USER EXPERIENCE AND USABILITY COMPARISON OF MENTAL HEALTH
INTERVENTION WEBSITES

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ABSTRACT

THESIS: User Experience and Usability Comparison of Mental Health Intervention Websites

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Perceptions of usability and user experience of a website can impede or enhance the use of a resource and determine whether users will return to that website, as well as users' perceived value of the information on the site. When an online product or service meets the expectations of the end user, a positive experience is more likely. This thesis presents an evaluation of usability and user experience perceptions of two suicide prevention websites to explore ways these critical resources may be improved. Suicide is one of the leading causes of death worldwide and is most prevalent in teen and young adult populations. Studies have provided evidence that the Internet can influence behavior related to suicide (Miner, et al, 2016). Thus, this thesis seeks to explore three goals to gauge user experience of the mental health intervention websites. First, results from this research should address how the language and ease of navigation contribute to more positive perceptions of the website. Second, results should provide a better understanding of how visceral and cognitive judgments lead to a more trustworthy experience on the websites. Third, this thesis explores how the attractiveness of the websites presented here may affect how users judge usability.

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Chapter 1: Introduction

Perceptions of usability (UI) and user experience (UX) of websites directly affect how valuable users believe a resource to be and determine whether users will return to a website. When an online product or service meets the expectations of end users it creates a positive experience. A positive experience can encourage repeat interactions and brand loyalty. However, the opposite is also true. When users' expectations are not met, online products fail to resonate with users, making them likely to interact with the site again.

While UI/UX considerations are important for all online products, they are particularly important for sites that provide critical information and/or services to vulnerable populations. For example, suicide is one of the leading causes of death around the world and is most prevalent in teen and young adult populations. Thus, evaluation of the UI/ UX perceptions of suicide prevention websites is important for determining whether these critical resources may be improved. Many studies provide evidence that the Internet can influence behavior related to suicide (Miner, et al., 2016). However, studies have shown that the role that technology plays in the journey of a suicidal user has been predominantly prosuicide, providing more information about *how* to commit suicide than how to *prevent* it (Miner, et al., 2016). In fact, the Internet, social media, websites, and chat rooms all play an influential role in the journey of a suicidal user. To tackle suicide prevention and better identify those at risk, Internet-based platforms have attempted to enable predictive analytics and artificial intelligence.

In an effort to identify individuals who struggle with mental health, previous UX technology tools include platform applications. Technology manufacturers have worked to make service and care more convenient with the hope to provide users additional ways to receive help (Andrade, et al., 2018). For example, studies have identified areas of improvement for personal

assistance devices that include more empathetic responses. While users seek to improve the overall user experience of technology, users also encounter limitations within predictive analytics and artificial intelligence. According to Andrade, et al. (2018), the framework for personal assistance devices, in particular, rely on “a clear verbal indication of suicidal thoughts” (p. 671).

UX improvements have also been attempted on social media platforms. For example, a Twitter application called Samaritans Radar was designed to flag users who exhibit at-risk behavior based on terms the Twitter user posts (Samaritans.org). This tool allowed users to receive a notification if a friend posted a message with concerning terms. However, the application did not require a mutual agreement of tracking or flagging of content. Due to privacy issues, Samaritan Radar was removed from Twitter and deactivated after nine days of data collection. While intentions for predictive algorithms are to reduce harm, poor user experience or negative interactions with an interface may discourage people.

In conjunction with predictive algorithms, technology advancements have also included fully automated conversational agents as a treatment option. Fitzpatrick, Darcy, and Vierhile (2017), found that the majority of college students that needed mental health services did not seek clinical services due to their perceived stigma around needing psychological help. Due to this stigma, a chatbot featuring empathic responses, tailoring responses based on user mood, goal setting, accountability, motivation, engagement, and reflection was tested (Fitzpatrick, et al., 2017). The research concluded that when a depressed or anxious user makes the active decision to seek help, the fully automated conversation agent significantly reduces depression. In addition to decreased depression, users found the system convenient enough to use frequently.

Previous research has also explored prediction of suicide through artificial intelligence and building additional resources through applications, such as conversational chatbots. But the issues of privacy and usability have been a roadblock. However, published research comparing existing suicide prevention websites has not been conducted. To pilot this type of research, this thesis presents a focused UI/UX study of two suicide prevention websites, one hosted in a state with a high suicide rate (New Mexico) and one hosted in a state with a low suicide rate (New Jersey). The intention is to identify usability and user experience differences. New Mexico has the second-highest suicide rate in the U.S. and sponsors the Agora Cares Crisis Center (agoracares.org) website. On the other hand, New Jersey has the lowest suicide rate in the U.S. and supports the Caring Contact (caringcontact.org) website. According to Hartmann et al. (2008), by identifying opportunities for website improvement, is a step toward ensuring that individuals at risk for self-harm have better access to resources meant to provide positive direction and assistance during their use of the Internet. Furthermore, providing platforms for which individuals feel a sense of trust and helpfulness, as well as one that fosters an ability to engage is an important starting point for positive results.

The goal of this thesis is to better understand and compare 1) the helpfulness and satisfaction, 2) the level of trust perceived, and 3) the perception of the design and layout of two distinct suicide prevention websites. To address these goals, a task-based usability survey was created to address the following research questions:

RQ 1: How do users' perceptions of helpfulness and satisfaction for two different suicide prevention websites affect overall perceptions of usability?

RQ 2: How do users' perceptions of trust, engagement, and interest for two different suicide prevention websites affect overall perceptions of credibility?

RQ 3: How do users' opinions about the design and layout of two different suicide prevention websites affect overall perceptions of desirability?

Furthermore, the following hypotheses underpin this research:

H 1: Prominent calls to action and contact information will contribute to a positive experience on the website.

H 2: Language and photo use will affect feelings of comfort and trust.

H 3: Vibrant colors and images through the website will appeal to participants and contribute to a positive user experience.

This thesis explores three interaction goals to measure user experience: 1) how the language and ease of navigation contribute to perceptions of the helpfulness of each website; 2) how much visceral and cognitive judgments affect users' perceptions of how trustworthy each site is; and 3) how perceptions of attractiveness affect how users judge usability. Combining these principals ultimately provides a mechanism for assessing the quality of each website (Preece & Rogers, 2015).

Furthermore, people who struggle with mental health often seek information online due to the stigma associated with seeking psychological help from other sources (Miner, et al., 2016). Thus, this thesis attempts to contribute to literature related to improving online resources often used by at-risk populations to improve user experience. Fisher, et al. (2005) found, "quality of navigation and how easy a site is to use does have an impact, how much information is read, the importance of the graphical components, a user's emotional response to a website, users' frustration and users' intention to return to that website" (para. 1). Intervention delivered via the Internet has the ability to positively change at-risk behaviors, but studies have found that more than over half of the target audience leaves this type of site after 30 seconds, without resource

engagement (Crutzen & Goeritz, 2010). Thus, it is imperative that suicide prevention sites provide satisfying and valuable user experiences.

The structure of this thesis is as follows: Chapter 2 supplies a