health related information and the Technology Acceptance Model used in this study. Section 3 describes the online mental health tools. The research model for the study and hypotheses are outlined in Section 4. Section 5 includes a description of the research methodology. Section 6 discusses the results and statistical analysis. Based on the analysis, the discussions of the research findings are outlined in Section 7. Conclusions about the research study are

outlined in Section 8, while the study limitations and future study recommendations are presented in Section 9.

1.2 Problem Statement

Help-seeking individuals mainly access online mental health resources because of the confidentiality and anonymity provided. Kauer et al. (2014) stated that online health resources are readily available in various formats for help-seeking students, including self-directed, web-based mental health support (e.g., Mindsight), online counseling services (e.g., Psychcentral), repositories for information and resources concerning mental health (e.g., Somazone), and structured self-directed online therapy (e.g., Moodgym). The diverse interactive media plays a vital role in users' acceptance and perceptions of these support tools; other factors that could culminate in users' acceptance of these new technologies are what need to be examined. To accomplish this, Park and del Pobil, (2013) suggested that social psychology perspectives should be used to elucidate the determinants of users' intention or usage of the online self-help resources.

A study conducted among Australian university campuses in 2007 found that the rate of access for student counseling services reported was as low as 5% (Urbis, 2007). The study (Neal, Campbell, William & Nussbaumer, 2011) suggested that the concept guiding existing online mental health support tools is not capturing self-help seekers at high levels because (a) help-seeking students lack the ability to determine credible sources, and (b) help-seeking students do not consider online mental health resources to be engaging. The study by Neal et al. (2011) among other prior studies clearly depicts the gap between the health information and self-help technology. Davis (1989) explained the factors affecting users' perception and acceptance of the online mental health support tools as Perceived Usefulness and Ease of Use. Davis (1986) suggested that the Perceived Ease of Use and Perceived Usefulness of the online mental health support tools would influence the students' Attitude toward the Intention to Use the support tools.

To successfully bridge the usage gap between the online mental health information and self-help technology, the students need to accept and perceive the support tools as

easy to use and useful enough to serve it purposes. To these ends, the research questions for this study are as follows:

1. What are the perceptions of the help-seeking emerging adults of the currently existing online mental health resources?
2. Could the self-help seekers' perception of Usefulness positively influence the Intention to Use the online mental health support tools?

Neal et al. (2011) suggested that given the fact that emerging adults prefer the Internet as their information source, online mental health support tools could be an effective avenue to reach emerging adults in mental distress and positive perception of these tools could increase their actual usage. The primary objective of this study is to identify the gap between online mental health support tools and the students' perception of these tools and determine what can be done to raise mental health awareness among the students.

2 LITERATURE REVIEW

Existing literature on the factors that influence the students' decisions to use or not to use the online health resources could help to understand the gap between the students' perception of the online mental health support resources and their actual usage. Some prior research suggests that Internet users are in fact very skeptical about what they read online (Rieh, 2002). For example, Lewis (2006) described university students as *active and critical* when accessing health information online. According to Powell and Clarke (2006), people access online mental health information more often than they trust it. Perceived credibility may predict use of online health information (Albano et al., 2003; Feng & Yang, 2007). Rieh's (2008) analysis of college students' information-seeking habits concluded that students verify information by reading multiple sources. Neal et al. (2011) confirmed that researchers have identified a number of facets that influence online credibility. Lee, Park, and Widdows (2009) found a positive relationship between satisfaction and credibility, and stated that consumers evaluate e-health information more positively when their utilitarian motivations are satisfied than when their epistemic needs are satisfied. Based on the above information, this review of literature on online mental health support tools usage will be categorized into three sub-sections, informatics influence in e-health, clinical influence and mental health aspect in higher institution education.

2.1 Informatics in e-Mental Health

The study by Bylund, Sabee, Imes, & Sanford (2007) concluded that consumers of health information on the Internet are increasingly being confronted with a myriad of health related resources of various qualities that are not always easy to comprehend. They pointed out the need to help the consumers bridge the gap between access to information and information understanding- i.e. to help consumers understand health related web-based resources so that they can access them. In their study, Aarons, Hurlburt, and Horwitz, (2011), argued that the important link between information and actual practice is the translation of evidence-based practices into broader application and impact. Moreover, the study by Bylund et al. (2007) suggested that the best way to address this

issue is to provide consumers with tailored information, which is contextualized, personalized, and easily comprehensible to the person's own health situation.

Fox (2006) further argued that bridging the gap between access to information and information understanding can empower consumers (in particular those with chronic conditions) by enhancing their comprehension of information perceived and, subsequently to act upon the information. Changes in health condition could be thoroughly understood and therefore better decisions can be made by the patients based on informed choices and education (Bylund et al., 2007). Information and Communication Technology (ICT) based contextualization and personalization of health information provides a new research avenue to support this process of patient empowerment. Kivits (2004) stated that being an informed patient requires a good level of information literacy, health literacy and is a lifelong learning process. McCray (2005) suggested that a better comprehension of the terminology employed through contextualization could raise health literacy levels. Contextualization and personalization of information in self-management systems is an important measure to raise the website visitor's health literacy and eventually an inveterate learning development.

Zhang and Von Dran (2000) stated that with the swift development and increasing use of the World Wide Web as both an information seeking and an electronic commerce tool, web-user interface studies grow in significance. Poor interface functionality is one potential cause for web usability meltdown (Nielsen, 1999). In addition, Zhang and Von Dran (2000) pointed at the affective and motivational aspects of the web environment, aspects of increasing importance to differentiate those websites that please users from those that turn people off. They stated that the challenge is to identify and develop design factors that can (1) make a website usable and serviceable, avoiding users' frustration or dissatisfaction. (2) Create more stimulating, visually pleasing, comprehensive, and commercially viable websites; and (3) help attract users to a website, maintain their interest in the website, and encourage them to return to the website.

The study by Isakowitz, Stohr, and Balasubramanian, (1995) stated that there are two different kinds of websites: the kiosk type and the application type. A kiosk website mainly provides information and allows users to navigate through that information; on the other hand, an application website is a kind of interactive information system where

the user interface is formed by a set of web pages (Isakowitz et al., 1995). De Troyer and Leune, (1998) stated that a kiosk type of website is designed to structure the (complex) information domain and to present it to the users in a clear and easily accessible way. Existing user interface studies and other studies indicate that many potential factors may be involved when studying users interacting with user interfaces. The cognitive fit theory explains that performance will be enhanced when spatial information representations facilitate the spatial or perceptual type of tasks and symbolic information representations facilitate analytical type of tasks (Vessey, 1991). According to Marchionini (1995), users' information-seeking tasks or searching behaviors make use of two classes of strategies: browsing and analytical strategies. Browsing is an informal and natural information seeking approach that depends heavily on the information environment and the user's recognition of relevant information. Analytical strategies, in contrast, depend on careful planning, recall of query terms, iterative query reformulation, and examination of results. The empirical evidence by Spool, Scanlon, Schroeder, Snyder, and DeAngelo, (1999) led them to believe that because surfing is significantly different from information retrieval on the web, designing for one may actually hurt a design for the other, and that it may not be possible to design one site to meet both purposes.

De Troyer and Leune (1998) claimed that explicit statements about the target audience and the purpose of the web page could help the user to see immediately whether the information on that page is of interest. They claimed that if a web page is publicly available, it should contain enough cues so that a user can place the information in the global context of the www (e.g. organizational information, copyright notices). De Troyer and Leune (1998) in their study stated that this guideline especially suits Website Design Method (WSDM) that is mostly centered on the concept of users' perspective. A website constructed with WSDM consists of a number of navigational tracks, one for each perspective. Each perspective has a different audience and possibly a different purpose, indicating the target audience and the purpose links up nicely with the concept of perspective (De Troyer & Leune, 1998).

2.1.1 e-Health Support Tools.

The development of online communication between consumers and health care providers, availability of health related information and the advancement in technology generates the self-assessment support tools. Hsu et al. (2005) evaluated the patterns of e-health use over a four-year period in United States of America and concluded that the number of members with known e-health access increased from 51,336 (1.6%) in 1999 to 324,522 (9.3%), in 2002. They also concluded that the percentage of households in which at least one person in the household had access increased from 2.7% to 14.1%; among the subjects with known access, the percentage of subjects that used e-health at least once increased from 25.7% in 1999 to 36.2% in 2002. Hsu et al. (2005) also concluded that access to and use of e-health services are growing rapidly; and that the use of these services appears to be greatest among individuals with more medical need. Online based interventions can include a variety of features. The study by Mohr, Burns, Schueller, Clarke, and Klinkman, (2013) stated that most of the online support tools contain didactic materials that could be supplemented by audio, video and animation. They also affirmed that many web-based interventions also include interactive tools to support learning, such as activity monitoring, thought records or distress ratings. Feedback tools can provide graphic visualizations of the patient's progress according to Mohr et al. (2013).

Designs and Interaction of e-Health Support Tools

The challenge for researchers and developers is how to structure something so unwieldy, while at the same time making it intuitive. Tom and Latter (2007), in a health informatics journal talked about the quality and accuracy of the information available on the web and the difficulties consumers have in evaluating the quality of that information. The studies by Eysenbach and Kohler (2002) and Schwartz et al. (2006) examined how the people that evaluate health information online have typically reported that users will judge quality by the endorsement by a government or professional body, ease of understanding, and perceived quality of presentation, suggesting that users deploy some critical evaluation when accessing information. In their studies about Internet use for a specific health information research, Sillence, Briggs, Fishwick, and Harris (2004) examined the participants' transcripts and concluded that layout and presentation were

considered important in assessing credibility of the information perceived. The more professional the site appeared, the more reliable it was perceived to be (Sillence et al., 2004). These research studies have focused primarily on the content, rather than on how that information was found in the first place.

Artz and Gil (2007) talked about some studies of consumer web searching for health information (sometimes called consumer health information retrieval) that were conducted using surveys, particularly in the medical and sociology fields. In one of those studies, Schwartz et al. (2006) surveyed 1392 family medicine patients about the types of health information they search for, how they search, and how they assess the accuracy of the information they find. Their study notably found that 79% searched for specific diseases or conditions, while 53% searched for medications. Most respondents reported that the information found was understandable and trustworthy and that they tended to look for government endorsements or reliable sources when assessing the accuracy of a website. When asked about strategies, Schwartz et al. (2006) stated that 82.5% of the respondents entered keywords into a search engine, which is less than the 95% reported by Eysenbach and Kohler (2002). Credibility was established by looking at factors identified as part of information quality. Participants tended to look for recognizable authoritative sources (e.g. Centre for Disease Control-CDC) or sources with the appearance of authority (e.g. physicians).

Read (2008) warned that it is perhaps worth noting that pharmaceutical companies sponsor many of the high-ranking mental health information websites either directly or indirectly. Schwartz et al. (2006) stated that so many will undoubtedly be rated as reliable sources by users (trust in drug information from traditional media such as television or print media is known to transfer to Internet presented materials) but are also unlikely to be free from bias. The few studies that have directly addressed this issue have found that pharmaceutical company websites have significant bias in presenting information about antidepressant medication (Read & Cain, 2013). Moreover, a study by Lissman and Boehnlein (2001) claimed that the lowest quality information on Internet depression sites was found on sites from profit-making companies of various types, rather than from not-for-profit organizations.

2.1.2 Concern/ Risk of e-Health Support Tools.

Privacy and Security

A 2006 World Health Organization report stated that the global investment in healthcare information and communication technologies has been dominated by the efforts to implement electronic health records, which promise improved quality and efficiency through better maintenance and availability of patient data. The study by Pagliari, Detmer, and Singleton, (2007) suggested that electronic personal health records may improve the quality, safety, and efficiency of care, but the key challenges include balancing security against utility and integrating diverse data sources and systems. Honeyman, Cox, and Fisher, (2005) stated that the anxieties around security and confidentiality have been expressed in most studies of patient attitudes to personal electronic records, particularly concerning mental and sexual health data. Powell, Fitton, and Fitton, (2006) claimed that encryption technologies can help to prevent unauthorized accessing of health information, and also suggested that the risk of privacy invasions may be greatest at the family level, whether the intent is supportive or maligning (for example, in spousal abuse), which is difficult to control. McKinstry (2007) suggested that the growing experience of online services in other sectors and traditionally high levels of trust in healthcare professionals are likely to help ease concerns about confidentiality.

Privacy and security issues are always a caveat of e-health technologies, and the fact that the data of the online patients could be somehow retrieved, forwarded, or deleted makes it a delicate issue. Early codes of conduct focused on honesty and disclosure (Purcell, Wilson, & Delamothe, 2002), but as websites have become increasingly interactive-recording and storing information about patients and professional users-issues of privacy and security have become important components of rating systems as well. This is also a crucial point when trying to determine the effect of the Internet on mental health, as any psychological consequences will depend on the activities enabled by technology, as well as the attributes of the user, and how the two interact (Bell, 2007). Purcell et al. (2002) stated that ethical considerations are also important in considering the quality of an online resource; the therapists or online supports group operators must ensure that patients fully understand how their data will be used, or fully assure that their health record will be preserved. They also advised written evidence of informed consent.

2.1.3 Reliability of e-Health Support Tools

In building good consumer health information systems, information design and search engine technology need to meld. In addition, integral is a user-focused perspective that reflects an understanding of users' need for information and how people search for that information (Tom & Latter, 2007). Tom and Latter (2007) argued that it is likely that building a taxonomy or framework that incorporates the relevant components from these two perspectives can aid in creating appropriate information structures that support fidelity and use. Searching for consumer health information remains a challenge for the average person. Bell (2007) indicated that the main concern commonly raised by professionals is the little quality control of the voluminous online health information. He pointed to the fact that the Internet is a free-for-all domain that can be created and hosted by a variety of individuals with a variety of motivations, and to the fact that the Internet is being accessed by people with vast differences in comprehension, searching abilities, and levels of information needs.

It is estimated that about 5% of web searches are health-related according to Eysenbach and Kohler (2002) despite the fact that the quality of information is mixed and users have limited competency in deducing reliable information when online. Griffiths and Christensen (2005) suggested that search engines often use a measure of how many other web pages link to a specific page (a measure of popularity) as a significant factor when ranking pages, so obviously false or eccentric information is unlikely to be immediately encountered when looking for general health information. Indeed, the rankings given to depression information websites by the popular search engine Google have been reported to largely correlate with ratings from a standardized tool for assessing quality of information (Griffiths & Christensen, 2005), suggesting that this process of online natural selection is quite effective in filtering out the most flawed information from general view. The study by Mohr, Burns, Schueller, Clerk, and Klinkman, (2013) stated that one disadvantage of web-based interventions is their status as *pull* technologies that rely on the patient's initiative to access the intervention. Thus, many developers include features that push information to the user, such as automated e-mail reminders to encourage patients to return to the website.

2.1.4 e-Health Support Tools Impact in Mental Health

Gatchel and Schultz (2012) affirmed that studies have proven that the Internet-based delivery of mental health services can be as effective as traditional face-to-face treatment by clinical professionals. The study by Bennett, Bennett, and Griffiths (2010) simply defined e-mental health as the delivery of mental health services via the Internet through videoconferencing, chat, or email web applications. Furthermore, their study cited online talk therapy, online pharmaceutical therapy, online counseling, computer-based interventions, cyber mental health approaches, and online life coaching as important functions of e-mental health. This form of psychological intervention modality offers a series of benefits as well as challenges to providers and clients according to Bennett et al. (2010). Most notable of all challenges is online security. The increasing popularity and availability of e-mental health interventions over the past decade has prompted psychological societies across the world to develop specialized guidelines for psychologists engaged in e-mental health activities (Fisher & Fried, 2003). These developments promote professional and ethical practices and are important for the protection of consumers of e-mental health interventions. However, the realization of ethical standards is complicated in the realm of e-delivery. In particular, protection of consumer privacy and confidentiality, a central principle of professional psychological services, evolves into wide-ranging technical and nontechnical security considerations (Fisher & Fried, 2003).

A myriad of online mental health support tools and health information is available to the self-help seeking public. Online mental health support tools are designed to better educate people on various mental health illnesses by illuminating various health information, health support strategies and treatment options in tandem with numerous resources. Among them are various Internet Support Groups (ISG), psychological testing and assessment tools, psychological advice portals, e-counseling and e-therapy. Internet-based or supported therapy has flourished in recent years. According to Shepellfgi (2012), e-mental health tools have yielded various conceptual approaches, intervention procedures, and communication modes. Examples of such are therapist-client communication through email, chat, or webcam, autonomous therapeutic programs via

websites, with or without human support, and group therapy through forums or chat rooms (Shepellfgi, 2012). Online discussion forums are support resources that offer counseling therapy through mobile access to videos, articles and blogs in which clients register personal journals of daily experiences as well as the use of online readings as part of therapeutic interventions. According to Mohr et al. (2013), the efficacy of a web-based intervention has been demonstrated by a large number of trials for a number of mental health problems, including depression, anxiety disorders, alcohol, substance abuse and insomnia. Research evaluating the outcome of video counseling, e-counseling, therap-e-mail, peer-to-peer chat and gaming forum procedures has been extensively conducted in recent years, according to Mohr et al. (2013) and has revealed positive results. (See appendix A for the list of mental health support tools).

A 2011 study conducted by the Australian Inspire Foundation reviewed all the new online services that can be leveraged to assist emerging adults with mental health issues (Stephens-Reicher, Metcalf, Blanchard, Mangan, & Burns, 2011). The study concluded that as mental health declines, an individual will seek out anonymous forms of assistance; moreover, the study also showed that online services can draw in populations who would otherwise not seek help, including those who are geographically dispersed and do not have easy access to city centers where traditional channels are available (Stephens-Reicher et al., 2011). A Shepellfgi (2012) study found that online counseling could provide a forum for individuals who might otherwise not access traditional forms of professional mental health support. The study also supported anonymity and confidentiality, as well as offering support to those geographically dispersed; other benefits included reduction of travel time required, appointment availability, and access for those with lack of mobility or transportation, those with verbal communication challenges, or social phobia(s) (Shepellfgi, 2012).

2.1.5 Mental Health Self-Assessment Support Tools

The study by Barak, Boniel-Nissim, and Suler, (2008) identified the online mental health support tools to include self-help resources such as online health forums and community forums, online psychotherapy and counseling, online peer supervision, and education and training programs among others. Research evaluating the effectiveness of

these online mental health support tools has been extensively conducted in recent years, revealing positive results (Rochlen, Zack, & Speyer, 2004; Tate & Zabinski, 2004). Studies have found that mental health information seekers frequently access information about depression (Fox, 2006), and online depression groups have been reported to be among the most common support groups on the Internet (Griffiths, Calear, & Banfield, 2009). Support websites such as http:// www.sheppellfgi.com, http://www.nlm.nih.gov/medlineplus/depression.html, http://mindsight.uoit.ca, provide the users with specific information on depressive related disorders. Fox (2006) suggested that Internet Support Groups (ISGs) such as http://forums.psychcentral.com provide individuals with specific health problems with an opportunity to share experiences and to seek, receive, and provide information, advice, and emotional support online. It has been estimated that millions of people visit online peer-to-peer discussion groups daily (Eysenbach, Powell, Englesakis, Rizo, & Stern, 2004), and there is evidence that over 28% of Internet users have visited an Online Support Group at least once (Horigan et al., 2001). An online group chat session such as http://psychcentral.com/chats.htm which is led by a psychologist enables smoother, flowing, and streaming online chat conversations, in which misunderstandings resulting from invisibility and the lack of full synchronicity are minimal, thereby contributing to feelings of helpfulness (Barak & Bloch, 2006).

Hsiung (2000) explained that online self-help groups are normally hosted by a mental health professional, in which the mental health professional focuses on maintaining the supportive milieu and the members of the group focus on providing the support for each other, which is hypothesized to combine the best of both worlds. An example is “Psycho-Babble”; records show that the online support group hosted by the Doctor Bob- Robert Hsiung (http://www.dr-bob.org/babble) had 1,516 members and posted 21,230 messages in 3,028 discussion threads between January and August 2000. Peer support has been postulated to improve mental health, including depression, through the provision of social support, which alters cognitions, attitudes, self-attributions, and coping, which, in turn, leads to a reduction in depressive symptoms (Lloyd & Brugha, 1995).

2.1.6 Mobile Technology (mHealth) Influences in e-Health

Mohr et al. (2013) described mobile health (mhealth) technologies as pervasive technologies that move interventions with the potential to provide ubiquitous connection between the care system and the patients in-the moment. mHealth interventions are interventions provided on electronic mobile devices like Apple phones (I-phones), androids based smart phones and tablet technologies. Proudfoot (2013) indicated that mhealth offers unique opportunities for accessing health information, monitoring progress, receiving personalized prompts and support, collecting ecologically valid data, and using self-management interventions when and where they are needed. She further stated that entry barriers associated with other forms of technology are minimized, and mhealth enhances the potential to reach underserved populations. A small but rapidly growing literature supports their use in the prevention and management of mental health disorders according to Proudfoot (2013). In the study by Whittaker et al. (2011), a test was conducted to deliver Cognitive Behavioral Therapy (CBT) based intervention via mobile phone text and video messages in order to prevent depression in adolescents. Their study revealed positive outcomes that indicated key messages from CBT can be delivered by mobile phones and that the participants perceived the mobile intervention as easy to use, helpful and useful (Whittaker et al., 2011).

mHealth technologies are particularly suited to Ecological Momentary Assessment (EMA), monitoring and assessment in real-time and real-world conditions, according to Proudfoot (2013). She argued that many dimensions of symptoms, affect and functioning, particularly those that change frequently, are not well captured by self-report or clinical interviews. Stone, Shiffman, and Schwartz, (2003) argued that relying on retrospective recall or compliance with paper diaries can be problematic and in most cases, validity is often compromised. With mobile phones, by comparison, information can be collected in real-time, multiple times a day, as people go about their everyday activities. Proudfoot (2013) also suggested that the progress made could be monitored because Short Message Service (SMS) reminders can be sent as memory prompts to enhance adherence, while situational information can be easily gathered to aid identification of triggers and patterns in moods or behaviors.

According to Proudfoot (2013), Ecological Momentary Assessment could be categorized into three groups:

i. Automated Tailored programs
ii. Context Aware programs
iii. Short Message Service (SMS) programs

Automated Tailored Programs according to Proudfoot (2013) are delivered via downloadable *apps* or via the Internet on smartphones. These programs are used with and without clinician support for prevention, early intervention and treatment, and to assist with the completion of therapy-related skills practice. Proudfoot further stated that, typically, users are prompted to enter information about their situation or internal states, and the program provides personalized information, support or therapy in real-time. An example is myCompass, an interactive program tailored to individual users with depression, anxiety and stress (Harrison et al., 2011). The program provides self-monitoring assistance, prompts and reminders, graphical feedback with contextual information, motivational messages, and brief self-help modules based on cognitive-behavioral therapy, interpersonal therapy and positive psychology techniques according to Proudfoot (2013).

Context-Aware Programs according to Proudfoot (2013) are the new smartphones containing many built-in sensors such as GPS, ambient light and movement that are capable of connecting to external sensors. The harnessed data could be linked to user-reported information to facilitate an understanding of individual patterns of responding in specific situations, and to deliver real-time information, support and feedback in those situations. Burns, Begale, and Dyuffecy, (2011) claimed that a small number of prototype mental health programs have been developed to detect when individuals need assistance and to provide real-time therapeutic interventions - for example, the Mobilyze program for people with depression. Context-Sensitive Treatment is an area of mhealth that holds much promise according to Prociow, Wac, and Crowe, (2012) who suggested that future work will focus on building sensors into smartphones, as preliminary data indicate lower compliance rates when users need to wear or carry sensor devices in addition to their mobile phone.

Proudfoot (2013) suggested Short Message Service (SMS) programs as part of ecological momentary assessment. She suggested that SMS, which is available on all mobile phones, could be used to reach large populations directly for mental health promotions, and to provide psychotherapeutic interventions for specific patient groups. In their study, Granholm, Ben-Zeev, Link, Bradshaw, and Holden, (2011) cited an example of Mobile Assessment and Treatment for Schizophrenia (MATS), a program targeting auditory hallucinations, medication adherence and social interaction as mhealth success.

2.1.7 Future of mHealth

Mobile devices are not only helping to bridge the digital divide for socioeconomic groups who cannot afford to own computers, but according to Proudfoot (2013), they would also help to bridge the health divide for underserved and hard-to-reach populations. Proudfoot (2013) suggested that clinicians will see the advantages of incorporating mobile mental health into their clinical assessment and care, and the public will access evidence-based interventions at the most useful times in their day-to-day lives. She also suggested that the next generation of mobile mental health programs would incorporate technologies and techniques such as dynamic personalization, semantic processing, speech pattern recognition and intelligent reminding.

The study by Mohr, Burns, Schueller, Clarke and Klinkman, (2013) suggested that to integrate mhealth into the existing health and mental health delivery systems, researchers would have to identify where mhealth fit into the armamentarium of the available treatment options. Van Straten, Seekles, van't Veer-Tazelaar, Beekman, and Cuijpers, (2010) stressed the importance of technological integration of mhealth into electronic medical records and patient portals, which might simplify the referrals, treatment monitoring, and appropriate follow-ups. mHealth will have to be largely accepted and adopted by healthcare delivery teams as well as patients.

2.2 Declining Mental Health in Our Universities

The stigma associated with mental health illness is a significant and widely cited barrier to seeking help (Perlick, Hofstein, & Michael, 2010). Behavioral researchers reveal that the label of mental illness promotes rejection and suboptimal social interactions; furthermore, legal restrictions and discriminatory practices throughout society convey evidence of the restricted life opportunities of individuals with mental disorders (Hinshaw & Stier, 2008; Thornicroft, 2006). Mental illness stigmatization is an international phenomenon, appearing cross-culturally and cross-nationally (Schomerus et al., 2012). A 2007 study by Mian and Guangrong postulated that the college students' perceptions of mental illness and social acceptance were positively correlated with obtaining help. The 2009 study by Naylor, Cowie, Walters, Talamelli, and Dawkins, suggested that the most important way to reduce mental health stigma is through education. For example, one group of researchers found that placing specialized tutors in schools to teach adolescents about common mental health issues created diminished negative attitudes about mental health disorders. Concurring with education, Stanley, Miller, Foster, and Thomson, (2011) called for the development of appropriate suicide prevention programs at universities and similar institutions. Another study found that a Colorado State University student organization provided peer support through Active Minds, an organization formed to help change people's negative attitudes about mental illness and encourage students to help one another in coping with their diagnoses (McKinney, 2009).

2.2.1 Population Use of e-Health Support Tools

The World Wide Web is increasingly recognized as a powerful tool for intervention and prevention programs (Levy & Strombeck, 2002). The Internet is an important mode of delivery because of its ability to reach a large number of people cost-effectively due to fewer personnel and infrastructure costs (Christensen & Griffiths, 2002). Online mental health interventions can also reach people who live in remote areas without easy access to healthcare providers and services (Christensen & Griffiths, 2002; Farrell & McKinnon, 2003; Gutierrez, 2001; NCI & RWJF, 2001). It is also a viable option for the people who will not seek out traditional services, especially those who wish to remain anonymous

(NCI & RWJF, 2001), and those that choose to utilize Internet-based health services (Bai, Lin, Chen, & Liu, 2001).

Fox and Jones (2009) pointed out that 21% of American adults looked online for information about depression, anxiety, stress or other mental health issues, compared with 12% of adults in 2002. There is a growing trend by health consumers to seek out health information online because of the perception that the web provides convenient access to reliable health information (Anderson, 2004) and facilitates access to content on sensitive health issues (Klein & Wilson 2002). About 80% of Americans have searched for at least one health-related topic (Boase & Wellman, 2006) on more than 70,000 websites that provide health information (Cline & Haynes, 2001). A 2009 Canadian Medical Association (CMA) survey of 683 physicians revealed that 83% of respondents said patients arrive with information from the Internet, and an additional 11% suspect that patients have referenced the Internet before arriving while 87% of respondents said that they use the Internet for health information. A survey conducted by CBC News in 2011, about the population use of the Internet revealed that 41% of Canadian adults polled use online sites for information on specific diseases, medical issues, or health-related products, while 67% claimed to trust information from the Internet (CBC News, 2011). Fox and Jones (2009) in their survey of Americans' usage of Internet to acquire health related information indicated that 61% seek health and medical information online in a typical day, while 60% claimed to have found health and medical information online that affected their decisions about how to treat an illness or condition.

2.2.2 Mental Health Impact in Higher Education Institution

The etiology of depression is unclear, but the U.S. Surgeon General's report on mental health indicated that stressful life events might play a role in depression. In general, students are often faced with stressors related to developmental issues, coping with family circumstances, life course decisions, academic hurdles, sexually related experimentation and/or exploitation, drug and alcohol use and abuse and violence (U.S. Department of Health, 1999). A Canadian Mental Health Association (CMHA, 2010) report stated that 20% of Canadians will personally experience a mental illness in their lifetime and that mental illness will indirectly affect all Canadians at some time through a

family member, friend or colleague. Studies have looked at correlates of depression, including life stressors, where major episodic events occurred that are believed to be precursors to depression. In addition, research has demonstrated the co-occurrence of alcohol and drug use and depression symptoms and/or diagnosis. Past trauma and child sexual abuse (Spataro et al., 2004); stressful life events and sexual assault; (Frank et al., 1984; Rickert IV et al., 2000) domestic violence and alcohol abuse; (Hankin et al., 1999) and substance abuse (Duncan et al., 1996) are shown to relate to anxiety and mental disorders including depression. Another study demonstrated evidence of increased risk of smoking related to assault, family substance abuse and depression (Acierno et al., 2000).

To understand student patterns of informal help seeking, Drum, Brownson, Denmark, and Smith in their 2009 study asked students who seriously considered attempting suicide in the past 12 months if they told anyone about their suicidal thoughts. Drum et al. (2009) found that 46% of undergraduate and 47% graduate students chose not to tell anyone about their suicidal thoughts. Of interest, after controlling for student status, gender, and intensity of suicidal thought, a hierarchical linear model found no relationship between disclosing suicidal ideation and actually making an attempt. However, they discovered that 52% of students who confided in other people reported that telling the first person was helpful or very helpful in dealing with the suicidal thoughts. Two thirds of those who disclosed their suicidal ideation first chose to tell a peer, such as a romantic partner, roommate, or friend. Almost no undergraduates and not a single graduate student confided in a professor. Not only are students more likely to be chosen as confidants by peers who experience suicidal ideation, but they also stand to benefit personally from the increased awareness of mental health issues that should be facilitated through training, thus resulting in a deeper and more enduring impact on campus suicide prevention.

Drum et al. (2009) concluded that the students' reasons for not telling others about their suicidal ideation provide valuable insight into the way students perceived both the seriousness of their suicidal thoughts and the potential consequences of sharing these thoughts with others. Several prominent themes that emerged from this inquiry were fear of being stigmatized or judged, not wanting to burden others, knowledge that the problem was transitory, not having anyone to tell, and fear of consequences such as expulsion from school or forced hospitalization. It is important for university policymakers to note

that wariness of institutional policies like mandatory treatment or medical leave prevents some students from disclosing their distress. These results also have implications for population-based interventions aimed at decreasing secrecy and stigma around mental health issues and increasing students' social support networks. Such interventions are likely to both reduce the chance that students will initially develop suicidal ideation and increase the probability that those students who do experience suicidal ideation will confide in others (Drum et al., 2009).

2.2.3 Mental Health Impact on University Students

Research suggests that the existence of mental health disorders may be worsening among college students (Hunt & Eisenberg, 2010), as evidenced by the results of a 2011 survey of 1,600 University of Alberta students. According to Dehaas (2011), the survey revealed that about 51% reported that within the past 12 months, they "felt things were hopeless; 88% claimed to have experienced "overwhelming anxiety" and a shocking 7% admitted they had "seriously considered suicide," while 1% had actually attempted it. The situation is not any different among American students; according to the 2011 survey conducted by the American College Health Association, 31% of college students surveyed claimed that they "felt so depressed it was difficult to function" at some point during the prior 12 months, 51% of them felt "overwhelming anxiety" during the same time period and 1.1% of the surveyed students actually attempted suicide. A Canada-wide prevalence survey conducted by the Centre for Addiction and Mental Health indicated that 29% of undergraduate students reported four or more symptoms of distress as measured by the 12-item General Health Questionnaire. The most common symptoms were feeling constantly under strain (47%), losing sleep over worry (32%), and feeling unhappy or depressed (31%) (Adlaf, Demers, & Glicksman, 2005). More recent Canadian students' surveys support the finding that emotional distress is common and that students see these problems as interfering with academic progress (MacKean, 2011). These statistics simply indicated that addressing students' mental health concerns is crucial if they are to fulfill their potential and contribute fully to the development of their communities (Patel, Flisher, Hetrick, & McGorry, 2007).

Arnett (2000) in her study labeled people from age 18 to 25 as *emerging adults*. Some studies (Arnett, 2000; Reynolds, Magidson, Mayes, & Lejuez, 2010) suggested that emerging adults engage in risky behaviors such as unprotected sex and binge drinking more often than adolescents or people in their late 20s. Similarly, other studies concurred with this study by providing additional evidence that risk-taking behavior is strongly correlated with emotional stress and psychological difficulties in this age group (Beck et al., 2009, Burris et al., 2009; Goldstein et al., 2009). Despite the volatility of emerging adults' life situations, they experience many barriers to receiving professional mental health care (Grant & Potenza, 2010). An estimated half of Canadians aged 18–25 with depression or suicidal tendencies have not sought mental health treatment (Cheung & Dewa, 2007). A 2009 Reader's Digest article on unsatisfactory access to Canadian mental health resources stated that, "Only 1/5 of youth who need help get it" (Isabella, 2009, p. 92). The study by Perlick, Hofstein, and Michael, (2010) outlined many factors that prevent emerging adults from seeking mental health treatment; social issues is highly regarded as one of the main factors that includes lack of symptom detection, avoidance of difficult feelings, and the use of drugs and alcohol to suppress symptoms. Other barriers according to Perlick, et al. (2010) included financial restrictions, difficulty with navigating the complex mental health system because of their symptoms, and identifying services perceived as accessible and responsive. Students who participated in the Eisenberg, Golberstein, and Gollust, (2007) study also reported a lack of time and the belief that stress is normal in school.

2.2.4 Mental Health Self-Help Measures

Studies conducted by Apodaca and Miller, (2003) and Scogin, Bynum, Stephens, and Calhoon, (1990) indicated that interventions using self-help materials can be effective in alleviating depression, anxiety and other mental health disorders. Self-help, self-care, self-management, and self-examination therapy are all terms used interchangeably to describe interventions where the client uses literature and techniques presented in a variety of formats to manage his or her mental health difficulties with minimal or no direction from relevant professionals (Richard, 2004). However, there is considerable

variability in effect sizes, and several recent studies have failed to obtain significant improvements in outcomes (Haeffel, 2010).

Self-help approaches to treating anxiety and depressive related disorders emphasize what the students can do for themselves rather than what professionals can offer. The study by Nemande, Reiss, and Dombeck, (2007) advised the students not to delay treating depression professionally or attempt solely self-treatment but instead, to seek a professional diagnosis at the earliest opportunity. They emphasized the importance of early diagnosis of depression and advised that the sooner depressive related disorders are properly diagnosed and treated, the better the chances of recovering. Patel et al. (2007) concluded that constant tiredness, feeling of loneliness, sadness, low mood, fearful and restless sleep are sometimes temporary and get better with time and sometimes do not. They further stressed the point that while some depressions are temporary and relatively mild conditions, others really are not. Nemande et al. (2007) warned that delaying treatment in such cases allows symptoms to worsen and can cause serious problems to occur such as severely impaired health and occupational functioning, damage to interpersonal relationships, and suicidal thoughts and behavior. Deciding on the active ways to implement a self-help routine that will enable a quick recovery is the key to overcoming the depression, according to Nemande et al. (2007).

The most important self-help measure is for the distress emerging adult students to seek help either from the school health care team, online support tools or professionally. Receiving effective treatments can reduce the detrimental effects of psychological distress (Nicholas, Oliver, Lee, & O'Brien, 2004). However, past research indicates that between 45% and 65% of university students experiencing mental health problems do not access professional help (Eisenberg et al., 2007; Urbis JHD, 2007). Paradoxically, those with serious problems such as severe depression and suicidal intent, who arguably have a greater need for professional help, may be even less likely to seek help (Cigularov, Chen, Thurber, & Stallones, 2008). The issue of not being willing to seek help in time of need is known as the *help-negation effect* (Rickwood et al., 2005). In general, people are more likely to seek informal rather than formal (professional) help for mental health issues (Kelly et al., 2007; Rickwood et al., 2005). Nemande et al. (2007) suggested that it is in

the best interest of depressed students to express themselves, either to a therapist or their family members.

Keeping a journal and venting through writing for 15 to 20 minutes three or four days in a row, helps ease ones' state of mind according to Nemande et al. (2007). Regular vigorous physical exercise is moderately more effective than no therapy for reducing symptoms of depression (Rimer et al., 2012). Furthermore, in their study they suggested that physical fitness training leads to general health improvement, improved mood, and self-concept and work behavior. Nemande et al. (2007) in their own study advised that exercise is a great way to distract oneself from thoughts as the need to attend to the physical demands drives out self-critical thinking at least for a little while. It is advisable to consult a physician before starting a new physical exercise program (Nemande et al., 2007). Leff and Warner (2006) suggested that it is advisable for one to stay socially engaged, since the core symptoms of depression motivate people to isolation by pushing people to stop participating with others socially and emotionally.

Nemande et al. (2007) made an assertion that choosing to make positive improvements in one's lifestyle could end up elevating personal mood. They further suggested that taking better care of oneself is a vital self-help measure that affects personal feelings, sleep and eating patterns, drug and alcohol usage, exercise, social and spiritual habits. Drum et al. (2009) described depression as a type of illness that tends to make people feel out of control; they suggested education about the illness is the best way to regain a sense of control. They further recommend seeking advice from qualified personnel like school counselors, campus physicians or therapists, and listening to what other people who have had similar mental issues have to say about it. Seeking as much information on the combination of treatments and techniques as one could, is the right attitude for becoming better educated about depressive related disorders (Drum et al., 2009).

2.3 Clinical Aspects of Online Mental Health Support Tools

With various information and communication technologies geared around mental health care, there is a need to evaluate the engagement level of the current online mental health support tools and health information available.

Bryan and Rudd (2006) stated that the feelings of hopelessness/helplessness are associated with increased risk for attempting suicide, and these feelings may be difficult to identify. They concluded that even highly trained professionals have difficulty accurately assessing the severity of suicide risk in their clients. The study by Wingate, Joiner, Walker, Rudd, and Jobes, (2004) found that clinicians tend to both overestimate the severity of clients' suicidal thoughts and underestimate the severity of risk that is associated with preparing for a suicide attempt. If trained professionals have difficulty accurately assessing suicide risk, then it follows that the lay people on the campus might struggle to make an accurate assessment.

2.3.1 Tele-Health

Tele-health or treatment via tele-conferencing constitutes a viable option to provide certain services remotely. The study by Germain, Marchand, Bouchard, Drouin, and Guay, (2009) found that recourse to remote treatment provides many advantages, such as increased and quicker accessibility to health care services for people who live outside major urban centers, as well as reduced wait lists, travel time, and transportation costs. They further argued that appropriate use of tele-health could contribute to mitigating the unequal distribution of resources. However, few studies have specifically assessed the effectiveness of remote psychotherapy, particularly via a videoconferencing system, according to Germain, et al. (2009). Video conferencing is a technological procedure that allows individuals to see and hear each other on a computer monitor or video screen in real time. Hence, it enables individuals in different locations to interact simultaneously and the advantage for therapists according to Riemer-Reiss (2000) is that they have access to their clients' nonverbal behavior. The access to the client's nonverbal behavior would enhance the quality of the therapeutic relationship and enables better understanding of clients' various reactions; because this technology is similar to face-to-face consultation, it is well suited for psychotherapy (Riemer-Reiss, 2000).

2.3.2 Video Counseling

Shepellfgi (2012) described video counseling as the process by which client and counselor communicate with each other using a webcam, landline, and encrypted custom Internet software, enabling both parties to see and hear each other; participants are also able to share and create documents in real time. A study conducted by Day and Schneider's (2002) compared five Cognitive Behavioral Therapy (CBT) sessions administered face-to-face, by videoconference and by telephone. In their study, 80 participants suffering from a variety of problems (e.g., preoccupations with body image, relationship or professional problems, low self-esteem) were assigned randomly to one of the three treatment conditions or to a wait list. The outcome of the Day and Schneider, (2002) study showed a significant improvement in all treatment conditions compared with the wait-list control, and no significant differences were observed between the three treatment modalities. In addition, despite their small samples, certain studies concerning CBT administered by videoconference have shown promising results, especially for bulimia, obsessive-compulsive disorder, and social anxiety (Bakke et al., 2001; Himle et al., 2006; Pelletier 2003; Simpson et al., 2006). Two single-case studies have also obtained positive results regarding the use of CBT administered by videoconference for problems related to anxiety or depression (Cowain, 2000) The results showed that group interventions are perfectly feasible and are comparable to standard face-to-face treatments (Frueh et al., 2007; Morland, Pierce, & Wong, 2004).

2.3.3 e-Counseling

Shepellfgi (2012) described e-counseling as an asynchronous, professional, and confidential counseling service directly through secure e-mail conferencing that gives people the opportunity to express themselves in email and the intervention is believed to be ideal for those more comfortable with written communication. Mitchell (2014) described therap-e-mail as the use of secure email to provide quality, effective counselling. According to Schell (2010), the process begins when clients visit Therapy Online's website on the World Wide Web (http://www.therapyonline.ca) and submit a request for the Virtually Solve It worksheet (VSI). The VSI is comprised of a series of questions that have been developed within the framework of narrative and solution-

focused therapies. A therapist receives VSI requests by e-mail and, provided the client consents to a series of conditions, warmly welcomes them and sends them the VSI via e-mail, according to Murphy and Mitchell (1998); clients can then use the VSI off-line to begin the process of the therapy.

2.3.4 Application of e-Therapy

Nickelson (1998) defined these scenarios (from psychotherapy to e-therapy) with the word *tele-health*: the use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, education and information, across distance. The focus is on the application of technology upon the process of the psychotherapy, of diagnosis, or of other psychological activities that can be enhanced with the use of technological media and tools according to Nickelson (1998). Online mental health support tools are various avenues of providing interventions to the help-seekers during their distress span. Therapy mailing list, group message board, or personal emotional support sessions in online peer to peer chat, these settings are freely available through instant messaging software (ICQ), as well as server-based chat programs as intervention avenues, according to Kirsch, Leno and Silverman, (2005). As noted by Grohol (1999) e-therapy is a new modality of helping people resolve life and relationship issues. It uses the power and convenience of the Internet to allow simultaneous (synchronous) and time-delayed (asynchronous) communication between an individual and a professional. Grohol (1999) stated that it would be inappropriate to compare e-therapy to traditional face-to-face psychotherapy, assessment or traditional services, because it is a resource that can supplement traditional treatments. Maheu and Gordon, (2000) pointed out that another key issue to consider in the possible applications of e-therapy is the provision of appropriate health assistance in remote areas where specialized staff and facilities are not widespread. In these situations, the Internet could be the only solution to allow daily health care. Health Infoway is an example of e-therapy success in Canada (www.infoway-inforoute.ca, 2014).

2.3.5 Advantages of e-Therapy

Clinical intervention in psychotherapy is enhanced in two different ways: individual therapy and self-help therapy. Murdoch and Connor-Greene, (2000) on self-help therapy concluded that the main possible advantage of using e-mail as an adjunct to therapy is the patient's involvement in treatment. They reported two interesting clinical cases where therapeutic alliance and impact improved with the use of e-mail homework reporting. The authors attributed this improvement to the fact that some patients have fewer problems when they talk about personal issues using e-mail than when they are in a face-to-face setting. In addition, in another outpatient case, Bouchard, Payeur, and Rivard, (2000) used videoconference to enhance a cognitive-behavior protocol for the treatment of patients suffering from panic disorders with agoraphobia. According to the authors, tele-psychotherapy demonstrated statistically and clinically significant improvements of target symptoms (frequency of panic attacks, panic apprehension, severity of panic disorder, and perceived self-efficacy) and measures of global functioning (trait anxiety, general improvement). Bouchard et al. (2000) concluded in their study that a good therapeutic alliance was built using videoconference (and not real face-to-face interactions) after the first tele-psychotherapy session.

The study by Fenichel et al. (2002) reiterated that one of the great challenges confronting online mental health professionals is the accurate perception of meaning, nuance, and tone within the context of text-based communication. According to Fenichel (2000), the client is likely to benefit most when they believe the counselor or therapist to be concerned, empathic, and expert in helping with their particular problem. There is a substantial body of information describing the various technical and practical challenges in effective online communication (Fenichel , 2000; Fenichel et al., 2002) as well as detailed analyses of the ways in which nuance, pacing, emphasis and meaning can be finessed through text-based communication, either through email or during the course of chat-based communication (Suler, 2000). Many of the psychological dimensions of text communication in general apply across the board to the various types of text communication tools in particular: video chat, email, message boards, instant messaging, blogs and audio chat (Suler, 2000).

Suler (2000) also named the conceptual model for understanding the dimensions that shape the various psychological environments of cyberspace: asynchronous versus synchronous communication, imaginary versus realistic environments, automated versus interpersonal interactions, being invisible versus being present and the extent to which communication is text-driven or sensory-rich with sight, sounds and even smells. All these dimensions interact with text to create a fascinating variety of therapeutic interventions. In asynchronous communication, such as email and message boards, they may enjoy the *zone reflection* where they can ponder on how to express themselves. In those cases, asynchronous text may be a less spontaneous form of communication than speech and online synchronous communication, such as chat (Suler, 2000).

Moreover, Suler (2004) in his study to attest the importance of text-based communication between the therapist and the patient stated that writing affects the relationship and the relationship affects the quality of the writing; the same reciprocal influence exists between the text relationship and writing style. Concrete, emotional and abstract expression; complexity of vocabulary and sentence structure; the organization and the flow of thought all reflect one's cognitive/personality style and influence how the other reacts according to Suler (2004).

Recent studies that examined the outcome and impact of new delivery channels of treatment in depression and anxiety disorders have shown that the numbers of online programs (e-therapy, video counseling, peer-to-peer chat, different online support groups) that target mental health are growing (Ryan et al., 2010; Richard et al., 2012; McAuliffe et al., 2012). While many of these studies focus on analyzing the clinical and monetary effectiveness of these online programs, according to Richard, William, and William, (2009), rarely do, they focus on user demographics other than simply listing the sample upon which the hypotheses are based. Richard et al. (2009) suggested that with an increasing number of consumers having access to the Internet and mobile technology, there is an opportunity to invest in the systematic expansion of current services and mental health programs (including more elaborate websites, tip sheets, educational webinars, self-assessment tools, etc.). This in turn will attract a younger demographic and

a geographically dispersed population, as well as reduce the financial burden generated by treating mental health issues (Cunningham, 2009).

2.3.6 Disadvantages of e-Therapy

Humphreys, Winzelberg, and Klaw, (2000) noted that, it is essential that ethical problems be taken into account for psychologists and people in Internet-based support groups. They argued that the issue of privacy violation is still the main problem with e-mental health; inappropriately all the personal information exchange in online self-help groups' therapy sessions could be wrongfully typed, recorded, copied, and distributed by unauthorized person, for various reasons (Humphreys et al., 2000). Health information exchanging via e-mail can reduce the emotional burden of patients by encouraging and enabling them to say whatever they care to say, according to Humphreys et al. (2000). Emotions can be simulated, to some extent, by using symbolic or graphics expressions (i.e., the emoticons) as underlined by Yager (2001); he further suggested that clinician or therapist failure to respond in a timely and adequate fashion, and difficulty to recognize urgent and troubled communications meriting phone and/or face-to face contact are also potential negative effects of online support group.

Literature has exposed the existing gap between the technology of the online mental health support tools and its usage. If emerging adults are more aware of and sensitive to the prevalence of mental health illness, they may more likely seek help that is more engaging and efficacious when they need it. However, such an occurrence will be driven by a positive impression of the online mental health support tools by the emerging adults (students). As such, the aim of this study is to find out how the emerging adults perceived these online support tools.

3. STUDY MENTAL HEALTH SELF-ASSESSMENT SUPPORT TOOLS

Online health support services require a holistic understanding of how health information consumers interact with the web and with the contents they found. To deduce the emerging adult students' perception of the online mental health tools for this research study, we introduced and educated 18-25 years old participants to Mindsight (http://mindsight.uoit.ca), Moodgym (http://moodgym.anu.edu.au) and Psychcentral (http://psychcentral.com) as mental health support tools of choice for this study, before they were allowed to participate in the study. Mindsight was chosen for this study because it was originally created for the well-being of the University of Ontario Institute of Technology students. Psychcentral and Moodgym were chosen for this study because of their similarity in features to Mindsight and their respective contents and users volumes. Though both support tools are used worldwide, Psychcentral was created in the United States of America, while Moodgym was created in Australia.

3.1 Mindsight

Mindsight is an online mental health support tool that consists of nine interactive modules designed to promote awareness and educate the students on mental health related issues. Each module contains information, animated demonstrations and ends with quizzes on mental health related issues, such as depression, anxiety, substance use, suicide, self-harm, bipolar and eating disorders, as well as psychosis and trauma. The portal was designed to educate students on how to eliminate the stigma generally associated with mental illness, by providing information about common mental illnesses, video clips of individuals living with the illness, support strategies and treatment options, as well as various resources in the community. A certificate of completion is awarded upon successfully achieving 80% or more on the multiple choice questions at the end of each module. The support section covers a wide range of information on health related issues that should engage the students. (http://mindsight.uoit.ca)

3.2 Moodgym

Moodgym is a free, fun, interactive online mental health therapy and support program to teach cognitive behaviour therapy interventions. The web tool is designed to treat and prevent anxiety and depression in people with access to the Internet. The self-paced program consists of five different modules, designed to be completed in sequence. The modules explore issues such as why you feel the way you do; changing the way you think; changing warped thoughts; knowing what makes you upset; assertiveness and interpersonal skills training. The interactive and multimedia possibilities afforded by standard web browsers offer the potential to engage the target population in ways that are not possible using conventional delivery methods. (http://www.moodgym.anu.edu.au)

3.3 Psychcentral

Psychcentral is an independent mental health social network. The support tool is overseen by mental health professionals who create and oversee all the content published on the site. Generally, the network offers broad-based mental health resources including resources on symptoms, psychotherapy, advocacy, and e-therapy among other resources. The network offers about 200 different online support forums and online self-help communities. Psychcentral offers fourteen interactive modules designed to promote awareness and educate the users on mental health related issues. Each module contains information, animated demonstrations, video clips, as well as quizzes on mental health related issues such as depression, anxiety and panic, post-traumatic stress disorder, autism, self-harm, bipolar and eating disorders, as well as psychosis and trauma. (http://www.psychcentral.com)

4. RESEARCH MODEL AND HYPOTHESES

Perceptions of the students on online mental health support tools such as benefits and complexity are critical factors that form individual students' Attitude toward them. To study the students' perception of these tools, this study aims to identify the factors that influence the usage of the online mental health support tools by applying a research model from the existing literature on technology acceptance. From the original TAM study of Davis et al. (1986), Perceived Usefulness and Ease of Use are factors that influence an individual's Attitude about a technology; this Attitude also has a critical influence on a potential Intention to Use the technology.

4.1 Research Model: Technology Acceptance Model

User technology acceptance has been extensively examined across assorted information technologies and user populations and satisfactory empirical support for respective theories or models investigated has been accumulated (Alavi & Carlson, 1992; Davis, Bagozzi, & Warshaw, 1989; Hartwick & Barki, 1994; Keen., 1991; Markus & Keil, 1994). Collectively, the literature has suggested that user acceptance is a critical success factor for information technology (IT) adoption and can be sufficiently explained, accurately predicted and effectively managed by means of a host of relevant factors (Hu, Chau, Sheng, & Tam, 1999). The researchers further stated that these factors are made up of three important dimensions: characteristics of the individual, characteristics of the technology, and characteristics of the organizational context. Various frameworks and models have used these characteristics to investigate the nature and determinants of IT acceptance/adoption. Among the examined models to analyze computer-usage behavior was the TAM, according to Davis (1986). TAM is an intention-based model developed specifically for explaining and/or predicting user acceptance of computer technology with advantages in parsimony, IT specificity, a strong theoretical basis, and ample empirical support (Hu et al., 1999).

To conceptualize a TAM for the prediction and explanation of students' perception of the available online mental health support tools and information, Hu et al. (1999), suggested that one has to first analyze different types of available acceptance models and

frameworks. In order to arrive at an appropriate acceptance model, the Theory of Reasoned Action (TRA) was adapted, a general social-psychological/behavioral theory that has been proven useful for understanding a variety of behaviors such as voting, exercise and condom use according to Fishbein & Ajzen (1975).

Different models according to Holden & Karsh (2009):

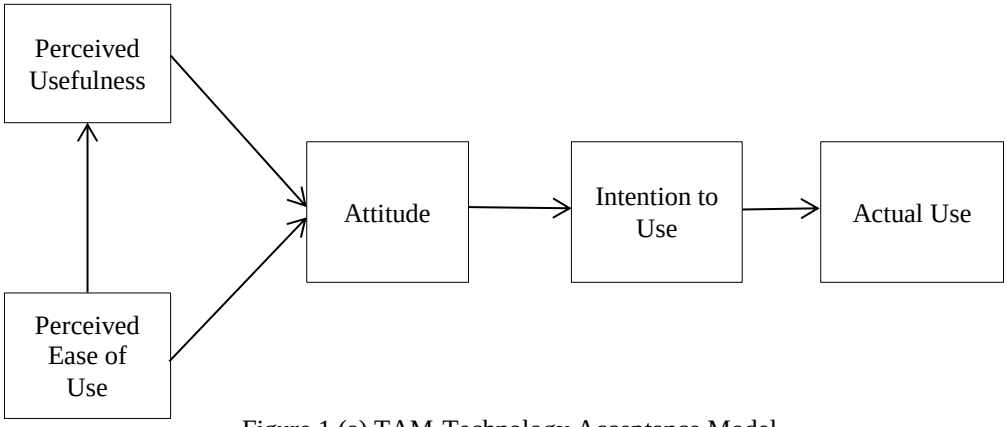
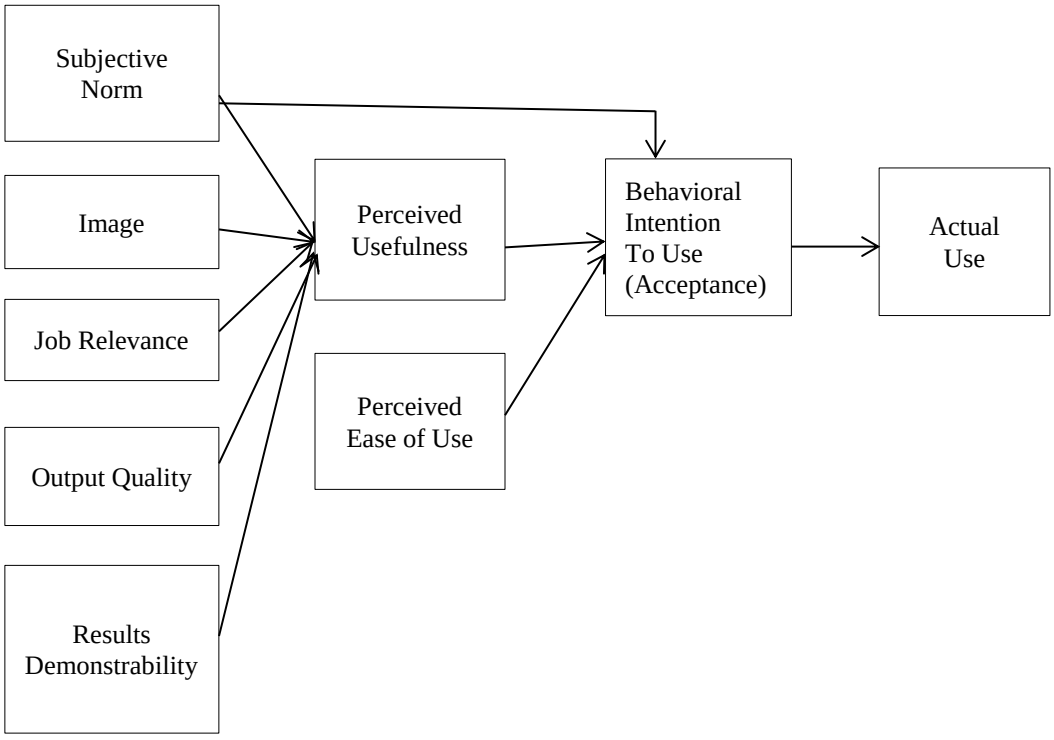
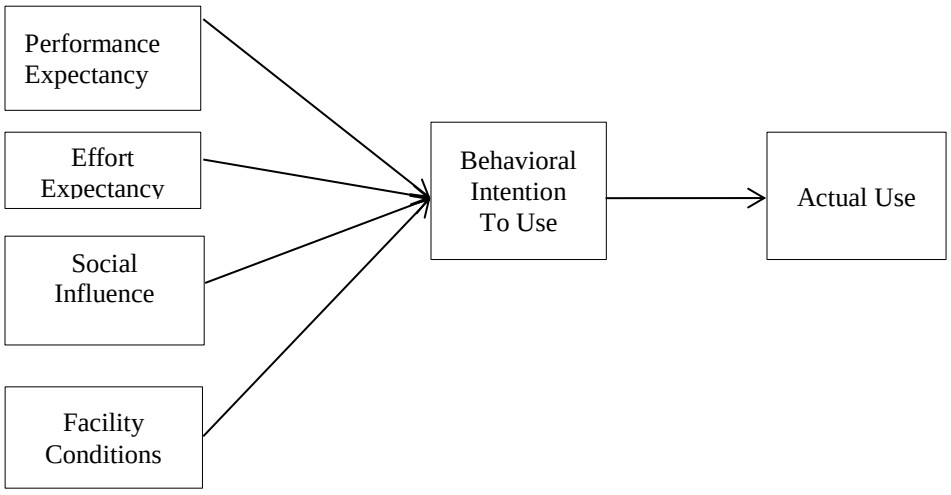


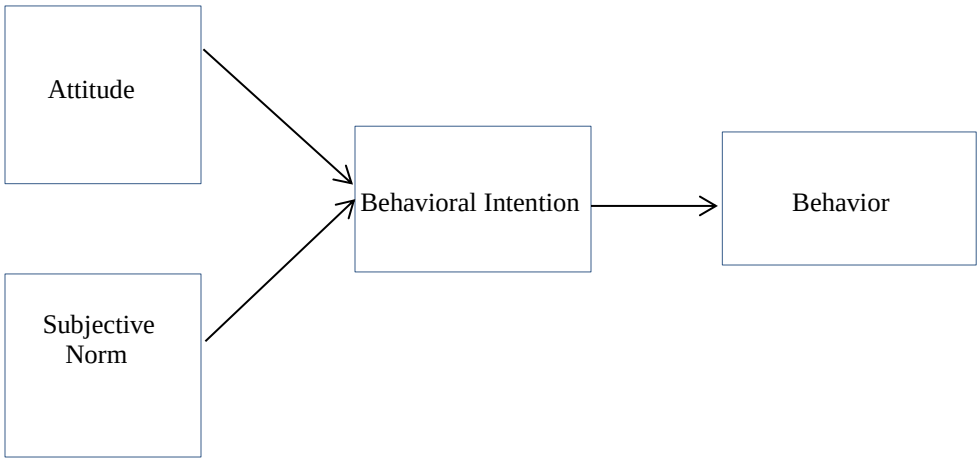
Figure 1 (a) TAM-Technology Acceptance Model



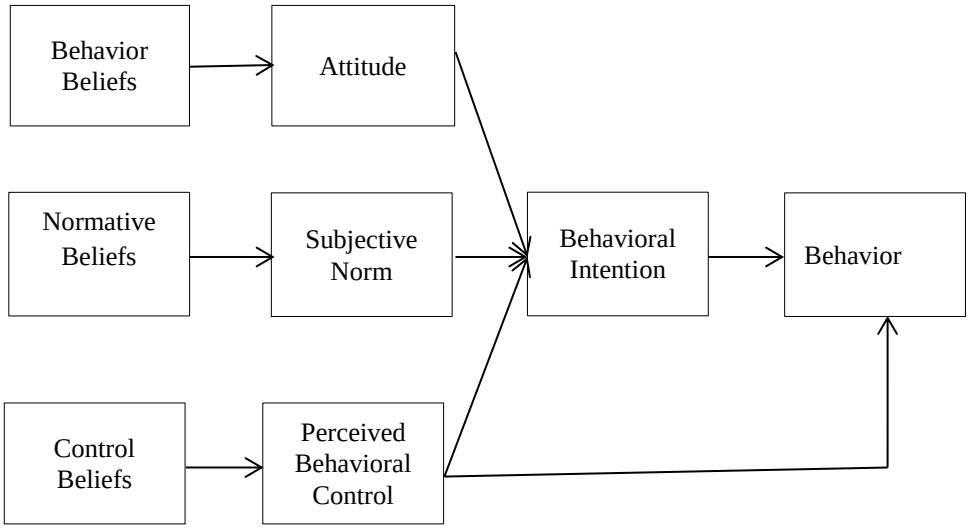
(b) TAM2-Technology Acceptance Model 2



(c) UTAUT-Universal Theory of Acceptance and Use of Technology



(d) TRA-Theory of Reasoned Action



(e) TPB-Theory of Planned Behavior

Figure 1, Illustrations of (a) the Technology Acceptance Model (TAM), and related theories, including (b) TAM2, (c) Universal Theory of Acceptance and Use of Technology (UTAUT), (d) Theory of Reasoned Action (TRA) and (e) Theory of Planned Behavior (TPB)

According to the Theory of Reasoned Action (TRA), beliefs influence Attitudes, which in turn lead to intentions, which then guide or generate behaviors. Ajzen and Fishbein (1980) claimed that it was customary for adapting such theory to new contexts. Davis (1986) conducted a preliminary study to determine what would be the appropriate variables to include in a model in order to understand information technology use behavior. In reference to Holden & Karsh (2009), we deduced the variables that could possibly influence the online mental health support tools usage to be as follows:

- Online Tool Designs (OTD) – Designation of different online mental health support tools
- Behavioral Intention to Use (ITU) – An individual's motivation or willingness to exert effort to perform the target behavior
- Attitude (ATT) – An individual's evaluative judgment of the target behavior on some dimension (e.g., good/bad, harmful/ beneficial, pleasant/unpleasant)
- Perceived Ease of Use (PEoU) – An individual's perception that using an IT system will be effortless

- Perceived Usefulness (PU) – An individual's perception that using an IT system will enhance job performance
- Social Influence (SI) – An individual's perception of the degree to which it is important, other people approve or disapprove of the target behavior

Davis (1986) first introduced the TAM as a theoretical extension of the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) and found that it could better explain user's acceptance. TAM proposes that two particular beliefs, Perceived Usefulness and Perceived Ease of Use, are the primary drivers for technology acceptance. Perceived Usefulness is defined in this research study as the degree to which the emerging adults believe that using an online mental health support system would enhance their mental health status. Perceived Ease of Use is defined as the degree to which the emerging adults believe that using an online mental health support system would be free of physical and mental effort (Davis, 1989). Furthermore, Perceived Usefulness and Perceived Ease of Use both affect the emerging adults' Attitude toward using the system, and consistent with TRA, these Attitudes toward using the system determine Behavioral Intention, which in turn lead to Actual System Use. The most proximal antecedent to acceptance of information technology (IT) usage, according to (Davis, 1989; Mathieson, 1991; Szjana, 1996) is the Behavioral Intention to Use it, however, Brown & Blanton, (2002) suggested that another common conceptualization of acceptance is end-user satisfaction. Intention to Use is thought to reliably predict Actual Usage, and the latter is difficult to measure; Intention to Use is sometimes the only measured outcome of interest in a study of TAM according to Chau et al. (2001) and Chau et al. (2002).

4.2 Model Selection

For this study, a reduced TAM model, excluding actual usage, was adopted. The original TAM was constructed with the thought of Behavioral Intention reliably predicting Actual Usage of IT (Davis, 1986), but for this particular study, because of lack of awareness of various mental health support resources among the emerging adults, it was decided that the Actual Usage would be difficult to measure. TAM is a theory that has gone through a number of changes (Venkatesh & Davis, 2000), so therefore modified TAM (TAM-Mod), with the exception of the actual usage construct was

adopted. The proposed models are presented in Figures 2 & 3. The model depicted in Figure 2 concerns pre-implementation beliefs about Usefulness and Ease of Use of the online mental health support tools, while Figure 3 depicts a model that involves post-implementation beliefs about Usefulness and Ease of Use of the online mental health support tools. The notable difference between the original TAM and the research TAM-Mod models is the omission of actual system use construct. Davis et al. (1989) and Adam et al. (1992) stated that empirical findings support the notion of different models for pre and post-implementations beliefs and acceptance. It is expected that beliefs or Attitudes differ or change with experience (Fazio, 1989). For this study, the student participants were interactively randomly introduced to the three online support tools (Mindsight, Moodgym, Psychcentral) employed for the research study, before participation. The pre-implementation version of the TAM-Mod predicts the acceptance of the online support tools with perception of Usefulness and Ease of Use before its actual implementation. The post-implementation model with the addition of two external variables (Online Tool Designs and Social Influence) used perceptions of Ease of Use and Usefulness as determinants of technology acceptance after the implementation of the three online mental health support tools.

4.3 Model Testing Criteria

Structural Equation Modeling (SEM) is a statistical approach for examining the causal relationships and testing the hypotheses between the observed and latent variables in a research model (Hoyle, 1995). In this study, an extended version of TAM based on the related literature was proposed in order to examine the students' perception of online mental health support tools. The main advantage of SEM is that it can estimate a measurement and structure model, and achieve a good model fit after analysis and modification (Ngai, Poon, & Chan, 2007). To test the model of this research, SEM and Analysis of Moment Structures (AMOS software, version 22.0) were used for validation. The maximum likelihood method to estimate the model's parameters was adopted. For the sample size, Boomsma (1987) suggested that if the maximum likelihood method is used to estimate the parameters, the smallest sample size should be higher than 200. However, he indicated that the sample size would have to be smaller than 100 to actually

generate incorrect results and inferences. Schumacher & Lomax (1996) suggested that many indices can be applied to evaluate the fit of a model, but no single index can serve as the only standard for judging the quality of a model. The following indices recommended by Hoyle and Panther (1995) and Kelloway (1998) were adopted as the criteria for the model's evaluation.

Table 1: Mode of Fit Requirement

Model Fit Measure	Recommended Value
X^2 /d:f:	< 3
Goodness-of –Fit Index (GFI)	>0.90
Adjusted Goodness-of-Fit Index (AGFI)	>0.80
Root Mean Square Root (RMR)	<0.10
Normed Fit Index (NFI)	>0.90
Comparative Fit Index (CFI)	>0.90
Increment Fit Index (IFI)	>0.90
Relative Fit Index (RFI)	>0.90
Tucker-Lewis Index (TLI)	>0.90
Root Mean Square of Error Approximation (RMSEA)	<0.10
Critical *N*	< 200

N should be more than 200 to get a good reading.

X^2 statistic is highly sensitive to sample size; with that in mind, several statistics were employed to assess the fitness of this model (Shook, Ketchen, Hult, & Kacmar, 2004). The study (Liu, Chen, & Sun, 2009) suggested that the closer the observed data is to the theoretical model, the better the fit of the model and the easier it will be to satisfy the thresholds of the above indices. They further suggested that, if the threshold of an index cannot be met, it means the model must be modified. For the threshold modification, a simple regression model was applied, where ITU, is predicted as a linear combination of the other three observed variables ATT, PU and PEoU. As with nearly all empirical data, the prediction is not perfect. The variable *Other* represents variables other than ATT, PU and PEoU that affect ITU. Some constraints are imposed in order to identify the model; this means that the paths' coefficients have fixed values set to 1.00. The fixed values are included by necessity; they set the scale of measurement for the latent factors and residuals. Alternatively, to obtain implicitly standardized solutions the variances of the factors were set to 1.00. (See Appendix F for the SPSS results)

4.4 Research Hypotheses

Online mental health support tool users need to see online mental health tools as useful tools that can influence their mental health recovery, enabling them to better communicate with their peers, friends, colleagues, psychiatrists, and other mental health professionals online without revealing their identity for the fear of stigmatization. Studies that use TAM (Davis, 1986) have addressed Perceived Usefulness, Ease of Use, Attitude, and Intention to Use as the major determinants that predict the acceptance of a new technology (as shown in Figure 1). In this study, Perceived Ease of Use is defined as the degree to which the participants believe that using online mental health support tools would be effortless, and Perceived Usefulness is defined as the degree to which the participants believe that using online mental health support tools would enhance his/her mental health status. Attitude in this study is defined as the degree to which student participants are interested in using the online mental health support tools, and Attitude toward the support tools determines Intentions to Use these tools, which, in turn, might lead to actual usage of the online mental health support tools. Since this study aims to determine the students' perception of the online mental health support tools, the following hypotheses based on revised TAM-Mod are proposed:

H1. Perceived Ease of Use of the online mental health support tools will positively influence the Perceived Usefulness of the online mental health support tools.

H2. Perceived Ease of Use of the online mental health support tools will positively influence Behavioral Attitudes towards the usage of an online mental health support tools.

H3. Perceived Usefulness of the online mental health support tools will positively influence Behavioral Attitudes towards the usage of an online mental health support tools.

In addition, TAM has shown that Perceived Usefulness will positively influence the user's Behavioral Intention, and Perceived Ease of Use affects Behavioral Intention indirectly through Perceived Usefulness (Davis, 1989). That is, Perceived Usefulness

mediates the effect of Perceived Ease of Use on Behavioral Intention. Many empirical studies have supported this argument (Venkatesh & Davis, 2000; Wu & Chen, 2005). Thus, it is hypothesized that:

H4. Perceived Usefulness of the online mental health support tools will positively influence the Intention to Use the online mental health support tools.

H5. Perceived Ease of Use of the online mental health support tools will positively influence the Intention to Use the online mental health support tools.

4.5 Theory of Planned Behavior (TPB)

Both the Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM) were developed based on the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), which argues that both Behavioral Attitude and Subjective Norm affect Behavioral Intention, which in turn affects the Actual Behavior. TPB adds a third factor to TRA– Perceived Behavioral Control: that affects Behavioral Intention and Actual Behavior (Ajzen, 1991). Many studies have replicated and investigated these three constructs and found that they are valid in explaining individual Intention to Use various forms of IT (Liao, 1999; Venkatesh, 2000). Attitude (ATT) refers to ‘‘the degree of a person’s favorable or unfavorable evaluation or appraisal of the behavior in question’’ (Fishbein & Ajzen, 1975). According to the TPB, Attitude influences users’ Behavioral Intention, which in turn influences their Actual Behavior. When individuals form a positive Attitude towards online mental health support tools, they will have a stronger Intention toward adopting it, and thus they are more likely to use it. Therefore, the following hypothesis is proposed.

H6. Behavioral Attitude toward online mental health support tools is positively related to the continued Intention to Use the online mental health support tools.

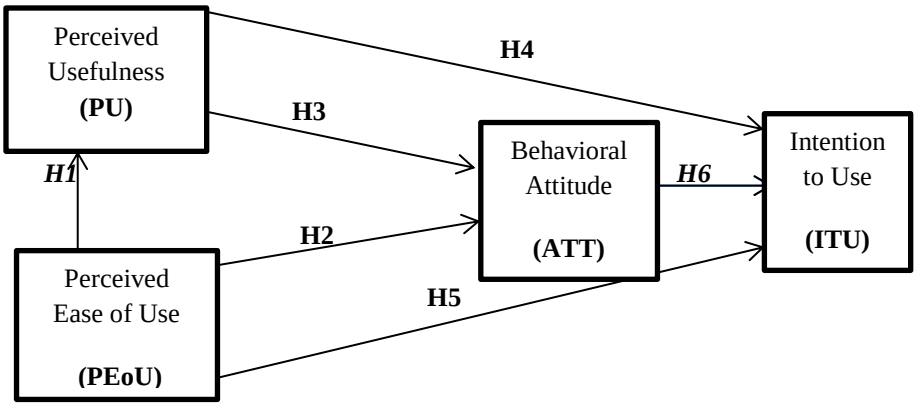


Figure 2 Determinants from the Modified-Technology Acceptance Model

4.6 External Variables

According to Fred Davis (1989), other external variables should be included in TAM for measuring the specific technology since they may influence the Perceived Ease of Use and Perceived Usefulness of that technology. Social Influence refers to the Perceived social pressure to perform or not to perform the Behavior (Ajzen, 1991). In other words, Social Influence is related to the normative beliefs about the expectation from other people. Because of its significant impact on any individual, Social Influence was included as one of the key component for the TAM-Mod based questionnaire. Many respondents might choose to use online mental health support tools because their friends, peers or family members who have used it recommend it to them. Furthermore, it is widely recognized that for students, the design of an online mental health support tool is the most important determinant of navigating effectiveness. The same holds true from the system's viewpoint, therefore, it is crucial that the support tool creators adopt the proper pedagogical strategy and technology when designing an online mental health support tool. From another perspective, a good interface design helps users resolve technical problems that may arise when using a system (Metros & Hedberg, 2002). According to Wang and Yang (2005), the Mindsight, Moodgym or Psychcentral interface designs will not facilitate beneficial outcomes if they are not comprehensive or they do not meet users' needs.

Designs and functions of the online mental support tools for this research study are different from each other's. Mindsight is an online educational resource created to promote awareness of mental health illness and also to facilitate greater understanding of basic strategies and resources for supporting individuals experiencing a mental health challenge. Psychcentral is an independent mental health social network, overseen by mental health professionals who offer online counseling services. Moreover, Mood Gym is a free, self-help program that teaches cognitive behavior therapy skills to help those vulnerable to depression and anxiety. Impression of support tools such as benefits, complexity and the sensitivity attach to mental health issues in the community are critical factors that form users' attitude and could possibly influence the users' choice of mental health support tools. The effect of peer-to-peer networking and presence of mental health professionals offering online counseling services to those in needs might positively or negatively influence the users' intention to use Psychcentral than Mindsight or Moodgym. More so, the privacy provided by Mindsight and the issue of trust in sharing personal feelings with strangers might positively or negatively influence the Users' intention to use Mindsight than Psychcentral or Moodgym. Mindsight was used as the reference category for the other tool designs in the study because it was created for the well-being and to raise mental health awareness among the students of the University of Ontario Institute of Technology. Based on the above information, the proposed conceptual model considers the influence of the following external variables of an online mental health support tool: Online Tool Designs in term of Psychcentral and Moodgym and Social Influence. Hence, the following hypotheses are proposed:

H7. Social Influence of the online mental health support tools will positively influence the students' Intention to Use the online mental health support tools.

H8. Social Influence of the online mental health support tools will positively influence the students' Perceived Usefulness of the online mental health support tools.

H9. Social Influence of the online mental health support tools will positively influence the students' Perceived Ease of Use of the online mental health support tools.

H10. The design of Psychcentral will positively (or negatively) influence students' Perceived Usefulness of the online mental health support tools relative to Mindsight.

H11. The design of Moodgym will positively (or negatively) influence students' Perceived Usefulness of the online mental health support tools relative to Mindsight.

H12. The design of Psychcentral will positively (or negatively) influence students' Perceived Ease of Use of online mental health support tools relative to Mindsight.

H13. The design of Moodgym will positively (or negatively) influence students' Perceived Ease of Use of online mental health support tools relative to Mindsight.

H14. The design of Psychcentral will positively (or negatively) influence students' Intention to Use the online mental health support tools relative to Mindsight.

H15. The design of Moodgym will positively (or negatively) influence students' Intention to Use the online mental health support tools relative to Mindsight.

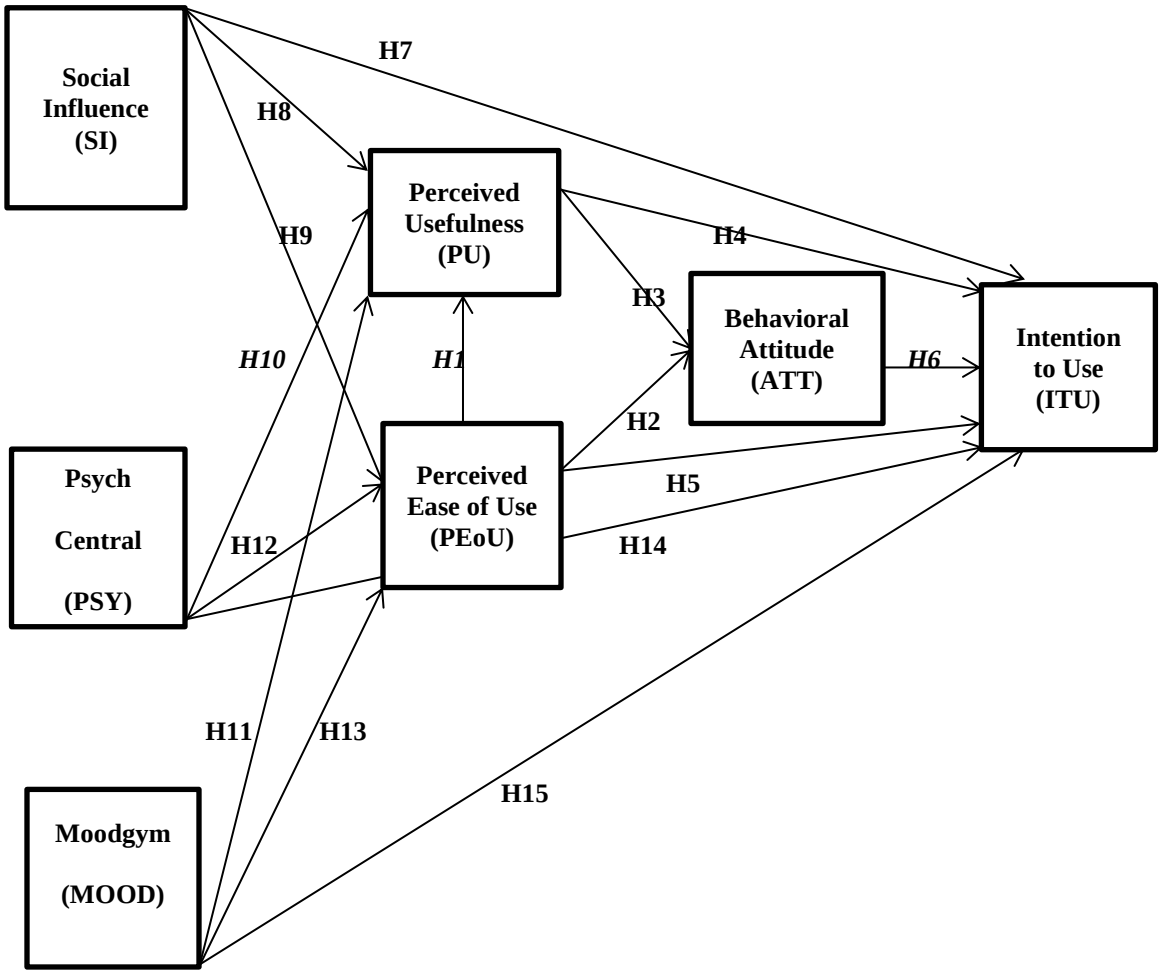


Figure 3 The proposed research model

5 RESEARCH METHODOLOGY

5.1 Longitudinal Experimental Study

For this study, a modified Technology Acceptance Model (TAM-Mod) as proposed by Davis, Bagozzi, and Warshaw, (1989) was adopted to identify the factors that could influence the mental health support tools usage. Therefore, the methodology included a longitudinal, experimental design using instruments similar to those used by Davis et al. (1989). Perceived Ease of Use and Perceived Usefulness were measured at the pre-implementation stage, as was Intention to Use the online mental health support tools. For the post-implementation phase of the study, Perceived Ease of Use, Perceived Usefulness and Behavioral Attitude were measured with the inclusion of Social Influence and Online Tool Designs (Psychcentral and Moodgym. Mindsight was made the reference category) as extended variables that could influence or determine the Intention to Use the online mental health support tools.

5.2 Participant Demographics

A total of 131 self-selected students aged 18-25 participated in the pre-implementation version of this research study. Table 2 shows the demographics profile of the participants. The mean age of participants was 22.0 years (*SD* = 3.162). Half of the participants (50.4%, *n* = 66) were male. First year undergraduate students are 6.1% (*n* = 8), other undergraduate students made up 68.7% (*n* = 90) of the sample, followed by 16.8% (*n* = 22) graduate students. The majority of participants were domestic students (81.7%, *n* = 107), while 85.5% (*n* = 112) of the student participants identified themselves as single/never married. (See Appendix E)

A sizeable 10% of participants chose not to answer some of the demographics questions while 2.3% did not complete the demographic questions of the survey. Thirty-six (27.5%) of the participants identified their ethnicity as Caucasians; 30 (22.9%) were black/ African/American descendants, 27 (20.6%) were Asian/ Pacific Islander, while 19 (14.5%) referred to themselves as other. A sizeable number of the respondents, 37 (28.2%) reported their family total household income to be over $45,000, while 32 (24.4%) of the respondents claimed that their yearly household total income is under

$15,000, 20 (15.3%) claimed that their yearly household income is between $25,000 - $35,000, and 19 (14.5%) reported their yearly household income to be $15,000 - $25,000. These statistics indicate that the study participants though limited in number, actually represent every demographics of the University of Ontario Institutes of Technology students, except the post graduate students.

5.3 Data Collection

The data collection approach for the survey was a user-reported self-assessment tool based on (TAM) framework and some relevant questions. The survey was a two-phase project that took 20-25 minutes. The first phase of the survey, (Pre-implementation of the online mental health support tools) was available as an online survey and paper-based that included demographic questions such as: age, gender, ethno-racial identity, financial income, marital status, level of study (first year undergraduate, other undergraduate, graduate or post-graduate), and mode of study (full-time, part-time or external). The survey also contained 27 closed ended TAM based questions about the students' general knowledge and perception of online mental health support tools and related health information.

The second phase of the survey, post-implementation of the online mental health support tools, contained three mental health support tools and three different mental health scenarios reports from which the participants randomly drew two scenarios reports and two support tools questionnaires. A 20-25 minutes survey on the mental health tools questions that was developed based on TAM framework focused on three different mental health support tools namely: http://mindsight.uoit.ca, http://moodgym.anu.edu.au, and http://psychcentral.com. It was followed by 10 open-ended written questions phrased as "Have you ever sought information related to mental health online" or "Which of the support tools would you access and why?" The participants were allowed to participate in the study after they had been introduced and educated on two different mental health support tools they randomly drew. The survey was to get their perception of those online mental health support tools after their implementation.

5.4 Questionnaire Development and Pretest

The use of TAM to investigate the students' technology acceptance is advantageous because it is a well-researched and validated measurement inventory (Davis, 1989; Mathieson, 1991; Segar & Grover, 1993). Specifically, preliminary measurements for Perceived Usefulness, Perceived Ease of Use, Social Influence and behavioral Intention to Use constructs were obtained from prior studies (Davis, 1989; Mathieson,1991; Davis et al.,1989) This research paper used a structured questionnaire consisting of two parts to test the theoretical model. The first part of the questionnaire measures the constructs included in the research model, while the second part collects demographic information about the study participants. The items of the constructs were measured with a five-point Likert scale, with answer choices ranging from "very unlikely" (1) to "very likely" (5). All constructs derived from the literature, primarily from previously tested survey instruments, were meant to take advantage of well-tested psychometric measures (Straub, 1989). All of the questionnaire items of the survey were adapted from previous studies: the five constructs including Perceived Ease of Use, Perceived Usefulness, and Attitude toward the technology, Intention to Use and Social Influence were adopted from Davis et al. (1989). The scale items for Social Influence were adapted from Taylor and Todd (1995). Behavioral Intentions to Use were assessed using adapted measures from Bhattacherjee (2001). Each construct was measured using multiple indicators in order to capture the underlying theoretical dimensions effectively (Premkumar & Ramamurthy, 1995). The questionnaire consisted of 34 questions that addressed the factors included in the research model. (See Appendix C for the TAM based questions)

5.5 Method of Recruitment

To raise the students' awareness about the project, a study poster was posted at every available space in the university premises almost a month before the survey. The requirement for participation was for the students to be between 18 and 25 years of age. Some professors were also approached for permission to run the study survey in their classrooms. Ninety students participated in the in-class survey that took place in three different second year classes while forty-one students decided to take the online version of the survey. Most of the online participants responded to the research posters posted

around the school premises. The participants were female and male from first year undergraduate to graduate students; their demography varied from domestic to international students studying either full time or part time. Altogether, 131 students from the University of Ontario Institute of Technology participated in the first phase of the research survey.

The second phase of the survey questionnaires is constructed to determine the student preferred support tools and the rationale behind the choice of the preferred tools. The written interview questions were tailored to appraise the student's awareness of the e-mental health support tools. There were no known or anticipated risks for participation in the study. Both phases of the survey were conducted from the beginning of October to the end of December 2013.

Incentives

As a token of appreciation for their study participation, the participants in both phases of the study were issued lottery tickets; the winning numbers were drawn at the end of the survey. The participants were eligible to win one of the available twenty $15 and $25 gift certificates. All 33 student participants that took part in the second phase of the study received a $5 cash compensation for their participation.

6. RESULTS

A total of 131 students from the University Of Ontario Institute Of Technology participated in this research study. Table 1 shows the demographics profile of the participants. The mean age of participants was 22.0 years (*SD* = 3.162), with ages ranging from 18- 25years; 50% were male. Other year undergraduate students made up 69% of the sample, followed by 17% graduate students, and 6% first year undergraduate students. The majority of participants were domestic students 82%, while 86% of the participants identified themselves as single/never married. Of all the respondents, 42% claimed that they would rather seek professional advice or help for their mental health concerns, while 41% claimed they would seek self-help online and 11% would rather not seek any sort of help. Ironically, 53% of the respondents claimed they had sought information related to mental health online, while 41% claimed they had not. (See Appendix E)

6.1 Participants' Responses

The Study Mental Health Support Tools (Mindsight, Psychcentral & Moodgym)

The second phase of the study was conducted specifically to evaluate the participants' perceptions of the Mindsight, Psychcentral and Moodgym. The participants were allowed to randomly choose two mental health scenarios and support tools questionnaires, after which they were introduced and educated on how to implement those online mental health support tools. The post-implementation survey was conducted with 33 student participants from the phase I of the study. A total of 66 responses were generated altogether, 25 (38%) of the responses were on Mindsight, 21 (32%) on Psychcentral and 20 (30%) questionnaires were on Moodgym. (See Appendix L)

6.2 Measurement of Constructs

Despite differences in the theoretical underpinnings of different measures of the TAM framework, these measures consistently identify a positive dimension and a conflict dimension (Chau, & Hu, 2002, Hu, Chau, Sheng & Tam, 1999). In this study, scores of the positive and conflict scales are moderately correlated with each other and both scores are predictive of students' perception of mental health support resources. The bivariate

correlations of the four constructs measured were all statistically significant in the pre-implementation version of the study. Tables 2 reports descriptive statistics (i.e., means and standard deviations) and inter- correlational statistics for the variables in the study model. As expected, in the pre-implementation phase of the study, Intention to Use showed moderate-to-strong significant correlations ranges from .418 - .636, with Perceived Usefulness, Perceived Ease of Use, and Attitude. Notably, Attitude was correlated significantly from .515 - .560 with Perceived Usefulness and Ease of Use. The report of the post-implementation phase of the longitudinal study indicated that the Intention to Use, shown moderate-to- strong significant correlations ranges from .418 - .648, with Perceived Usefulness, Perceived Ease of Use, and Attitude. However, there was no statistical significant correlation between the external factors: Online tool designs (Psychcentral and Moodgym), Social influence and Intention to Use in the model. Online tool designs constructs was measured by grouping the study support tools into two variables, each consisting of two attributes with Mindsight as a reference category for the regression analysis. The first construct , named Psychcentral consisted of Psychcentral dummy coded as 1 and Mindsight as 0, and second construct, named Moodgym was made up of Moodgym, dummy coded as 1 and Mindsight as 0.

The self-selected participants were administered the TAM-Mod framework questionnaires. All twenty-six questionnaires assess 5-point Likert-type items. Reliability coefficients of the study constructs, as determined by Cronbach's alpha for the pre-implementation version are Perceived Usefulness (5 items, $\alpha = 0.72$), Perceived Ease of Use (6 items, $\alpha = 0.83$), Attitude (3 items $\alpha = 0.72$), Intention to Use (5 items $\alpha = 0.75$). The reliability coefficients for the post-implementation version of the study are Perceived Usefulness (5 items, $\alpha = 0.73$), Perceived Ease of Use (6 items, $\alpha = 0.71$), Attitude (3 items $\alpha = 0.74$), Intention to Use (5 items $\alpha = 0.76$) and Social Influence (4 items $\alpha = 0.81$). All the study constructs measured above 0.7 as suggested by Cronbach's alpha. The overall Cronbach's alphas are 0.865 and 0.792, respectively for the pre and post-implementation phases of the study. Kaiser-Meyer-Olkin (KMO) measure was 0.768 and Bartlett's test of sphericity was $p < 0.000$. The TAM-Mod provided an adequate fit to our data with evidence of both convergent and discriminant validity. Tolerances values of

above .4 and Variance Inflation Factor (VIF) below 2.5 indicated that, there was no Multi-Collinearity in our study constructs (See Appendix F-ii & iii).

Table 2 Descriptive Analysis and Correlation Matrix of the Constructs in Pre & Post Implementation

Constructs	Mean	Std. Dev.	ITU	ATT	PU	PEoU	SI	PSY	MO	*N*
Intention (ITU) $_1$	3.62	0.79								121
Attitude (ATT) $_1$	3.83	0.76	.513***							121
Usefulness (PU) $_1$	3.86	0.74	.515***	.560***						121
Ease of Use (PEoU) $_1$	3.79	0.69	.427***	.515***	.636***					121
Attitude (ATT) $_2$	3.90	0.69	.418***							66
Usefulness (PU) $_2$	4.04	0.58	.638***	.531***						66
Ease of Use (PEOU) $_2$	4.10	0.54	.641***	.513***	.648***					66
Influence (SI) $_2$	3.42	0.60	.287	.268	.222	.205				66
Psych Design $_2$	0.46	0.50	.255*	.432**	.361**	.308	.162	-.610**		66
Mood Design ^{2}	0.44	0.50	-.076	-.147	-.056	-.033	-.610**			66
Intention (ITU) $_2$	3.70	0.79								66

($p < .05$*, $p<.01$**, $p<.001$***)

1= pre-implementation of the online mental health support tools

2= post-implementation of the online mental health support tools

6.3 Multivariate Linear Regression Statistics

Linear Regression Analysis of Pre-Implementation Version

For the pre-implementation of the mental health support tools (Mindsight, Psychcentral and Moodgym) hierarchal linear regression was applied to determine possible predictor(s) of the Intention to Use (ITU) the online mental health support tools among the demographics variables and the independent variables (ATT, PEoU, PU and SI). The outcome of the multivariate regression analysis of the combination of the three mental health support tools indicated that ATT $\beta = 0.27$ $p<.05$, PU $\beta = 0.29$, $p<.05$ and Age $\beta = 0.25$ $p<.01$ are all statistically significant predictors of the Intention to Use online mental health support tools. In the model, the strength of the significant relationships changed with AGE, which significantly pointed to Age as the strongest predictor of the Intention to Use (ITU) followed by PU and ATT. The majority of the respondents were between the ages of 21-23 (35%), which indicated the probability that the participants from that age group have more tendencies to use the online mental health support tools. While all the other variables like PEoU, Race, Gender, Marital Status, Educational Level, Household income, Awareness of online tools, Frequencies of seeking online help and types of online help are not significantly relevant in the Intention to Use online mental health support tools.

The adjusted R square of 0.398 indicates that Attitude, Perceived Usefulness and Age explain 40% of the variance observed in Intention to Use the online mental health tools. This leaves 60% of the variance in Intention to Use unaccounted for. Thus, other independent variables might be responsible for the explanation; among other independents variables that might influence the Intention to Use is the participants' inexperience with or disinterest in the online mental health support tools. Furthermore, the sensitive nature of mental health illness' associated stigma and more notably, not all the student participants were troubled with mental health concerns that they deemed necessary to seek help online and not all participants with mental health concerns were necessarily interested in seeking online mental health support tools. Moreover, some participants were motivated by the incentive provided; this might automatically bias their responses. The study was conducted from the beginning of October to December 31st 2013; a longer duration for the survey might have provided the participants more time for participation, which might possibly have influenced the study outcome. Offering of higher or no compensation for participation could have biased the self-selection for the survey, which might have significantly influenced the study outcome.

Table 3 Statistic Analysis of Pre-Implementation Version
Health seeking Variables & Demographics Regressed on ITU

	Model 1		Model 2		Model 3		Model 4	
	b	Beta	b	Beta	b	Beta	b	Beta
Intercept	1.491		.730		1.025		.986	
ATT	.562**	.530	.337**	.318	.362**	.342	.274*	.259
PEoU			.111	.095	.062	.053	.074	.133
PU			.311*	.283	.254*	.231	.291*	.265
Sought Help					-.032	-.019	.035	.021
Help, Professional=1					-.177	-.107	-.079	-.047
How often do you seek help info on-line					.123	.065	.004	.002
Are you aware of on-line Mental Health tools? Yes=1					.206	.123	.149	.089
Age							.254**	.305
Gender Male=1							-.042	-.025
Race White=1							-.044	-.024
Marital Status Not single=1							-.246	-.064
House Hold Income							-.029	-.055
F-value	39.023**		18.254**		8.669**		6.568**	
Adjusted R^2	.274		.339		.347		.398	
R^2 Change	.		.078		.034		.077	

Note. The results from the imputed data sets with *N* _ 121 are shown. Gender is a dummy variable with male coded as (1) and female coded as (0). White (1) and Non-white (0) are the dummy coded variables for Ethnicity, while Age groups 18 -23 years old are coded (0) and 24 – 25 years old (1). (See Appendix F-I) ($p < .05$* $p<.01$**, $p <.001$***) *N=121*

6.4 Model Summary

The prediction model was reached in four steps; it contained all the predictors with no variable removed. The R square value indicated significant changes in the models with the addition of both dependent and independent variables. In model four, the strength of the significant relationships changed with Age, which significantly pointed to Age as the strongest predictor of the Intention to Use (ITU) followed by PU and ATT. Model one, the F-stat for this model indicates that 39.023: $p<.01$ is statistically significant and therefore has a good fit. The independent variable Attitude b= 0.562, $p<.01$is also significant. The adjusted R square of .274 indicates that Attitude explain 27% of the variance observed in Intention to Use. The F-stat for model two indicates 18.254; $p<.01$, is statistically significant and therefore has a good fit. The independent variable Attitude b=337; $p< .01$ and b=311; $p<.01$ for Perceived Usefulness (PU) indicates that Attitude and Perceived Usefulness are both statistically significant predictors of the Intention to Use, while Perceived Ease of Use is not statically significant as a predictor of Intention to Use in this model. The adjusted R square of .339 indicates that Attitude and Perceived Usefulness explain 34% of the variance observed in Intention to Use the online mental health tools.

Model three indicates an F-stat of 8.669; $p <.01$, which is statistically significant and therefore has a good fit. Among all the independent variables in this model only Attitude b=.362; $p <.01$ and Perceived Usefulness b= .254; $p<.05$ are statistically significant predictors of Intention to Use. The Independent variables Perceived Ease of Use, awareness of online tools, frequencies of seeking online help and types of online help do not predict the Intention to Use online mental health support tools. The adjusted R square of .347 indicates that Attitude and Perceived Usefulness explain 35% of the variance observed in Intention to Use the online mental health tools.

Model four indicates an F-stat of 6.568; $p<.01$, which is statistically significant and therefore has a good fit. The model contains the demographic, independent variables.

Among all the Independent variables ATT b= .274 *p*<.05, PU b=.291, *p*<.05 and Age b=254 p<.01 are all statistically significant predictors of the Intention to Use online mental health support tools. While all the other variables like PEoU, Race, Gender, Marital Status, Educational Level, House hold income, Awareness of online tools, frequencies of seeking online help and types of online help do not predict the Intention to Use online mental health support tools. The adjusted R square of .398 indicates that Attitude, Perceived Usefulness and Age explain 40% of the variance observed in Intention to Use the online mental health tools. This leaves 60% of the variance in Intention to Use unaccounted for. Thus, other independent variables like inexperience with or disinterest in the online mental health support tools, the stigma attached to the mental health or no current mental health concerns might be responsible for the explanation.

Due to the small number of participants for the post-implementation version of this research study (*N=66*), it was concluded that the entire university population cannot be generalized based on the results; however, the intent is to convey what has been learned about the past and enlighten the student participants about the existing online mental health support tools. Although, it was not possible to make a definite prediction about the students' online mental health support tools usage, the association between the dependent and independent variables was clearly examined.

Linear Regression Analysis of Post-Implementation

6.5 Comparison of Mindsight, Psychcentral and Moodgym

To understand the factors that influence the use of the online mental health support tools, after the post-implementation of the mental health support tools (Mindsight, Psychcentral and Moodgym) hierarchal linear regression was used to determine possible predictor(s) of the Intention to Use (ITU) the online mental health support tools among the independent variables (ATT, PEoU, PU and SI). (For comparison statistics, see Table 7). The outcome of the multivariate regression analysis of the combination of the three mental health support tools indicated an F-value of 15.994, p <.01. The outcome also indicates that independent variables like PEoU b= 0.560 p<.01 and PU b = 0.493<.01are both statistically significant predictors of the dependent variable ITU. However,

independent variables like OTD, ATT and SI are not statistically significant as a predictor of ITU in this model. The adjusted R square of .512 indicates that Perceived Ease of Use and Perceived Usefulness explain 51% of the variance observed in Intention to Use an online mental health support tool, this leaves 49% of the variance in Intention to Use unaccounted for.

Other variables that might influences the Intention to Use the online mental health support tools after the post-implementation are the participants' disinterest in the online mental health support tools. The participants' perception of the support tools being too difficult or demanding, the content not being engaging enough, or the programs being too long may all factor into the participants' Intention to Use these online mental health support tools. There is also the possibility that the study material, the mental health scenarios, used during the survey might have also influenced the participants' perception of mental health support tools usage. Although, statistically the outcome of the regression analysis indicated that there are no significant differences in the participants' perception of the online mental health support tools, a prior or broader knowledge of the mental health support tools might have influenced the outcome of this study.

Table 4 Statistics Analysis of the- Post-Implementation Version

	Model 1		Model 2		Model 3	
	b	Beta	b	Beta	b	Beta
Intercept	1.841		-.772		-1.289	
ATT	.478**	.418	.023	.020	-.004	.003
PEOU			.569**	.387	.568**	.387
PU			.508**	.376	.506**	.375
SI					.162	.124
PSYCH					.080	.047
MOOD					.083	.049
F-value	13.571**		20.392**		10.402**	
Adjusted R^2	.162		.472		.465	
R^2	.175		.497		.514	
R^2 Change			.322		.017	

Note. The results from the imputed data sets with *N* _ 66 are shown. The study tool designs are dummy coded with variable 1 coded as Moodgym (1) and (0) for Mindsight. Variable 2 has Psychcentral coded as (1) and Mindsight (0). (See Appendix F-I for the list of dummy codes)
(*p* < .05* *p*<.01**, *p* < .001***) *N*=66

The F-stat for this Model 1 indicates that 13.571, *p*<.01, is statistically significant and therefore has a good fit. The independent variable Intention to Use b = 0.478, *p*<.01is also significant. The adjusted R square of .175 indicates that Attitude explain 17.5% of

the variance observed in Intention to Use the online support tools, this leaves 82.5% of the variance in Intention to Use unaccounted for.

The F-stat for Model 2 indicates 20.392, $p<.01$ is statistically significant and therefore has a good fit. However, the inclusion of the independent variables PEoU b=569 $p< .01$ and PU b=508<.01 which are both statistically significant predictors of ITU automatically renders the relationship formed in the Model 1- between ITU and ATT insignificant, which indicates that Attitude is not statistically significant as a predictor of Intention to Use in this model. The adjusted R square of .497 indicates that Perceived Ease of Use and Perceived Usefulness explain 50% of the variance observed in Intention to Use as an online mental health support tool, this leaves 50% of the variance in Intention to Use unaccounted for.

Model 3 has an F-stat of 10,402, $p<.01$, which is statistically significant and therefore has a good fit. The independent variables PEoU b=568 $p<.01$ and PU b=506<.01 are both statistically significant predictors of the dependent variable ITU. ATT and SI are not statistically significant as a predictor of ITU in this model. The adjusted R square of .465 indicates that Perceived Ease of Use and Perceived Usefulness explain 47% of the variance observed in Intention to Use an online mental health support tool this leaves 53% of the variance in Intention to Use unaccounted for. Thus, other independent variables described above might be responsible for the explanation. Addition of the study mental health tools into this model as independent variables (Psychcentral and Moodgym) does not yield any significant results, which indicate that none of the study support tools could predict any proportion of the Intention to Use.

Multiple Comparisons

The study support tools were compared to determine if there are any significant differences. The outcome of pairwise comparisons of the Mindsight, Psychcentral and Moodgym conducted using a Bonferroni method indicated an F-value of 2.564, $p>.085$(p= n.s). Lack of statistical significance among the study tools indicates that although there might be some differences in individual features or the tools' interface,

study participants perceived no significant difference between the Mindsight, Moodgym and Psychcentral.

6.6 Analysis of Post-Implementation of the Study Support Tools:

Post-Implementation of Mindsight

The outcome of the linear regression indicated that all the independent variables strongly and significantly predicted the Intention to Use Mindsight as a mental health support tool. The outcome reflected significant increases in PEoU, PU and SI as ITU increases. The impact of SI on ITU is notable in this model; however, the addition of PEoU, PU and SI into the model renders ATT spurious. Due to the fact that the majority of the participants preferred Mindsight, because it was a support tool created by the school reflected on the Social Influence on its Intention to Use.

Table 5 Post-Implementation of Mindsight

	Model 1		Model 2		Model 3	
	b	Beta	b	Beta	b	Beta
Intercept	2.391		-2.177		-4.895	
ATT	.363	.252	-.085	-.059	-.378	-.263
PEOU			.807*	.437	.950**	.514
PU			.689	.327	1.024*	.486
SI					.550*	.398
F-value	1.561		4.034*		4.673**	
Adjusted R^2	.023		.275		.380	
R^2	.064		.366		.483	
R^2 Change			.302		.118	

(*p* < .05*, *p*<.01**, *p*<.001***) *N*=25

The F-stat for this Mode 1 indicates that 1.561 with no statistically significant association between Attitude and the Intention to Use Mindsight as a mental health support tools. The F-stat for Model 2 indicates b= 4.034; *p*<.05, which is statistically significant and therefore has a good fit. The independent variable Perceived Ease of Use b= 807; p< 05 indicates a moderate positive, statistically significant association with Intention to Use. This means that as Perceived Ease of Use increases, Intention to Use also increases. The F-stat for Model 3 indicates b= 4.673; *p*<01 which is statistically significant and therefore has a good fit. The independent variables Perceived Useful b= 1.024; *p*<.05, Perceived Ease of Use b = 950 *p*<.01 and Social Influence b= .550; p<.05 all indicate strong positive, statistically significant association with Intention to Use Mindsight as a mental health support tool. This indicates significant increases in PEoU, PU and SI as ITU

increases. Because Mindsight is more popular than other tools among the university students, SI is found to be positively correlated to PEoU and PU as the ITU increases among the student participants.

Statistical Analysis of Post-Implementation of Psychcentral

The result of the linear regression analysis of the students' Intention to Use Psychcentral as an online mental health support tools indicated that the model has an F value of 5.576; $p<.01$, R^2 =58%. This support tool is not popular among the study participants, so it is not surprising that the analysis indicated no statistically significant association between the Intention to Use Psychcentral as a mental health support tools and independent variables like PEoU, ATT, PU and SI. This model also indicates negative insignificant association between SI and the ITU.

Table 6 Post-Implementation of Psychcentral

	Model 1		Model 2		Model 3	
	b	Beta	b	Beta	b	Beta
Intercept	1.422		-1.150		-1.099	
ATT	.585*	.453	.170	.132	.172	.133
PEOU			.264	.168	.279	.177
PU			.776	.550	.806	.571
SI					-.068	-.055
F-value	4.895*		7.831**		5.576**	
Adjusted R^2	.163		.506		.478	
R^2	.205		.580		.582	
R^2 Change			.375		.002	

($p < .05$*, $p<.01$**, $p <.001$***) N=21

The F-stat for this Model1 indicates that 4.895; $p<.05$ and b= .453, which is a statistically significant association between Attitude and the Intention to Use Psychcentral as a mental health support tool.

The F-stat for Model 2 indicates 7.831; $p<.01$, which is statistically significant and therefore has a good fit. However, there is no statistically significant association between the Intention to Use Psychcentral as a mental health support tool and independent variables like PEoU, ATT, PU and SI. The association between ITU and the other independent variable is negative and insignificant, unlike in the cases of the other mental health support tools.

The F-stat for Model 3 indicates 5.576; $p<01$, which is statistically significant and therefore has a good fit. However, there is no statistically significant association between the Intention to Use Psychcentral as a mental health support tool and independent variables like PEoU, ATT, PU and SI. This model also indicates negative insignificant association between ITU and SI.

Statistical Analysis of Post-Implementation of Moodgym

Before the implementation of the Moodgym as a support tool for this study, this support tool was seemly unknown to the study participants; moreover, the linear regression analysis of the students' Intention to Use Moodgym as an online mental health support tool indicated an F-stat of 5.163; $p<.01$. However, there is no statistically significant association between the Intention to Use Moodgym as a mental health support tool and independent variables like PEoU, ATT, PU and SI.

Table 7 Post-Implementation of Moodgym

	Model 1		Model 2		Model 3	
	b	Beta	b	Beta	b	Beta
Intercept	2.354		.071		-.516	
ATT	.302	.327	.013	.014	-.003	-.004
PEOU			.464*	.422	.452	.411
PU			.403	.417	.392	.406
SI					.223	.191
F-value	2.151		6.360**		5.163**	
Adjusted R^2	.057		.458		.467	
R^2	.107		.544		.579	
R^2 Change			.437		.035	

($p < .05$*, $p<.01$**, $p<.001$***), $N=20$

Model 1- The F-stat for this Model 1 indicates that 2.151, with no statistically significant association between Attitude and the Intention to Use Moodgym as a mental health support tool, unlike Psychcentral.

The F-stat for Model 2 indicates 6.360; $p<.01$, which is statistically significant and therefore has a good fit. The independent variable Perceived Ease of Use b=464; $p< 05$ indicates a moderate, positive, statistically significant association with Intention to Use. This differs from the Psychcentral outcome in Table 6 where there is no significant association between ITU and other independent variables. This means that as Perceived Ease of Use increases, Intention to Use also increases.

The F-stat for Model 3 indicates 5.163; $p<.01$, which is statistically significant and therefore has a good fit. However, there is no statistically significant association between the Intention to Use Moodgym as a mental health support tool and independent variables like PEoU, ATT, PU and SI. The outcome of the regression statistically indicated no significant difference in the participants' perception of all the mental health support tools used in this study.

6.7 Model Testing Results

The maximum likelihood method was adopted to estimate the model's parameters; IBM SPSS AMOS suggested constraining the parameter of the model equally. The summarized result of SEM is in Table 8. Some modifications to fit the entire model were made such that the actual values of the above listed indices are above the thresholds of the recommended values. The entire model presents a good fit except the Root Mean Square of Error Approximation (RMSEA) in the post implementation of the support tools that produced a result of 0.121, which was above the threshold of 0.10. This could be due to the small sample size. The Chi-square (X^2 /d:f) results obtained from the pre and post-implementation of the support tools were found to be insignificant at 1.70, p=0.163 and 2.47 p=0.059 respectively. This could be related to different factors: the participants' lack of prior knowledge of the online mental health support tools, the participants with prior knowledge of the support tools are not sure of its reliability and lastly, the relative small sample sizes (121 & 66) of pre and post-implementation of the support tools. Boomsma (1987) suggested that if the maximum likelihood method is used to estimate the parameters, the smallest sample size should be higher than 200. However, he indicated that the sample size would have to be smaller than 100 to actually generate incorrect results and inferences.

Table 8 Models Fit Measures

Model Fit Measure	Recommended Value	Pre-Implementation Value	Post-Implementation Value
X^2 /d:f:	< 3	1.70	2.47
Goodness-of –Fit Index (GFI)	> 0.90	0.979	0.966
Adjusted Goodness-of-Fit Index (AGFI)	> 0.80	0.930	0.821
Root Mean Square Root (RMR)	< 0.10	0.040	0.041
Normed Fit Index (NFI)	> 0.90	0.969	0.955
Comparative Fit Index (CFI)	> 0.90	0.987	0.969
Increment Fit Index (IFI)	> 0.90	0.987	0.973
Relative Fit Index (RFI)	>.0.90	0.938	0.910
Tucker-Lewis Index (TLI)	> 0.90	0.973	0.979
Root Mean Square of Error Approximation (RMSEA)	< 0.10	0.077	0.121
Critical *N*	< 200	121	66
Akaike Information Criterion (AIC)		19.116	71.426

The results of the pre-implementation of the online mental health support tools indicated that Perceived Ease of Use was positively associated with Perceived Usefulness ($\beta = 0.56$; $p < .001$) and Attitude ($\beta = 0.40$; $p < .001$). Therefore, Hypotheses 1 and 2 were supported. Perceived Usefulness was positively related with Attitude ($\beta = 0.40$; $p < .001$) and, Intention to Use ($\beta = 0.30$; $p < .01$), thus supporting Hypotheses 3 and 4. Attitude was found to be positively significant in influencing Intention to Use ($\beta = 0.32$; $p < .001$), thus supporting Hypothesis 6. Perceived Ease of Use was found not to be positively significant to Intention to Use the online mental health support tools ($\beta = 0.08$), so the Hypothesis 5 was rejected.

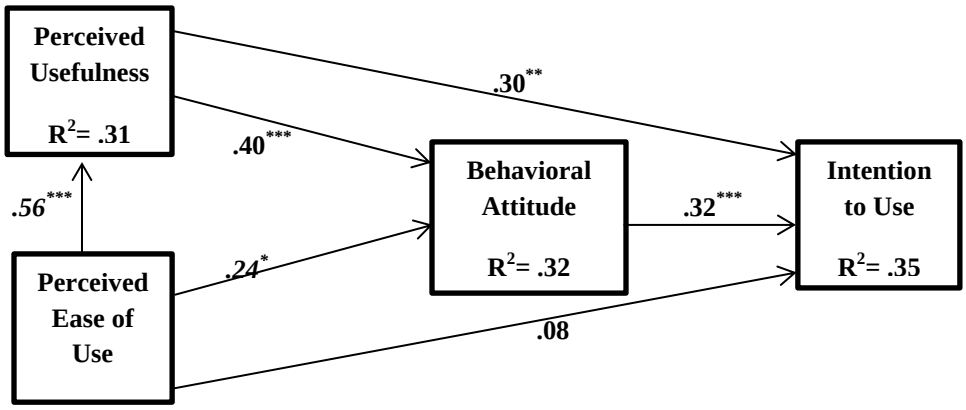


Figure 4 Pre-Implementation Model with the Results of R^2 and β Values
$p < .05$*, $p<.01$**, $p < .001$***

Table 9 Summary of Hypothesis Test - Pre-Implementation of the Online Mental Health Support Tools

Hypothesis Supported	R-Square	Beta	Significant level	Hyp/supported
PU ← PEoU	0.31	0.56	***	H1/Yes
ATT ← PU	0.32	0.40	***	H3/Yes
ATT ← PEoU		0.24	*	H2//Yes
ITU ← PU	0.35	0.30	**	H4/Yes
ITU ← ATT		0.32	***	H6/Yes

PEoU Perceived Ease of Use, *PU* Perceived Usefulness, *ATT* Attitude, *ITU* Intention to Use.
$p < .05$*, $p<.01$**, $p < .001$***

Hypothesis Not Supported ($_N$)	R-Square	Beta	Significant level	Hyp/supported
ITU ← PEoU	0.35	0.08		H5/No

$p < .05$*, $p<.01$**, $p < .001$***

The endogenous variables in the pre-implementation of the online support tools version were analyzed. Perceived Usefulness construct was significantly predicted by Perceived Ease of Use and behavioral Attitude and these variables together were explained by $R^2 = 0.31$, which is 31% of the variance in Perceived Usefulness. Behavioral Attitude was significantly determined by Perceived Usefulness and Perceived Ease of Use by $R^2= 0.32$, which is 32% of the variance in the Behavioral Attitude. Intention to Use the online tools support was significantly determined by behavioral Attitude and Perceived Usefulness by $R^2=0.35$, meaning that all the effects are able to explain the 35% of the variance of Intention to Use.

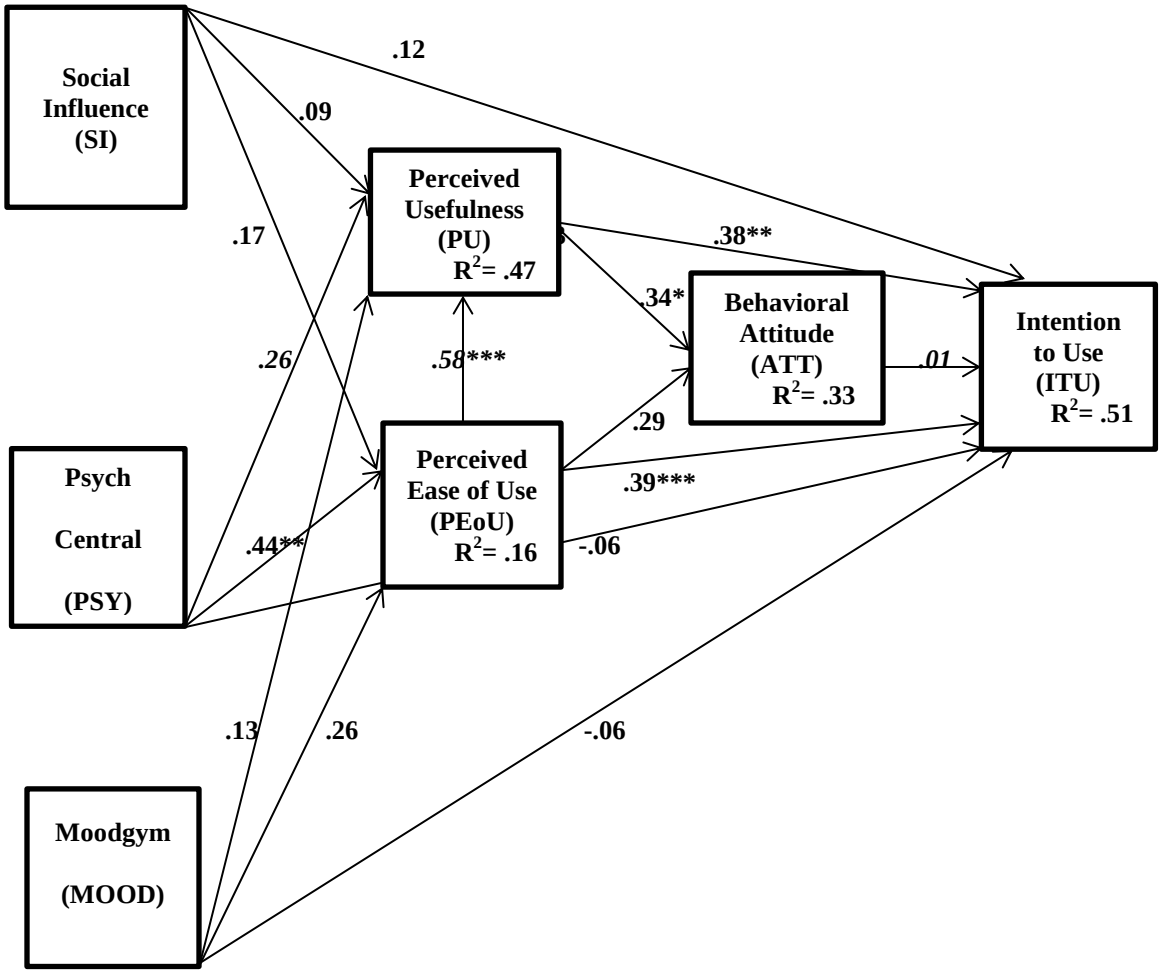


Figure 5 Post-Implementation Model with the Results of R^2 and β Values
$p < .05$*, $p<.01$**, $p < .001$***

Table 10a Post–Implementation of the Online Mental Health Support Tools

Hypothesis Supported	R-Square	Beta	Significant level	Hyp/supported
PU ← PEoU	0.47	0.58	***	H1/Yes
ATT ← PU	0.33	0.34	*	H3/Yes
ITU ← PU		0.38	**	H4/Yes
ITU ← PEoU	0.51	0.39	**	H5/Yes
PEoU ←PSY	0.16	0.44	**	H12/Yes

PEoU Perceived Ease of Use, *PU* Perceived Usefulness, *ATT* Attitude, *ITU* Intention to Use, *PSY* Psychcentral, *Mood* Moodgym, *SI* Social Influence.
$p < .05$*, $p<.01$**, $p < .001$***

The result of the post-implementation survey outcome is slightly different from the pre-implementation outcome. Perceived Ease of Use was positively found to be

associated with Perceived Usefulness (β = 0.58; $p < .001$) and the Intention to Use (β = 0.39; $p < .01$), thus supporting Hypotheses 1 and 5. Perceived Usefulness was positively related with Attitude (β = 0.34; $p < .05$) and, Intention to Use (β = 0.38; $p < .01$), thus supporting Hypotheses 3 and 4. Online Tool Design of Psychcentral was found to have a significant positive effect on Perceived Ease of Use (β = 0.44; $p < .01$) of the online mental health support tools, thus supporting Hypothesis 12.

Table 10b Post–Implementation of the Online Mental Health Support Tools

(b) Hypothesis Not Supported ($_N$)	R-Square	Beta	Significant level	Hyp/supported
ATT ← PEoU	0.33	0.29		H2/No
ITU ← ATT		0.01		H6/No
ITU ← SI	0.51	0.12		H7/No
PU ← SI		0.09		H8/No
PEoU ← SI	0.16	0.17		H9/No
PU ← PSY		0.26		H10/No
PU ← MOOD		0.13		H11/No
PEoU ← MOOD	0.16	0.26		H13/No
ITU ← PSY		-0.06		H14/No
ITU ← MOOD		-0.06		H15/No

PEoU Perceived Ease of Use, *PU* Perceived Usefulness, *ATT* Attitude, *ITU* Intention to Use, *PSY* (Psychcentral) and *MOOD* (Moodgym), *SI* Social Influence
$p < .05$*, $p<.01$**, $p < .001$***

Attitude has no significant relationship with the Intention to Use online mental health support tools, there was no significant relationship between Perceived Ease of Use and behavioral Attitude. Social Influence was also found not to have any significant effect on both Perceived Usefulness and Perceived Ease of Use, thus allowing Hypotheses 2, 6, 8 and 9 to be rejected. Moreover, the results did not show that any of the Online Tool Designs (Psychcentral and Moodgym) had any significant effect on Perceived Usefulness and the Intention to Use mental health support tools, so Hypotheses 10, 11, 13, 14 and 15 were rejected.

The analyses of the four endogenous variables in the post-implementation version indicated that Perceived Ease of Use was predicted by Online Tool Designs of Psychcentral and Moodgym with a result of $R^2 = 0.16$, which is 16% of the variance in Perceived Ease of Use. Perceived Usefulness was significantly determined by Perceived Ease of Use and behavioral Attitude resulting in $R^2 = 0.47$, which is 47% of the variance in Perceived Usefulness. Attitude was determined by Perceived Usefulness, with a result

R^2= 0.33, which is 33% of the variance in Attitude. Intention to Use was significantly determined by Perceived Usefulness and Perceived Ease of Use with a result R^2= 0.51, meaning that all the effects are able to explain the 51% of the total variance in Intention to Use the online mental health support tools.

6.8 Effect of the External Variables in the Model

In the path analysis, the external variable Social Influence was shown not to have any significant relationship in the association with the Perceived Usefulness, Perceived Ease of Use and the Intention to Use the online mental health support tools. However, the design of Psychcentral positively influence Perceived Ease of Use of support tools, with a path coefficient of $\beta = 0.44$. The outcome indicates that the study participants perceived online support tools designed similar to Psychcentral to be easy to use. Liang and Lai (2001) cited human and computer factors as two major elements of website designs (support tool designs). They listed the computer factors to be those that provide functionality; they categorized the functionality elements as the technical aspects, navigation, impartiality, interface make up, or information contents of any support tool. However, Zhang and von Dran (2000) described human factors as the hedonic elements that add value to the Websites (tool designs) by contributing to user satisfaction. They identified six categories of human factors as specific enjoyment, cognitive outcome, user empowerment, credibility, visual appearance and organization of informational content of the support tools as the elements that can result in the students perceiving the online mental health support tools as not easy to use, which will have a negative effect on the mental health support tools usage.

7 DISCUSSION

The results of this longitudinal study provide support for the research model and for the hypotheses regarding the directional linkage among the model's variables. The overall explanatory power of the research model in pre-implementation had an R-square of 35% for Intention to Use, 31% for Perceived Usefulness, and 32% for Attitude toward Intention to Use. The post-implementation of the online mental health support tools produced R-square of 51% for Intention to Use, 47% for Perceived Usefulness, 33% for Attitude and 16% of Perceived Ease of Use, suggesting that the extended model is capable of explaining a relative proportion of variation of continued Intention to Use the online mental health support tools.

Both the Usefulness and Ease of Use beliefs are depicted as having a direct effect on Behavioral Attitude, and Attitude toward the support tools determines Behavioral Intentions to Use these tools. In other words, the students would rely on both their perceptions of Usefulness and Ease of Use to form the Intention to Use the online mental health support tools. These intentions then predict acceptance behavior. After an interactive introduction and education on the study's three mental health support tools (post-implementation version), it was deduced that many variables could factor into actual usage of these support tools. Social Influence and Online Tool Designs are depicted as having indirect influence, while Perceived Ease of Use and Perceived Usefulness are depicted as having direct influence on the Intention to Use the online mental health support tools. The implication is that once the students have used or have been using the online mental health support tools, their subsequent Intentions are formed from the perceptions of its Usefulness. Intentions then are expected to predict future online mental health support tools acceptance behavior.

7.1 Result Analysis

Pre-Implementation of the Support Tools

This study evaluated the Usefulness of the modified TAM in explaining the University of Ontario Institute of Technology students' perception of the online mental health support tools. To argue whether the students perceived the online mental health support

tools useful or easy to use, the original version of TAM was adopted and modified in the post-implementation of the online mental health support tools survey. TAM-Mod was able to predict 35% of the variance in Intention to Use (ITU) and ITU was predicted by Perceived Usefulness PU (31%) and Attitude ATT (32%). Compared to prior TAM studies, PEoU was found not to be significant in using the online mental health support tools among the participants of the pre-implementation version of the study. TAM-Mod in this study appeared to be more useful in explaining the perception of the students to use the support tools. The analysis indicated that Perceived Ease of Use was positively predicted by Perceived Usefulness ($\beta = 0.56$; $p < .001$) and Attitude ($\beta = 0.40$; $p < .001$). Perceived Usefulness was positively predicted by Attitude ($\beta = 0.40$; $p < .001$) and, Intention to Use ($\beta = 0.30$; $p < .01$). Attitude was found to be positively significant in influencing Intention to Use ($\beta = 0.32$; $p < .001$). However, Perceived Ease of Use was found not to be positively significant to Intention to Use the online mental health support tools ($\beta = 0.08$); all our hypothesis were supported except for Hypothesis 5, which was rejected.

Perceived Usefulness was found to be a key determinant that has a statistically significant and strong influence on the students' Intentions to Use the online mental health support tools. This suggests that students will use any online mental health support tools that they think is useful and engaging enough to help them in time of their distress. Students tend to focus on the Usefulness of the online mental health support tools. Ironically, 53% of the participants claimed to have sought some sort of health information online prior to this study. In this study, Perceived Ease of Use significantly influenced Perceived Usefulness as TAM-Mod hypothesizes. This outcome indicated a positive effect that the majority of the participants perceived the online mental health support tools as useful.

Post-Implementation of the Support Tools

The students who participated in the post-implementation version of this study were educated for approximately 20-25 minutes on the randomly chosen mental health support tools. The introduction and education on these support tools shaped their perception and this reflected on the outcome of the study. The four endogenous variables in the post-

implementation version were analyzed, and the outcome indicated that Perceived Ease of Use was predicted by Psychcentral, R-square = 0.16, which means that 16% of the variance in Perceived Ease of Use was predicted by design of Psychcentral. Perceived Usefulness was significantly determined by Perceived Ease of Use and Attitude by 47%, R-square = 0.47, which means 47% of the variance in Perceived Usefulness was predicted by Perceived Ease of Use and Attitude was significantly predicted by Perceived Usefulness, with a result R-square= 0.33, which means 33% of the variance in Attitude was predicted by Perceived Usefulness. Intention to Use was significantly predicted by Perceived Usefulness and Perceived Ease of Use, R-square = 0.51, meaning that all the effects are able to explain the 51% of the total variance in Intention to Use the online mental health support tools. The results of this study indicated that Perceived Usefulness and Perceived Ease of Use are core determinants of the Intention to Use the online mental health support tools.

The analysis of the results shows that Perceived Ease of Use was found to have significant effect on the students' Perceived Usefulness ($\beta = 0.58$; $p < .001$) and Intention to Use ($\beta = 0.39$; $p < .001$) the online support tools, this may be due to the fact the participants were educated and shown how to access and navigate the mental health support tools before the survey. Perceived Usefulness positively affect Attitude ($\beta = 0.34$; $p < .05$) and, Intention to Use ($\beta = 0.38$; $p < .01$). This indicated that if the students perceived the online mental health support tools to be useful and engaging enough, their Attitude to try to access those support tools in the time of distress might be influenced and that might result in a positive influence of Intention to Use. The design of Psychcentral had statistical significant correlation with Perceived Ease of Use ($\beta = 0.44$; $p < .01$), suggesting that the qualities, contents or interface that enables easy navigation of the online support tools might lead the users to perceived the tools as easy to use. This indicated that the study participants perceived the design of Psychcentral, an independent mental health social network, overseen by professionals to be easy to use than any other designs of mental health support tools in this study. The effects of peer-to-peer networking may have led the users to belief that they are not the only one with mental health issues, and online counseling at needs offered by mental health professionals, might have influenced the Perceived Ease of Use of the support tool.

Since tool design is a main factor in predicting the students' Perceived Ease of Use of the online mental health support tools, school administrators could support this factor by organizing various programs to educate the students about the importance of occasional self-assessment measures on-school campus.

The answer to the second study question was answered by Hypothesis 4, which predicted that the Perceived Usefulness of the online mental health support tools by the students would significantly influence the Intention to Use it. TAM postulates that external variables intervene indirectly by influencing Perceived Ease of Use and Perceived Usefulness. In the path analysis of the TAM-Mod, the external variable Social Influence was shown not to have any significant relationships in the association with the Perceived Usefulness, Perceived Ease of Use or the Intention to Use the online mental health support tools.

The research outcome did not indicate that any of the Online Tool Designs had any statistical significant effect on Perceived Usefulness or the Intention to Use Online mental health support tools. Moreover, Attitude was found to have no significant relationship with the Intention to Use; Perceived Ease of Use has no significant relationship with the behavioral Attitude as well, and Social Influence was found not to have any significant effect on both Perceived Usefulness and Perceived Ease of Use of the online mental health support tools. This might be due to the privacy issue and the stigma attached to mental health in our community. Social Influence's lack of significance is confirmed by the study conducted by Perlick, et al., (2010), that outlined Social Influence as an important factor that prevent emerging adults from seeking mental health treatment. Due to the stigma associated with the mental illness, many people have found that they lose their self-esteem and have difficulty making friends. The stigmatization of mental illness is pervasive, damaging and threatens many students core health values. Behavioral researchers revealed that the label of mental illness promotes rejection and suboptimal social interactions; it can also affect self-image when one starts to believe the negative views held by others. However, Social Influence could be effective in reducing mental health stigma among the University students. *Active Minds* an organization formed by Colorado State University students' organization provided

peer support to help change students negative attitudes about mental illness. They encourage students to help one another in coping with their diagnoses (McKinney, 2009).

7.2 Study Research Questions

The efficacy of the online mental health support tools and online interventions has been well supported by literature (Braithwaite & Fincham, 2007; Cavanagh et al., 2006; Christensen et al., 2006; Goh & Agarwal, 2008). This study analyzed the emerging adults' Attitudes toward various online mental health support tools and identified the effects of Social Influence and Online Tool Designs on its usage. The outcome of the research survey for the pre and post implementation of the online mental health support tools helped to explain the research questions as follows:

What are the perceptions of the emerging adults of the currently existing online mental health resources?

Statistically, it seems plausible to extrapolate cautiously from the study outcome that the participants do consider available online mental health support resources to be highly engaging. When asked a qualitative question about "Where would you seek advice or help if you are having mental health concerns", 70 (53%) of the participants indicated they had used the Internet in the past to seek mental health related information online prior to this study. It is not clear if the mental health information sought online was for their friends, family members or self-usage, moreover the types of the support tools used were not mentioned. This outcome clearly indicated that more than half of the participants had some sort of prior knowledge of online mental health support tools, supporting belief that many participants would be online self-help seekers, who would like to use this avenue to get more information. From this statistics, it can be determined that participants who had previously sought e-mental health were more aware of various forms of online mental health support tools (text-based searching, informational websites, discussion boards, self-directed therapy, games, and group chat with a psychologist) than those who had not looked for help online. Perhaps the help seekers believed that accessing these support tools would lead to a useful outcome. These

students did not access the resources because of a lack of awareness or because they did not believed these self-assessment support tools would help.

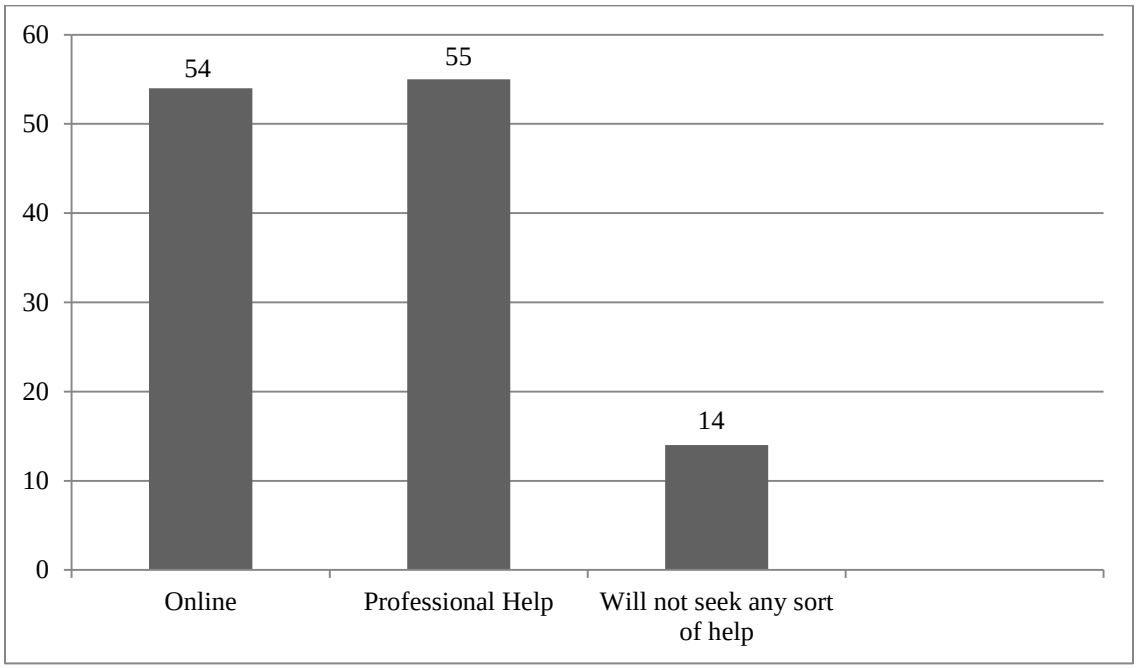


Figure 6. Participants' response to a qualitative question "where would you seek mental health information in time of need

However, when the participants were asked a quantitative question, "Where would you seek mental health information in time of need?" the responses indicated mixed preferences. Fifty-five (42%) of the participants indicated that they would rather trust mental health professionals e.g. psychologists, psychiatrists or counselors with their mental health concerns, while 54 (41%) declared their intention to try self-assessment support tools whenever they have mental health concerns. However, alarmingly 14 (11%) of the respondents claimed they will not seek any sort of help (See Appendix H).

The survey contained three open-ended survey questions in which the respondents were allowed to voice their perception of online mental health support tools. (For the full responses, see Appendix M). The study participants' responses to the qualitative question, "In your opinion what makes online mental health resources useful to the students?" indicated mix perceptions of the support tools. Some respondents think, "It is probably a good way to gradually seek help", "The students can identify their problems before going to seek professional help" or "It could serve as first-aid before seeking

professional help". However, most of the respondents thought the online support tools are useful to the students because of a "Certain degree of anonymity provided through online interactions", "Anonymous", "Easy to navigate" or "It enables or helps the students feel comfortable and acknowledge that there is help/support out there". Although, the participants responded differently, all the responses reflected a positive impression about the online mental health support tools.

On the question of "What makes online mental health resources appealing to the students?" most respondents decided that "Less stigma", "Confidentiality", "The need not to feel judged by others" or "Anonymous" are the reasons why these online support tools are becoming more popular among the help-seeking population. This response clearly reflected the stigmatization attached to the mental illness in the community, which is clearly a barrier to seeking professional help. When the participants were asked, "What concern do you have about online mental health resources usage?" the responses simply showed the uncertainty attached to the online support tools usage. Some responses were "Inaccurate or misleading Information", "May lead to self-diagnosing", "The validity of the information provided" and "Too many websites to choose from, would not know which one to choose". Some responses also indicated the bias involved in these online support tools by saying, "It is scary to open up to someone you don't see in person".

Formative feedback is an integral part of this study and notably, in a study exploring the perceptions of the university emerging adults of the online mental health support tools and the information available for self-assessment online. Some participants perceived this form of research participation as a valuable way to communicate and contribute their views on the pressing mental health concerns among the university students. However, many participants see their participation in the survey as a way to enlightened themselves on the online mental health resources available for their future usage. The results of this study led the researcher to contemplate Wilson's (1983) idea, which stated that people learn about the world through their own first-hand knowledge, as well as second-hand via other people, but only those who are perceived to have authority and credibility on the topic. Neal et al. (2011) argued that cognitive authority could be found not only in people, but in sources as well. In the case of this study, the participants' cognitive

authority of various online mental health support tools could be understood through their perception of these tools.

Could the self-help seekers' perception of Usefulness positively influence the Intention to Use the online mental health support tools?

In the pre-implementation version of the analysis the standardized coefficients reflects the strength of the predictor, Perceived Ease of Use ($\beta = .56$, $p < .001$), predicts a moderately strong, positive, statistically significant association with Perceived Usefulness, which means as the Perceived Ease of Use increases, so does the Perceived Usefulness of the online mental health support tools. Perceived Usefulness ($\beta = .30$, $p < .01$) predicts a positive statistically significant association with the Intention to Use; Perceived Ease of Use ($\beta = .24$, $p < .05$) predicts a significant association with the Behavioral Attitude, while Perceived Usefulness ($\beta = .30$, $p < .01$) also predicts a significant association with the Intention to Use the online mental health tool.

The post-implementation of the online mental health support tools analysis indicated that Perceived Ease of Use ($\beta = 0.39$, $p < .01$) predicted the Intention to Use; Perceived Usefulness ($\beta = 0.38$, $p < .01$) predicted the Intention to Use; Perceived Usefulness ($\beta = 0.34$, $p < .05$) predicted the Behavioral Attitude, while Perceived Ease of Use ($\beta = .58$, $p < .001$) strongly predicted Perceived Usefulness. The tools design of Psychcentral positively influenced the Perceived Ease of Use, with a standard coefficient of ($\beta = .44$, $p < .01$). All these results strongly reflected that the research participants perceived the online mental health support tools to be easy to use and useful.

Both, Perceived Ease of Use and Perceived Usefulness have moderate effect on the students' Intention to Use online mental health support tools. This outcome reveals that when the system is easy to use, many users feel it is useful: therefore, they have stronger Intentions to Use the online mental health support tools. Consistent with prior studies, Perceived Usefulness and Perceived Ease of Use were positively related with Attitude and Intention to Use. Although these factors affected the user's perception, Perceived Ease of Use and Perceived Usefulness, are both critical to students' usage of online mental health support tools.

The level of significant impact of Perceived Usefulness $\beta = 0.30$ (30%) on the Intention to Use, in the pre-implementation version is significantly increased in the post-

implementation version $\beta = 0.47$ (47%). This indicated that better education on mental health issues and well-designed support tools could all positively influence the students' Intention to Use the online mental health support tools. Studies have demonstrated that consumers typically find online mental health resources to be acceptable, but its' Perceived Usefulness is an important determinant of the Intention to Use. Users are likely to engage in a given health-related behavior when they believe the intervention will be effective.

This perception is corroborated by Amy's narration of her mental health support tool usage: "I was diagnosed with depression when I was at college, after being bullied at secondary school, which caused me to have very low self-esteem and increased stress levels around examination periods. It was very difficult for me to talk about my feelings and even harder to trust anybody. I constantly had self-harming and suicidal thoughts, whilst I was at university. I took time out from my studies and my local doctor referred me to talking therapies at the Community Mental Health Center – if it hadn't been for this referral, I don't think I would have been able to start my recovery journey and I don't know where I would be today. Being given the choice and opportunity to access these services enabled me to face and start dealing with my depression instead of feeling as if I was helplessly enduring and battling with it. Talking therapies helped me to not try and get rid of negative feelings but instead to learn to deal with them effectively so that they have less impact, as well as helping me to realize that it is not normal to be happy all the time. I found this approach very helpful and it became a significant turning point in my life". I was informed of a 'Text and Email Support Service' (TESS), which was a very helpful support tool for me. I tend to find it easier to express how I am feeling through written communication and I have found TESS a non-judgmental service that enables me to make sense of how I am feeling, by the volunteers not telling me how I should be feeling but instead acknowledging and listening to what I am saying. Exercise has also helped with my journey. I am in a better place and want to send out the message that a mental illness does not make a person weak or define whom they are, and that people can recover and be successful in reaching their goals. It is important for other people living with a mental illness to know that there is help, support and information out there – do not give up (Amy, 2012)."

8 CONCLUSIONS

The Centre for Addiction and Mental Health (CAMH) described mental illness as a disturbance in thoughts and emotions that decreases a person's capacity to cope with the challenges of everyday life. However, stigma is defined as a set of negative and often unfair beliefs that a society or groups of people have about something ("Stigma", n.d.). Information powered by technology is vital to knowledge. Exploring many possible ways to translate knowledge into action for the sake of the help-seekers or the distressed population is first stage and the most important intervention that could be provided. Early detection and management of mental health issues is vital to prevent or ameliorate mental illness and increase students' well-being. However, many college students do not seek treatment for mental health disorders as they feel that symptoms are typical of college stress and express concern that others will judge them for seeking treatment (Eisenberg, et al., 2007). Without treatment, students experiencing mental health concerns are at high risk for lower grade point averages, school dropout, and future unemployment. The stigma attached to mental health in our community is worrisome and unfortunately more prevalent among university students as many studies have shown (e.g. Hunt & Eisenberg, 2010). Some participants confirmed that using the Internet to obtain health information helps dissolve some of the barriers to seeking help such as the stigma and also addresses privacy concerns.

Perceiving negative attributes such as believing individuals with mental health problems are weak, incompetent, and cannot take care of themselves, are common forms of stigma and may contribute to increases in harmful attitudes (Corrigan, Edwards, Green, Diwan, & Penn, 2001). Reducing or completely alleviating the stigma associated with mental health in our community requires a change in behavior and attitudes-toward acceptance, respect and equitable treatment of people living with mental illnesses. Perhaps most important is for people to understand that mental illnesses are not anyone's choice and that recovery is possible with appropriate treatment and supports. Necessary interventions could be rendered accordingly if stigma can be overcome.

Online mental health interventions are evolving at a rapid rate, and they should be regarded as an adjunct to other mental health services rather than an alternative to traditional face-to-face therapies. Online resources provide an opportunity for users to

overcome the barriers in accessing mental health services, and an effective way to seek-help for those in need. These resources are crucial in any comprehensive university mental health strategy as a proactive and preventative measure. Most online resources are designed to provide users with information and tools to help identify mental health and addiction problems in themselves and/or others. In addition, they strive to teach students problem-solving, coping, and social skills, which can help support them in times of difficulty, assist them in recognizing when self-management is not enough and where to go to seek professional help. The study by Nemande, et al., (2007) advised the students not to attempt solely self-treatment but instead, to seek a professional diagnosis or external assistance to deal with their mental health concerns at the earliest opportunity. Amy's narration of her online mental health support tool usage concurs with the belief that, perceived usefulness is among the core determinants of Intention to Use any online support resources. Online mental health resources help users recognize and respond to emerging mental health problems, and connect to peer and professional support at the times they need it most.

Mental health interventions delivered over the Internet or support resources are likely to cost less than treatments requiring frequent contact with health care professionals. Online mental health support resources are argued to be cost-effective compared to traditional face-to-face treatments or *do-nothing* alternatives (Anderson & Titoy, 2014). Given the prevalence and onset of mental illness and addictions among the university students population, targeting them for early mental health interventions would have great impacts on improving mental health in society with significant financial and social cost savings. It is clear that the economic burden of mental illness in the community is enormous. It was estimated that every $1 spent on mental health illness treatment saves $7 in health costs and $30 dollars in lost productivity and social costs (Ontario Ministry of Health and Long-Term Care, 2009, p.16).

Despite the increased numbers of online mental health support tools, relatively little is known about the characteristics affecting the acceptance and Intention to Use these support tools. To address this issue, the revised TAM model (Davis, 1986) was modified to include three additional external variables (Social Influence and Online Tool Designs: Psychcentral and Moodgym) that could serve as the theoretical foundation to identify the

core factors influencing Attitude and Intention to Use these online mental health support tools. This study revealed the impact of Social Influence on the mental health help-seeking students. Arguably, it is easier for an individual to disclose the diagnosis of cancerous diseases than an issue of mental disorder to their family, peers, or colleagues. The design of Psychcentral play an important role as a core determinant of Perceived Ease of Use of these online mental health support tools. This indicated that the study participants perceived the online mental health support tools designed like Psychcentral to be easy to use than any other designs of mental health support tools. This perception indicated that the participants can employ online mental health support tools with design similar to Psychcentral for self-assessment anytime and anywhere, which eventually increases the level of Usefulness and Ease of Use. Consistent with prior studies, Perceived Usefulness and Perceived Ease of Use were positively related with Attitude and Intention to Use, according to TAM, and the Intention could lead to actual usage. Although, TAM-Mod indicated that these two factors affected the users' perception of the various online mental health tools, Perceived Ease of Use and Perceived Usefulness of these online mental health tools are critical to the students' Intention to Use. This study also provides a good explanation of Attitude toward online mental health support tools usage, while it provides a minimal explanation of Intention to Use the support tools.

The significant differences in the Perceived Ease of Use, Perceived Usefulness and Intention to Use relationship for the pre and post-implementation versions of this study make a compelling argument for more education and motivation for the students on the importance of mental health literacy. Future work needs to focus more on improving the emerging adults' mental health literacy.

9 STUDY LIMITATIONS AND FUTURE RESEARCH

9.1 Limitations

This study has some limitations that create opportunity for future research. First, responses to this research study were voluntary and thus inevitably subject to self-selection biases. Moreover, due to the stigma attached to mental illness in the community, most students are not willing to talk or express themselves openly. That might explain why the response rate was not as high as expected. Second, the results of this research may be limited by the types of the online mental health support tools used in the research; some of the participants claimed not to have prior knowledge of any of the support tools used in this research. Third, in terms of the study participants, the sample was mainly composed of undergraduate and graduate students; no postgraduate students were represented in the study. Fourth, the relatively low R-square values in the model (TAM-Mod) compared with prior TAM studies suggest the potential limitations of TAM in this particular subject area. Fifth, is the participants' age limitation; if the study was open to students younger than 18 years or older than 25 years the study might have attracted more participants. Lastly, this study did not consider participant-related-factors. Previous studies have indicated that individual differences could have significant impacts on participants' Intention to Use or actual usage of the tools. For example, history of mental illness in the family may relate to participants' Intention to Use or actual usage of online mental health support tools.

9.2 Future research

Future research may consider including a random sampling of students with more diverse demographics: age groups, language and cultural background to discern the students' online mental health support tools experiences. The Entertainment Software Association (ESA, 2013) reported that the 58% of North American households own at least one dedicated game console, personal computer, tablet or smart phone. Since this is the gaming generation, embedding these mental health support tools into various types of games supported by the University could positively affect the usability of these tools. The impact of mental health support tools as self-assessment games available to the students

on their mobile devices- (I-pads or I phones, Androids based smart phones or tablets) should also be investigated.

Future research should also explore the benefits and importance of various e-mental health support tools as applications (apps) on the learning machines provided by the school for the faculty members and students. Easy accessibility to these e-mental health support tools as intervention applications on the school provided laptops or on students' mobile devices could positively influence the Perceived Ease of Use, which might lead to Perceived Usefulness or even improve its usage. Mohr et al. (2013) suggested that research in mhealth is still at a developmental stage, never the less understanding students' use of mobile devices and how mental health interventions could be integrated into mhealth as seamlessly as possible, should be a priority for future research.

9.3 Study Recommendations

Informatics in Mental Health- Extending students' access to mental health support tools

There are various ways information technology could appeal to the help-seeking students particularly in time of distress. In addition to Mindsight, which was created for the students' well-being, there are various mental health "apps" for the help-seeking population. According to MobiHealthNews, (2012) among the available apps are:

- Depression CBT self-help guide
- Positive Thinking
- Depression Check
- Smiling Mind
- Happy Habit
- Depression Monitor
- Mood Me- Mood Diary and Tracker
- Getting on the Go-Help for Depression
- Secret of Happiness

All these apps are available and supported by mobile devices (Android, I-phone, or any other types of smart phones) as e-mental health applications. There are over 700 consumer applications for mental health conditions in the Apple App Store alone (MobiHealthNews, 2012), in addition to applications running on Androids and other operating systems, and programs delivered via the Internet or SMS. The study by Luxton, McCann, and Bush, (2011) indicated that applications are available for clinical assessment, symptom monitoring, psycho-education, psychological therapy (guided and unguided), psychotherapeutic skills training and support – and for a range of mental health disorders including depression, bipolar disorder, anxiety, addictions, psychosis, eating disorders as well as comorbid conditions.

To the School

During the course of this study, it was identified that there was a lack of awareness of Mindsight, the online mental health support tool designed by Dr. Wendy Stanyon, for the well-being of the students, the faculty members and staff of the University of Ontario Institute of Technology and any other mental health support tools, despite all the effort to create an environment that promotes better mental health in the university. Many studies have indicated that students are a high-risk population for mental health issues, suggesting the need for early intervention programs for the students. Early intervention could help prevent the development of more serious mental health problems among students and it is likely to result in better physical health, a greater chance of academic success and better long-term outcomes, according to Vaez and Laflamme (2008).

The university should strive to work together with relevant student groups and associations to develop targeted mental health promotional campaigns. This could greatly benefit the students by educating them on how to identify the signs and symptoms of mental illnesses among their friends and peers and where to access the appropriate services on campuses, or in the community, which could assist them in better managing their own mental health or that of others. These campaigns can assist students, staff and faculty members by promoting mental wellbeing and healthy lifestyles. The institution can also promote social inclusion of people living with mental illness and build an

understanding of the stressors that exist in the university environment according to Council of Ontario Universities, COU (2010). More mental health awareness interventions could be implemented by faculties to educate, encourage and support wellness promotion campaigns among the students, faculty and staff on the campus.

To the Web Designers

De Troyer and Leune (1994) claimed that users usually visit websites, use web applications or support tools with questions in mind. The websites, web application or support tools should anticipate the users' questions and be able to answer them. If a user's intention and questions are met, the probability of the user returning to the websites, web applications or support tools is very high. Understanding the contributing factors to user satisfaction and dissatisfaction is important for the website, applications and support tools designers. To keep the interactivity, as well as add cognitive and affective values to a web application, the designers need to constantly identify and build motivational factors into their websites, as well as web applications or support tools. The survey analysis clearly indicated the Online Tool Designs is a significant factor in the students' Perceived Ease of Use of the online support tools. The designers of the online mental health support tools should consider user-friendly websites. A user-friendly website will automatically prompt the user's return. Studies conducted by Kelly et al., (2007); O'Kearney, Gibson, Christensen, & Griffiths,(2006); Ybarra & Eaton, (2005) provide clear direction for developers to create a program in the form of web applications, support tools or websites, which is relevant and engaging for students, and thus more likely to be utilized.

Bylund et al. (2007) argued about the need to help the consumers bridge the gap between access to information and information understanding- i.e. to help consumers understand health related web-based resources so that they can make use of them. Moreover, they also suggested that the best way to address this issue is to provide consumers with tailored information that is contextualized and personalized so that it is easily comprehensible and directly relevant to the person's own health situation. Bridging the gap between access to information and information understanding can empower

consumers by enhancing their comprehension of the information perceived, which thereby increases the likelihood that the consumer will act on that information. Moreover, the gap could also be bridged by the health support resources designers not only to improve how easily these health resources can be found online, but to also improve the quality of the resources themselves.

To the Students

Various studies have shown that university students are a high-risk population for mental health problems, yet few seek appropriate help when experiencing problems. Receiving effective treatments can reduce the detrimental effects of psychological distress (Nicholas et al., 2004). The anonymity of the Internet allows individuals to obtain help without having to meet a health professional face-to-face, and online help is often preferred by individuals experiencing problems that they feel uncomfortable or ashamed about discussing with a health professional, or even with friends and family (Gerrits et al., 2007; Gray et al., 2005). Most educational institutions are doing everything possible to improve awareness of mental health among their students. According to Hunt and Eisenberg (2010), multiple studies have identified barriers to seeking help among the student population. These include lack of time, privacy concerns, lack of emotional openness, a lack of a perceived need for help and skepticism about treatment effectiveness.

The analysis of the post-implementation of online mental health support tools interview conducted with the students revealed that even though most students are skeptical about their usage, they still believed that conducting a self-assessment using any of the online mental health support tools could be a vital first-step in the help-seeking process. Online interventions could play an important role in supporting university students' wellbeing. A study conducted by Eisenberg et al. (2007) reported that most of their participants believe that stress is normal in school, and seeking mental health help is a sign of weakness. More needs to be done to improve mental health literacy among the students, as well as to encourage the students that help seeking in time of distress is not a sign of personal weakness but rather a healthy and wise decision.

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APPENDICES

APPENDIX-A

Pre-Implementation of the Support Tools

Demographics - Questionnaire

Please take some time to complete this questionnaire. The findings of this study should provide insights into the students' perspective of the e-mental health support tools and how to effectively raise its awareness among the university students.

1 What is your age?

- 18 – 20 years
- 21-23 years
- 24-25 years
- 25 years and above

2 What is your gender?

- Female
- Male

3 Please, specify your ethnicity.

- Caucasian
- Hispanic or Latino
- Black or African American
- Native American or American Indian
- Asian / Pacific Islander
- Other

4 Citizenship Status

- Local student
- International Student

5 Level of studies

- First year undergraduate
- Other undergraduate
- Graduate
- Postgraduate

6 What is your current marital status?

- Single/Never been married
- Married or Domestic partnership
- Separated
- Divorced
- Widowed

7. What is your total household income?

- Under $15,000
- $15,000 - $25,000
- $25,000 - $35,000
- $35,000-$45,000
- Over $45000

Online mental health support tools questions

Online mental health support tools are designed to better educate people on various mental health illnesses by illuminating various health information, health support strategies and treatment options in tandem with numerous resources. Among them are various Internet support groups (ISG), psychological testing and assessment tools, psychological advice portals, e-counseling and e-therapy.

8. Where would you seek advice or help if you are having mental health concerns?

- Online (self-help)
- Professional help
- I will not seek any help

9. Have you ever sought information related to mental health online?

- Yes, I have.
- No, I have not.

10. Are you aware of any online mental health self-assessment support tool?

- Yes
- No

11. How often do you seek Information related to mental health online?

- Regularly
- Never

APPENDIX–B

Post-Implementation of Support Tools Questionnaire
(Reference to the mental health scenarios)

If you found yourself in any of the above positions:
1. Would you have sought any sort of self-help?
2. Have you ever sought information related to mental health online?
3. Which one of these e-mental health support tools have you heard of?
4. Which of these e-mental health support tools would you access and why?
5. Which of these e-mental health support tools would you NOT access and why?
6. Would you recommend any one of the e-mental health support tools to your friends or family members?
7. How did the students' actions or responses to their situations (reference to the scenario) affect your choice of e-mental health support/information tool?
8. In your opinion, what makes an online mental health resource tool useful to the students?
9. In your opinion, what makes online mental health resources appealing to the students?
10. What concern do you have about online mental health usage?

APPENDIX-C

Measurement Items Used in this Study (TAM)

Perceived Useful (PU)

PU1: Using the e-mental health support tools would enable me to know that I am not the only one that feels the way I am feeling.
PU2: Using the e-mental health support tools would improve my ability to talk about my feelings
PU3: Using the e-mental health support tools can improve my knowledge about mental health symptoms.
PU4: Using the e-mental health support tools CANNOT enhance my knowledge about mental health issues
PU5: Using the e-mental health support tools can make it easier for me to seek further help
PU6: I would find the e-mental health support tools NOT useful enough to help my mental health issue

Perceived Ease of Use (PEoU)

PEOU1: Learning to access the e-mental health support tools would be easy for me
PEOU2: I would find it easy to use the e-mental health support tools to access my mental health status
PEOU3: My interaction with e-mental health support tools would be clear and understandable
PEOU4: I would find the e-mental health support tool modules flexible to navigate.
PEOU5: It will NOT be easy for me to become skillful in using any of the e-mental health support tools.
PEOU6: I will find the e-mental health support tools easy to use.

Attitude

ATT1: Using the e-mental health support tools for personal mental health assessment among students is a good idea
ATT2: Using the e-mental health support tools by the student is UNPLEASANT
ATT3: Using the e-mental health support tools for personal mental health assessment by the students is beneficial

Intention to Use

ITU1: I intend to use the e-mental health support tools to educate myself about common mental illnesses, support strategies, treatment options and available resources.
ITU2: I intend to use the e-mental health support tools to analyze my mental health status
ITU3: I intend NOT to access any of the e-mental health support tools for my personal reason
ITU4: I intend NOT to use any of the e-mental health support tools to check out my mental health status.
ITU5: To the extent possible, I would use the e-mental health support tools for self-assessment
ITU6: To the extent possible, I would refer the e-mental health support tools to my friends and family members

Social Influence

SI1: People who are important to me think I should NOT use any e-mental health support tools
SI2: People who are important to me think I should use the e-mental health support tools to improve my knowledge on mental health issues
SI3: People whose opinions I value think I should use the e-mental health support tools to avert stigmatization of my mental health illness
SI4: People who are important to my health service think I should use the e-mental health support tools for self-assessment

APPENDIX-D

Mental Health Scenarios

Scenario A

Mariette Lee could not wait to become a student at McMaster University in Hamilton, Ontario. Toward the end of her second year, she began to feel overwhelmed. "I was trying to do too much simultaneously, to be the perfect student," says Lee, 22. She began skipping classes, and she was not eating right; she became increasingly withdrawn, gripped by sadness or anxiety for reasons she could not understand. "I remember sitting in class, and a whole hour would go by without me realizing it." It wasn't until a friend reached out to her—one who said he himself had a mental illness—that Lee understood she needed to talk to someone or seek some sort of help. Lee sought and got help; first, she accessed an e-mental health support website to get more information about the state of her mental health after which she decided to consult the campus health center. She was later sent to Healthcare Center, where she was diagnosed with depression. At first, Lee was shy about sharing her diagnosis, but once she saw others were supportive, she opened up. "If people don't talk about it, they won't recognize the signs," she says.

(Mental health crisis on Campus, by Kate Lunau, 2012)
(Retrieved from http://www.macleans.ca/education/uniandcollege/the-mental-health-crisis-on-campus)

Scenario B

"My drive to do anything is at an all-time low, especially in school. Since the semester began, I have felt overwhelmed, unappreciated, and alone and misunderstood. I work part time at a fast food restaurant, and go to school full time. I have tried cutting back on my working hours, but nothing has changed. When I am at school, I just feel like a ghost sitting there. I cannot concentrate, I have been thinking of taking a break from school next semester. I am just so confused because my life feels like it is in an uproar and I have no control over it. A friend of my mine once said that, whatever I am dealing with, acknowledging the fact that it is an issue and willing to take an action is the first step to improving my situation. What should I do"?

(Retrieved from http://www.macleans.ca/education/uniandcollege, 2010)

Scenario C

"I was diagnosed with depression when I was at college, after being bullied at secondary school, which caused me to have very low self-esteem and increased stress levels around exams. It was very difficult for me to talk about my feelings and even harder to trust anybody. I constantly had self-harming and suicidal thoughts, whilst I was at university. I took time out from my studies and my local doctor referred me to talking therapies at the Community Mental Health Center – if it hadn't been for this referral, I don't think I would have been able to start my recovery journey and I don't know where I would be today. Being given the choice and opportunity to access these services enabled me to face and start dealing with my depression instead of feeling as if I was helplessly enduring and battling with it. Talking therapies helped me to not try and get rid of negative feelings but instead to learn to deal with them effectively so that they have less impact, as well as helping me to realize that it is not normal to be happy all the time. I found this approach very helpful and it became a significant turning point in my life".

"I went to a well-being and counseling service at university. It took me a while to feel comfortable and safe enough to open up and develop a trusting relationship with the practitioner, but the consistency of seeing the same person each time enabled me to do this. I was informed of a 'Text and Email Support Service' (TESS), which has been another very helpful support tool for me. I tend to find it easier to express how I am feeling through written communication and I have found TESS a non-judgmental service that enables me to make sense of how I am feeling, by the volunteers not telling me how I should be feeling but instead acknowledging and listening to what I am saying. Exercise has also helped with my journey. I am in a better place and want to send out the message that a mental illness does not make a person weak or define whom they are, and that people can recover and be successful in reaching their goals. It is important for other people living with a mental illness to know that there is help, support and information out there – do not give up!"

(Amy's story: Living with Depression: Retrieved from http://www.mentalhealth.org.uk/get-involved/your-stories/amys-story/?view=Standard)

APPENDIX-E

Study Population Demographics

VARIABLES	COUNT (*N*)	PERCENTAGE
AGE:		
• 18 – 20 years	43	32.82%
• 21-23 years	46	35.11%
• 24-25 years	16	12.21%
• 25 years and above	18	13.74%
• No response	5	3.82%
• Not completed or Not displayed	3	2.29%
GENDER:		
• Female (F)	56	42.75%
• Male (M)	66	50.38%
• No response	6	4.58%
• Not completed or Not displayed	3	2.29%
ETHNICITY:		
• White	36	27.48%
• Hispanic or Latino	3	2.29%
• Black or African American	30	22.90%
• Native American or American Indian	6	4.58%
• Asian / Pacific Islander	27	20.61%
• Other	19	14.50%
• No response	7	5.34%
• Not completed or Not displayed	3	2.29%
CITIZENSHIP STATUS:		
• Local student	107	81.68%
• International Student	11	8.40%
• No response	10	7.63%
• Not completed or Not displayed	3	2.29%
LEVEL OF STUDIES:		
• First year undergraduate	8	6.11%
• Other undergraduate	90	68.70%
• Graduate	22	16.79%
• Post graduate	0	0.00%
• No response	8	6.11%
• Not completed or Not displayed	3	2.29%

VARIABLES	COUNT (*N*)	PERCENTAGE
TOTAL HOUSEHOLD INCOME:		
• Under $15,000	32	24.43%
• $15,000 - $25,000	19	14.50%
• $25,000 - $35,000	20	15.27%
• $35,000-$45,000	14	10.69%
• Over $45000	37	28.24%
• No response	6	4.58%
• Not completed or Not displayed	3	2.29%

APPENDIX-F

Summary of SPSS Analysis

Data Modification

(I) Univariate Analysis of the Dummy Coded Variables

Variables	0	1
Gender	Male	Female
Age	18 - 23 years old	24 - 25 years old
Race	Non- white	White
Marital Status	Single	Non –Single
Citizenship status	Local students	International students
Household Income	$15,000 - $35,000	$35,000 - $45,000
Level of Education	Under-graduate	Graduate
Where would you seek advice or help if you are having mental health concern	Online help	Professional help
Have you ever sought information related to mental health online?	No	Yes
Are you aware of any online mental health support tool?	Yes	No
How often do you seek Information related to mental health Online?	Never	Regularly

Online Tool Designs Codes:

Moodgym = 1, Mindsight = 0, Psychcentral = 1

Variable 1 named Psych design = Psychcentral (1), Mindsight (0)

Variable 2 named Mood design = Moodgym (1), Mindsight (0)

Mindsight was used as the reference category for the regression.

(II) Multi-Collinearity Statistics in the Pre-Implementation

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.506	.354		4.249	.000		
	ATT	.556	.091	.524	6.121	.000	1.000	1.000
2	(Constant)	1.741	.368		4.738	.000		
	ATT	.532	.090	.501	5.892	.000	.982	1.018
	Where would seek help, pro=1	-.289	.142	-.173	-2.035	.045	.982	1.018
3	(Constant)	1.053	.414		2.544	.013		
	ATT	.324	.109	.306	2.988	.004	.622	1.607
	Where would seek help, pro=1	-.220	.138	-.132	-1.599	.113	.958	1.044
	PU	.370	.117	.327	3.157	.002	.607	1.648
4	(Constant)	1.230	.439		2.804	.006		
	ATT	.293	.112	.276	2.608	.011	.587	1.704
	Where would seek help, pro=1	-.188	.145	-.113	-1.301	.196	.874	1.144
	PU	.353	.121	.312	2.924	.004	.579	1.728
	Marital status, Non-single=1	.106	.321	.028	.331	.742	.948	1.055
	ever sought help, Yes=1	.042	.147	.025	.288	.774	.888	1.127
	Level of Education, Grad=1	.254	.189	.116	1.340	.184	.872	1.147
	Race white=1	-.237	.155	-.127	-1.528	.130	.947	1.056
	GENDER Female=1	-.035	.142	-.021	-.248	.805	.912	1.096

a. Dependent Variable: ITU

Tolerances are all above .4 and VIF are all below 2.5

(III) Multi-Collinearity Statistics in the Post-Implementation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.841	.513		3.587	.001		
	ATT	.478	.130	.418	3.684	.000	1.000	1.000
2	(Constant)	-.772	.584		-1.320	.192		
	ATT	.023	.126	.020	.180	.858	.669	1.495
	PU	.508	.168	.376	3.026	.004	.526	1.902
	PEOU	.569	.180	.387	3.160	.002	.540	1.852
3	(Constant)	-1.289	.751		-1.715	.092		
	ATT	.004	.134	.006	.028	.004	.597	1.676
	PU	.506	.172	.375	2.941	.005	.508	1.970
	PEOU	.568	.182	.387	3.118	.003	.535	1.868
	SI	.162	.125	.124	1.297	.200	.904	1.107
	Psych	-.010	.024	-.056	-.423	.674	.477	2.099
	Mood	-.010	.021	-.058	-.488	.627	.582	1.717

a. Dependent Variable: ITU

Tolerances are all above .4 and VIF are all below 2.5

Summary of SPSS Analysis

(IV) Descriptive Statistics of Pre-Implementation of Support Tools

	N	Min	Max	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
AGE	124	.00	3.00	1.0887	1.04385	.648	.217	-.738	.431
Race white=1	125	.00	1.00	.2880	.45465	.948	.217	-1.120	.430
LEVEL OF EDUCATION	121	.00	1.00	.1901	.39400	1.600	.220	.568	.437
MARITAL STATUS	125	.00	1.00	.0560	.23085	3.909	.217	13.498	.430
WHERE WOULD YOU SEEK HELP	109	.00	1.00	.5046	.50229	-.019	.231	-2.037	.459
EVER SOUGHT HELP Yes=1	124	.00	1.00	.5726	.49671	-.297	.217	-1.943	.431
PU	121	1.20	5.00	3.8545	.73666	-.709	.220	.298	.437
PEoU	121	1.33	5.00	3.7865	.69430	-1.026	.220	1.386	.437
ATT	121	1.00	5.00	3.8320	.75905	-.752	.220	.609	.437
ITU	121	1.40	4.80	3.6248	.79144	-.706	.220	-.158	.437
Valid N (listwise)	101								

(V) Descriptive Statistics of Post-Implementation of Support Tools

	N	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Sought self-help	66	.00	1.00	.7273	.44877	-1.045	.295	-.938	.582
Sought mental help	66	.00	1.00	.3939	.49237	.444	.295	-1.860	.582
Any one of the tools	60	1.00	3.00	1.3000	.59089	1.856	.309	2.410	.608
Which one would you use	58	1.00	3.00	1.5517	.75329	.966	.314	-.537	.618
Not Access	64	1.00	3.00	2.2813	.80610	-.562	.299	-1.231	.590
Recommend	63	1.00	3.00	1.5714	.71198	.848	.302	-.542	.595
Do you agree	65	.00	1.00	.9231	.26854	-3.251	.297	8.840	.586
PU	66	2.80	5.00	4.0424	.58337	-.370	.295	-.658	.582
PEOU	66	2.83	5.00	4.0960	.53674	-.424	.295	-.177	.582
ATT	66	2.33	5.00	3.8939	.68975	-.407	.295	-.620	.582
ITU	66	2.00	5.00	3.7030	.78857	-.336	.295	-.716	.582
SI	66	2.00	5.00	3.4167	.60341	.872	.295	.388	.582
PSYCH DESIGN	46	.00	1.00	.4565	.50361	.181	.350	-2.059	.688
MOOD DESIGN	45	.00	1.00	.4444	.50252	.231	.354	-2.039	.695
Valid N (listwise)	20								

APPENDIX-G

Correlation Matrix of the Post-Implementation of Support Tool

Correlation Matrix of Post-implementation of the mental health support tool

	PU1	PU2	PU3	PU4	PU5	PEO U1	PEO U2	PEO U3	PEO U4	PEO U5	PEO U6	ATT 1	ATT 2	ATT 3	ITU 1	ITU2	ITU3	ITU4	ITU5	SI1	SI2	SI3	SI4
PU1	1.00																						
PU2	.571	1.00																					
PU3	.425	.107	1.00																				
PU4	.360	.226	.349	1.00																			
PU5	.358	.319	.272	.413	1.00																		
PEOU1	.472	.343	.489	.397	.223	1.00																	
PEOU2	.458	.358	.286	.164	.196	.423	1.00																
PEOU3	.448	.336	.419	.302	.381	.522	.571	1.00															
PEOU4	.385	.303	.300	.272	.343	.455	.480	.601	1.00														
PEOU5	.245	.226	.264	.511	.365	.404	.281	.512	.568	1.00													
PEOU6	.356	.250	.260	.323	.042	.373	.348	.414	.346	.427	1.00												
ATT1	.605	.297	.555	.319	.200	.442	.358	.436	.418	.262	.339	1.00											
ATT2	.315	.113	.242	.383	.263	.151	.185	.289	.282	.278	.266	.397	1.00										
ATT3	.408	.132	.400	.342	.180	.319	.256	.390	.317	.246	.271	.566	.422	1.00									
ITU1	.183	.121	.119	.179	.013	.120	.139	.189	.198	.131	.225	.291	.189	.422	1.00								
ITU2	.474	.398	.269	.135	.243	.192	.487	.481	.424	.303	.236	.472	.215	.423	.277	1.00							
ITU3	.230	.149	.147	.268	.351	.078	.177	.210	.172	.122	-.073	.241	.242	.192	.121	.431	1.00						
ITU4	.246	.285	.087	.326	.394	.083	.280	.320	.323	.293	-.026	.238	.202	.295	.113	.580	.718	1.00					
ITU5	.383	.287	.382	.274	.287	.288	.187	.361	.371	.269	.274	.471	.210	.405	.235	.486	.377	.223	1.00				
SI1	.329	.295	.174	.335	.880	.213	.242	.338	.309	.308	.045	.119	.131	.151	.047	.251	.287	.380	.206	1.00			
SI2	1.00	.571	.425	.360	.358	.472	.458	.448	.385	.245	.356	.605	.315	.408	.183	.474	.230	.246	.383	.329	1.00		
SI3	.458	.358	.286	.164	.196	.423	1.00	.571	.480	.281	.348	.358	.185	.256	.139	.487	.177	.280	.187	.242	.458	1.00	
SI4	.594	.833	.161	.239	.333	.328	.375	.385	.370	.247	.229	.370	.123	.163	.147	.433	.179	.254	.358	.308	.594	.375	1.00

APPENDIX-H

Responses to the Pre-Implementation of the Support Tools

Mental health help-seeking behavior

VARIABLES	FREQUENCY	PERCENTAGE
Where would you seek advice or help if you are having mental health concerns:		
• Online (self-help)	54	41.22%
• Professional help	55	41.98%
• I won't seek any help	14	10.69%
• No answer	4	3.05%
• Not completed or Not displayed	4	3.05%
Have you ever sought information related to mental health online:		
• Yes, I have	70	53.44%
• No, I have not	54	41.22%
• No answer	3	2.29%
• Not completed or Not displayed	4	3.05%
Are you aware of any e-mental health self-assessment support tools:		
• Yes	50	38.17%
• No	73	55.73%
• No answer	4	3.05%
• Not completed or Not displayed	4	3.05%
How often do you seek information related to mental health on line		
• Regularly	32	24.43%
• Never	91	69.47%
• No answer	4	3.05%
• Not completed or Not displayed	4	3.05%

APPENDIX-I

Responses to the Technology Acceptance Model (TAM) Based Questionnaires

Out of the 131 respondents, one (.76%) participant did not respond to any of the survey questions but submitted a blank questionnaire, while nine (6.87%) participants did not completed the research survey.

VARIABLES	FREQUENCY	PERCENTAGE
E-mental health support tools would enable me to know that I am not the only one that feels the way I am feeling:		
• Very Unlikely	4	3.05%
• Somewhat Unlikely	11	8.40%
• Neither	17	12.98%
• Somewhat Likely	62	47.33%
• Very Likely	27	20.61%
Using the e-mental health support tools will improve my ability to talk openly about my feelings:		
• Very Unlikely	8	6.11%
• Somewhat Unlikely	15	11.45%
• Neither	23	17.56%
• Somewhat Likely	53	40.46%
• Very Likely	22	16.79%
Using the e-mental health support tools can improve my knowledge of mental health symptoms:		
• Very Unlikely	2	1.53%
• Somewhat Unlikely	6	4.58%
• Neither	11	8.40%
• Somewhat Likely	59	45.04%
• Very Likely	43	32.82%
Using the e-mental health support tools CANNOT enhance my knowledge about mental health issues:		
• Very Unlikely	56	42.75%
• Somewhat Unlikely	38	29.01%
• Neither	16	12.21%
• Somewhat Likely	9	6.87%
• Very Likely	2	1.53%
I would find the e-mental health support tools NOT useful enough to help my mental health issue:		
• Very Unlikely	46	35.11%
• Somewhat Unlikely	36	27.48%
• Neither	24	18.32%
• Somewhat Likely	8	6.11%
• Very Likely	7	5.34%

VARIABLES	FREQUENCY	PERCENTAGE
I would find it easy to use the e-mental health support tools to access my mental health status:		
• Very Unlikely	7	5.34%
• Somewhat Unlikely	3	2.29%
• Neither	21	16.03%
• Somewhat Likely	76	58.02%
• Very Likely	14	10.69%
My interaction with the e-mental health support tools would be clear and understandable:		
• Very Unlikely	2	1.53%
• Somewhat Unlikely	7	5.34%
• Neither	25	19.08%
• Somewhat Likely	60	45.80%
• Very Likely	27	20.61%
I would find the e-mental health support tool modules flexible to navigate:		
• Very Unlikely	1	0.76%
• Somewhat Unlikely	12	9.16%
• Neither	32	24.43%
• Somewhat Likely	55	41.98%
• Very Likely	21	16.03%
It would NOT be easy for me to become skillful in using the e-mental health support tools:		
• Very Unlikely	45	34.35%
• Somewhat Unlikely	30	22.90%
• Neither	29	22.14%
• Somewhat Likely	13	9.92%
• Very Likely	4	3.05%
I would find the e-mental health support tools easy to use:		
• Very Unlikely	4	3.05%
• Somewhat Unlikely	6	4.58%
• Neither	25	19.08%
• Somewhat Likely	69	52.67%
• Very Likely	17	12.98%

VARIABLES	FREQUENCY	PERCENTAGE
Use of the e-mental health support tools by students is UNPLEASANT:		
• Very Unlikely	34	25.95%
• Somewhat Unlikely	40	30.53%
• Neither	39	29.77%
• Somewhat Likely	5	3.82%
• Very Likely	3	2.29%
I intend to use the e-mental health support tools to educate myself about common mental illnesses, support strategies, treatment options and available resources:		
• Very Unlikely	6	4.58%
• Somewhat Unlikely	15	11.45%
• Neither	17	12.98%
• Somewhat Likely	59	45.04%
• Very Likely	24	18.32%
Using the e-mental health support tools for personal mental health assessment by the students is beneficial:		
• Very Unlikely	4	3.05%
• Somewhat Unlikely	7	5.34%
• Neither	21	16.03%
• Somewhat Likely	68	51.91%
• Very Likely	21	16.03%
I intend to use the e-mental health support tools to evaluate my mental health status:		
• Very Unlikely	12	9.16%
• Somewhat Unlikely	13	9.92%
• Neither	22	16.79%
• Somewhat Likely	58	44.27%
• Very Likely	16	12.21%
I DO NOT intend to access any of the e-mental health support tools for my personal reason:		
• Very Unlikely	38	29.01%
• Somewhat Unlikely	35	26.72%
• Neither	26	19.85%
• Somewhat Likely	9	6.87%
• Very Likely	13	9.92%

VARIABLES	FREQUENCY	PERCENTAGE
To the extent possible, I would refer the e-mental health:		
• Very Unlikely	2	1.53%
• Somewhat Unlikely	12	9.16%
• Neither	27	20.61%
• Somewhat Likely	67	51.15%
• Very Likely	13	9.92%
People who are important to me think I should NOT use the e-mental health support tools:		
• Very Unlikely	37	28.24%
• Somewhat Unlikely	28	21.37%
• Neither	43	32.82%
• Somewhat Likely	13	9.92%
• Very Likely	0	0.00%
People that are important to me think I should use the e-mental health support tools to improve my knowledge on mental health issues:		
• Very Unlikely	4	3.05%
• Somewhat Unlikely	12	9.16%
• Neither	57	43.51%
• Somewhat Likely	34	25.95%
• Very Likely	14	10.69%
People whose opinions I value think I should use the e-mental health support tools to avert stigmatization of my mental health illness:		
• Very Unlikely	5	3.82%
• Somewhat Unlikely	8	6.11%
• Neither	74	56.49%
• Somewhat Likely	24	18.32%
• Very Likely	10	7.63%
People who are important to my health service think I should use the e-mental health support tools for my self-assessment:		
• Very Unlikely	8	6.11%
• Somewhat Unlikely	7	5.34%
• Neither	73	55.73%
• Somewhat Likely	24	18.32%
• Very Likely	9	6.87%

*** Of the 131 respondents, one (0.76%) did not respond to any of the survey questions, while nine (6.87%) participants did not complete the survey.

APPENDIX-J

Reponses to the Post-Implementation of the Support Tool Questions

Awareness of mental health resources

VARIABLES	FREQUENCY	PERCENTAGE
Would you have sought any sort of self help		
• Yes	48	72.7%
• No	18	27.3%
Have you ever sought information related to mental health online?		
• Yes	24	36.4%
• No	42	63.6%
Which one of the e-mental health support tool have you heard of?		
• Mindsight	46	69.7%
• Psychcentral	10	15.2%
• Moodgym	4	6.1%
• No response	6	9.1%
Which of these e-mental health support tools would you access?		
• Mindsight	35	53.0%
• Psychcentral	14	21.2%
• Moodgym	9	13.6%
• No response	8	12.1
Which of these e-mental health support tools would you NOT access?		
• Mindsight	14	21.2%
• Psychcentral	18	27.3%
• Moodgym	32	48.5%
• No response	2	3.0%
Would you recommend any of these e-mental health support tools to your friends or family members?		
• Mindsight	35	53%
• Psychcentral	20	30.3%
• Moodgym	8	12.1%
• No response	3	4.5%
Do you agree with the student's decision (reference to the given scenario) to access online mental health support?		
• Yes	61	92.4%
• No	3	4.7%
• No response	2	3.0%

APPENDIX-K

Responses to the Technology Acceptance Model (TAM) Based Questionnaires

VARIABLES	FREQUENCY	PERCENTAGE
Using the e-mental health support tools would enable me to know that I am not the only one that feels the way I am feeling:		
• Very Unlikely	1	1.5%
• Somewhat Unlikely	1	1.5%
• Neither	7	10.8%
• Somewhat Likely	24	36.9%
• Very Likely	32	49.2%
Using the e-mental health support tools will improve my ability to talk openly about my feelings:		
• Very Unlikely	3	4.5%
• Somewhat Unlikely	4	6.1%
• Neither	7	10.6%
• Somewhat Likely	35	53%
• Very Likely	16	24.6%
Using the e-mental health support tools can improve my knowledge of mental health symptoms:		
• Very Unlikely	1	1.5%
• Somewhat Unlikely	1	1.5%
• Neither	2	3.0%
• Somewhat Likely	31	47.0%
• Very Likely	30	45.5%
Using the e-mental health support tools CANNOT enhance my knowledge about mental health issues:		
• Very Unlikely	25	37.9%
• Somewhat Unlikely	27	40.9%
• Neither	5	7.6%
• Somewhat Likely	5	7.5%
• Very Likely	3	4.5%
I would find the e-mental health support tools NOT useful enough to help my mental health issue:		
• Very Unlikely	15	22.7%
• Somewhat Unlikely	27	40.9%
• Neither	16	24.2%
• Somewhat Likely	5	7.6%
• Very Likely	2	3.0%

VARIABLES	FREQUENCY	PERCENTAGE
I would find it easy to use the e-mental health support tools to access my mental health status:		
• Very Unlikely	0	0%
• Somewhat Unlikely	5	7.6%
• Neither	6	9.1%
• Somewhat Likely	35	53.0%
• Very Likely	19	28.8%
My interaction with the e-mental health support tools would be clear and understandable:		
• Very Unlikely	1	1.5%
• Somewhat Unlikely	0	0%
• Neither	7	10.6%
• Somewhat Likely	37	56.1%
• Very Likely	20	30.3%
I would find the e-mental health support tool modules flexible to navigate:		
• Very Unlikely	0	0%
• Somewhat Unlikely	4	6.1%
• Neither	8	12.1%
• Somewhat Likely	32	48.5%
• Very Likely	21	31.8%
It would NOT be easy for me to become skillful in using the e-mental health support tools:		
• Very Unlikely	21	31.8%
• Somewhat Unlikely	28	42.4%
• Neither	10	15.2%
• Somewhat Likely	5	7.6%
• Very Likely	1	1.5%
I would find the e-mental health support tools easy to use:		
• Very Unlikely	1	1.5%
• Somewhat Unlikely	2	3.0%
• Neither	6	9.1%
• Somewhat Likely	28	42.4%
• Very Likely	28	42.4%
Use of the e-mental health support tools by students is UNPLEASANT:		
• Very Unlikely	16	24.2%
• Somewhat Unlikely	27	40.9%
• Neither	15	22.7%
• Somewhat Likely	4	6.1%
• Very Likely	3	4.5%

VARIABLES	FREQUENCY	PERCENTAGE
Using the e-mental health support tools for personal mental health assessment by the students is beneficial:		
• Very Unlikely	1	1.5%
• Somewhat Unlikely	6	9.1%
• Neither	6	9.1%
• Somewhat Likely	30	45.5%
• Very Likely	22	33.3%
I intend to use the e-mental health support tools to evaluate my mental health status:		
• Very Unlikely	5	7.6%
• Somewhat Unlikely	11	16.7%
• Neither	10	15.2%
• Somewhat Likely	19	28.8%
• Very Likely	20	30.3%
I DO NOT intend to use any of the e-mental health support tools to check out my mental health status:		
• Very Unlikely	16	24.2%
• Somewhat Unlikely	25	37.9%
• Neither	14	21.2%
• Somewhat Likely	4	6.1%
• Very Likely	6	9.1%
To the extent possible, I would refer the e-mental health:		
• Very Unlikely	2	3.0%
• Somewhat Unlikely	3	4.5%
• Neither	15	22.7%
• Somewhat Likely	32	48.5%
• Very Likely	13	19.7%
People who are important to me think I should NOT use the e-mental health support tools:		
• Very Unlikely	4	6.1%
• Somewhat Unlikely	2	3.0%
• Neither	36	54.5%
• Somewhat Likely	12	18.2%
• Very Likely	11	16.7%
People that are important to me think I should use the e-mental health support tools to improve my knowledge on mental health issues:		
• Very Unlikely	13	19.7%
• Somewhat Unlikely	17	25.8%
• Neither	31	47.0%
• Somewhat Likely	4	6.1%
• Very Likely	0	0%

VARIABLES	FREQUENCY	PERCENTAGE
People who are important to my health service think I should use the e-mental health support tools for my self-assessment:		
• Very Unlikely	1	1.5%
• Somewhat Unlikely	3	4.5%
• Neither	42	63.6%
• Somewhat Likely	10	15.2%
• Very Likely	9	13.6%

*** Out of the 66 responses for the phase II survey, one (1.5%) participant did not respond to any of the TAM based survey questions.

Scoring the TAM

In scoring the TAM, a value of 1, 2, 3, 4, or 5 is assigned to a response depending upon whether the item is worded positively or negatively. Unresponsive is scored 0

For items 12- 14, 17-20, 22-23, 25-27, 30, 32 -34 the scoring is:

Very Unlikely 1
Somewhat Unlikely 2
Neither 3
Somewhat Likely 4
Very Likely 5

Items 15-16, 21, 24, 28-29, 31, are in reverse scored as follows:

Very Likely 1
Somewhat Likely 2
Neither 3
Somewhat Unlikely 4
Very Unlikely 5

APPENDIX-L

Multiple Comparisons of the Study Mental Health Support Tools: TAM Based Questions Responses

Variables	Mindsight Frequency	%	Psychcentral Frequency	%	Moodgym Frequency	%
E-mental health support tools would enable me to know that I am not the only one that feels the way I am feeling:						
• Very Unlikely	0	0	1	4.8	0	0
• Somewhat Unlikely	0	0	2	9.5	1	5
• Neither	0	0	8	38.1	6	30
• Somewhat Likely	11	44	10	47.6	5	25
• Very Likely	14	56	0	0	8	40
Using the e-mental health support tools will improve my ability to talk openly about my feelings:						
• Very Unlikely	0	0	1	4.8	2	10
• Somewhat Unlikely	1	4	2	9.5	1	5
• Neither	1	4	2	9.5	5	25
• Somewhat Likely	14	56	11	52.4	10	50
• Very Likely	9	36	5	23.8	2	10
Using the e-mental health support tools can improve my knowledge of mental health symptoms:						
• Very Unlikely	0	0	0	0	1	5
• Somewhat Unlikely	0	0	1	4.8	0	0
• Neither	1	4	0	0	2	10
• Somewhat Likely	12	48	9	42.9	10	50
• Very Likely	12	48	11	52.4	7	35
Using the e-mental health support tools CANNOT enhance my knowledge about mental health issues:						
• Very Unlikely	12	48	6	28.6	7	35
• Somewhat Unlikely	11	44	10	47.6	6	30
• Neither	0	0	2	9.5	4	20
• Somewhat Likely	2	8	2	9.5	1	5
• Very Likely	0	0	1	4.8	2	10
I would find the e-mental health support tools NOT useful enough to help my mental health issue:						
• Very Unlikely	7	28	5	23.8	3	15
• Somewhat Unlikely	11	44	11	52.4	5	25
• Neither	5	20	4	19.0	8	40
• Somewhat Likely	2	8	1	4.8	2	10
• Very Likely	0	0	0	0	2	10

Variables	Mindsight Frequency	%	Psychcentral Frequency	%	Moodgym Frequency	%
I would find it easy to use the e-mental health support tools to access my mental health status:						
• Very Unlikely	0	0	0	0	0	0
• Somewhat Unlikely	1	4	2	9.5	2	10
• Neither	1	4	1	4.8	5	25
• Somewhat Likely	13	52	13	61.9	9	45
• Very Likely	10	40	5	23.8	4	20
My interaction with the e-mental health support tools would be clear and understandable:						
• Very Unlikely	0	0	0	0	1	5
• Somewhat Unlikely	0	0	0	0	0	0
• Neither	1	4	1	4.8	6	30
• Somewhat Likely	14	56	14	66.7	9	45
• Very Likely	10	40	6	28.6	4	20
I would find the e-mental health support tool modules flexible to navigate:						
• Very Unlikely	0	0	0	0	0	0
• Somewhat Unlikely	1	1	1	4.8	2	10
• Neither	1	1	2	9.5	6	30
• Somewhat Likely	12	12	11	52.4	10	50
• Very Likely	11	11	7	33.3	2	10
It would NOT be easy for me to become skillful in using the e-mental health support tools:						
• Very Unlikely	7	28	6	28.6	8	40
• Somewhat Unlikely	14	56	9	42.9	5	25
• Neither	1	4	4	19.0	6	30
• Somewhat Likely	2	8	2	9.5	1	5
• Very Likely	1	4	0	0	0	0
I would find the e-mental health support tools easy to use:						
• Very Unlikely	1	4	0	0	0	0
• Somewhat Unlikely	0	0	2	9.5	0	0
• Neither	0	0	4	19.0	3	15
• Somewhat Likely	11	44	7	33.3	10	50
• Very Likely	13	52	8	38.1	7	35

Variables	Mindsight Frequency	%	Psychcentral Frequency	%	Moodgym Frequency	%
Use of the e-mental health support tools by students is UNPLEASANT:						
• Very Unlikely	6	24	5	23.8	5	25
• Somewhat Unlikely	12	48	11	52.4	4	20
• Neither	6	24	3	14.3	7	35
• Somewhat Likely	1	4	2	9.5	1	5
• Very Likely	0	0	0	0	3	15
I intend to use the e-mental health support tools to educate myself about common mental illnesses, support strategies, treatment options and available resources:						
• Very Unlikely	2	8	0	0	1	5
• Somewhat Unlikely	0	0	2	9.5	2	10
• Neither	1	4	1	4.8	6	30
• Somewhat Likely	9	36	9	42.9	10	50
• Very Likely	13	52	9	42.9	1	5
Using the e-mental health support tools for personal mental health assessment by the students is beneficial:						
• Very Unlikely	1	4	0	0	0	0
• Somewhat Unlikely	2	8	3	14.3	1	5
• Neither	0	0	2	9.5	5	25
• Somewhat Likely	11	44	11	52.4	8	40
• Very Likely	11	44	5	23.8	6	30
I intend to use the e-mental health support tools to evaluate my mental health status:						
• Very Unlikely	2	8	1	4.8	2	10
• Somewhat Unlikely	3	12	3	14.3	5	25
• Neither	3	12	2	9.5	6	30
• Somewhat Likely	7	28	7	33.3	5	25
• Very Likely	10	40	8	38.1	2	10
I DO NOT intend to access any of the e-mental health support tools for my personal reason:						
• Very Unlikely	6	24	3	14.3	4	20
• Somewhat Unlikely	9	36	12	57.1	6	30
• Neither	4	16	2	9.5	7	35
• Somewhat Likely	3	12	4	19.0	2	10
• Very Likely	3	12	0	0	1	5

Variables	Mindsight Frequency	%	Psychcentral Frequency	%	Moodgym Frequency	%
To the extent possible, I would refer the e-mental health:						
• Very Unlikely	0	0	1	4.8	1	5
• Somewhat Unlikely	1	4	1	4.8	1	5
• Neither	2	8	7	33.3	7	35
• Somewhat Likely	16	64	6	28.6	10	50
• Very Likely	6	24	6	28.6	1	5
People who are important to me think I should NOT use the e-mental health support tools:						
• Very Unlikely	2	8	0	0	3	15
• Somewhat Unlikely	1	4	1	4.8	1	5
• Neither	11	44	13	61.9	14	70
• Somewhat Likely	7	28	2	9.5	2	10
• Very Likely	4	16	5	23.8	0	0
People that are important to me think I should use the e-mental health support tools to improve my knowledge on mental health issues:						
• Very Unlikely	5	20	0	0	2	10
• Somewhat Unlikely	11	44	0	0	0	0
• Neither	7	28	11	52.4	13	65
• Somewhat Likely	0	0	5	23.8	3	15
• Very Likely	2	8	5	23.8	2	10
People whose opinions I value think I should use the e-mental health support tools to avert stigmatization of my mental health illness:						
• Very Unlikely	1	4	1	4.8	0	0
• Somewhat Unlikely	2	8	0	0	1	5
• Neither	15	60	12	57.1	13	65
• Somewhat Likely	3	12	5	23.8	3	15
• Very Likely	4	16	3	14.3	3	15
People who are important to my health service think I should use the e-mental health support tools for my self-assessment:						
• Very Unlikely	1	4	0	0	0	0
• Somewhat Unlikely	1	4	1	4.8	1	5
• Neither	16	64	13	61.9	14	70
• Somewhat Likely	4	16	3	14.3	3	15
• Very Likely	3	12	4	19.0	2	10

Of the Sixty-six responses received, Twenty-five (38%) of the responses were based on Mindsight, twenty-one (32%) on Psychcentral and Twenty (30%) questionnaires were on Moodgym.

APPENDIX-M

Responses to Post-Implementation Open-Ended Questions

QUESTIONS	COMMON RESPONSES
In your opinion what makes online mental health resources useful to the students?	"It cost nothing" "Anonymous" "Ease of accessibility" "Interactive" "It could serve as first-aid before seeking professional help" "It can be the first step to open up oneself" "The ability to discretely obtain needed help" " Certain degree of anonymity provided through online interaction" " Non-judgmental, acknowledging and listening" "Easy to navigate" "Less time consuming" " It enables or helps the students feel comfortable and acknowledge that there is help/support out there" " Gives information about step-to-step procedures in addressing certain mental health related situation" " The students can identify their problems before going to seek professional help" "It is probably a good way to gradually seek help"
What makes online mental health resources appealing to the students?	"Confidentiality" "Anonymous" "Less stigma" " Easy, convenience and it's free" " The ease of access" "Flexibility, fast and easy" "Interactive and Informative" " the vast amount of information that is available" "One can work at their own pace" "Gratification of self-help" "Strengthens confidence" "It may help to objectify student mental health concerns and mark progress" "Can get information quickly" "They need not to feel judged by others" " It contains lot of important information significant to healthy living" "The visuals on the websites are usually what makes it appealing to self-help seekers" " Some depressed students are more comfortable with virtual scenarios" "The students may be too shy or feel insecure to express themselves to their doctors"

QUESTIONS	COMMON RESPONSES
What concern do you have about online mental health resources usage?	"Inaccurate or misleading Information" " Students will not seek professional help" "Might be limited in the types of services it can provide" "Misconceptions" " May leads to self-diagnosing" "Incorrect diagnosing" " Students may over assess themselves" "No outside support" " Lack or not enough professional evaluation" "The validity of the information provided" "Too many websites to choose from, would not know which one to choose" "It is scary to open up to someone you don't see in person" "Online intervention may not be enough to replace services offered on one-on–one with a professional"

Answers to open-ended survey Questions provided by the Respondents

APPENDIX-N

Various Online Mental Health Support Tools

Mental health support tools	Examples
Online therapy (e-therapy): • Therapist-client communication through email, private chat, or webcam • Autonomous therapeutic programs via websites, with or without human support • Group therapy through forums or chat rooms • Providing an evidence based online program for information and managing symptoms • Providing multimedia and interactive activities	http://moodgym.anu.edu.au http://www.nlm.nih.gov/medlineplus http://mindsight.uoit.ca http:// www.sheppellfgi.com http://www.ecouch.com
Online counseling (e-counseling): • Online discussion forums offering counseling through mobile access to video calls, articles and blogs in which clients register personal journals of daily experiences • Use of online reading resources as part of therapeutic interventions	http://psychcentral.com/chats.htm
Psychological advice portals: • Uses an Internet technology, such as e-mail, instant messaging, online chat, or video call	http://forums.psychcentral.com http://www.ReachOut.com
Internet support group (ISG): • Provide individuals with specific health problems, an opportunity to share experiences, to seek, receive, and provide information, advice, and emotional support online. • Forums are a moderated peer-support community for young people, assisting to understand mental health difficulties and wellbeing topics connect with others and learn strategies for better mental health.	http://forums.psychcentral.com http://www.ReachOut.com http://www.somazone.com.au

Mental health support tools	Examples
Web-based mental health educational games and activities: • Learning positive psychology skills • Practicing positive thought habits • Proactive strategies for building better mental health	http://www.happify.com https://www.superbetter.com https://www.ReachOut .com
Psychological journaling “app” • Journaling positives and negatives in each day • Keeping track of mood / perceptions over time • Goal setting based around positive thinking	http://www.lifecharge.com

APPENDIX-O

Letter of Ethical Approval

UNIVERSITY OF ONTARIO INSTITUTE OF TECHNOLOGY

RESEARCH ETHICS BOARD
OFFICE OF RESEARCH SERVICES

PHONE: (905) 721-8668, ext. 3693

Date: October 2nd, 2013
To: James Oduntan (Graduate Student, PI) and Jennifer Percival (Supervisor)
From: Bill Goodman, REB Chair
REB File #: 13-015
Project Title: Student's Perception of the Online Self-Assessment Support Tools/Information on Depressive Related Disorders

DECISION: APPROVED

START DATE: October 2nd, 2013 EXPIRY: October 2nd, 2014

The University of Ontario, Institute of Technology Research Ethics Board (REB) has reviewed and approved the above research proposal. This application has been reviewed to ensure compliance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2) and the UOIT Research Ethics Policy and Procedures.

Please note that the (REB) requires that you adhere to the protocol as last reviewed and approved by the REB.

Always quote your REB file number on all future correspondence.

Please familiarize yourself with the following forms as they may become of use to you.

Change Request Form: any changes or modifications (i.e. adding a Co-PI or a change in methodology) must be approved by the REB through the completion of a change request form before implemented.

Adverse or unexpected Events Form: events must be reported to the REB within 72 hours after the event occurred with an indication of how these events affect (in the view of the Principal Investigator) the safety of the participants and the continuation of the protocol. (I.e. un-anticipated or un-mitigated physical, social or psychological harm to a participant).

Research Project Completion Form: must be completed when the research study has completed.

Renewal Request Form: any project that exceeds the original approval period must receive approval by the REB through the completion of a Renewal Request Form before the expiry date has passed.

All Forms can be found at http://research.uoit.ca/faculty/policies-procedures-forms.php.

REB Chair
Dr. Bill Goodman, Faculty of Health Sciences
bill.goodman@uoit.ca

Ethics and Compliance Officer
compliance@uoit.ca

APPENDIX-P

Inform Consent Form

I (print name) _____ understand that I am being asked to participate in a research study (REB # 13-015). I confirm that I AM BETWEEN 18-25 YEARS OF AGE. The purpose of the study is to collect information from the students about their perceptions of the available online mental health support tools on anxiety and depressive related disorders. Data from this study will be used to evaluate how to raise the awareness of the students of the University Of Ontario Institute Of Technology's knowledge of available online support tools and health information on their mental health. No researcher will ever see any of my personal identifying information.

I am aware that by signing this consent form I am releasing this information to be used in the above research study only. **I am also aware that my participation in this study is voluntary and should I wish to, I can withdraw from this study at any time without being penalized in any way**.

I understand that any information resulting from this study will be kept strictly confidential and anonymous. I will not be identified by name in any reports of the completed study.

I understand the questionnaire will take approximately 20-25 minutes to complete and participation is voluntary. I understand that I am free to withdraw from the study at any time without any negative consequences. I have been told that this project will be a part of graduate research at the Faculty of Health Science about the available online mental health support tools and information. Responses will have no identifying names and will only be accessible on Dr. Percival's password protected computer and Dr. Percival is the only one who will have access to all of the raw data collected from the survey. James Oduntan will have access to the anonymous version of the stored file. A backup copy of the file will be stored on a CD in a locked cabinet in the Faculty of Business and Information Technology. All data will be destroyed after four years.

Due to the sensitivity surrounding the mental health issues in the community, participation in this study might make some participants feel uncomfortable, embarrassed, worried or loss of privacy. If the survey scenarios mirrors their life experiences, but there are qualified counselors available on the school campus to help deal with any negative consequences that might arise from participating in this mental health survey.

You may omit any question you prefer not to answer and you may <u>withdraw</u> from the study at any time. Participation in this project is voluntary and anonymous.

I am aware that by participating in this study, I am not waiving any legal right.

If I have any questions or want further information about this study, I may contact James Oduntan at (647.710.4693) or (James.Oduntan@uoit.ca) at any time. I am aware that the data may be re-analyzed at some later date but that no one, other than me, will ever know how I, in particular, responded.

This study has been approved by the UOIT' Research and Ethics Board. However, if I feel uncomfortable at any time, I am free to withdraw from the study. In addition, I can contact the Ethics and Compliance Officer, Sascha Tuuha (at compliance@uoit.ca or at 905 721 8668 Ext 3693) to talk about the rights of participants.

I agree to participate in this study.

Signed: _____ Date: _____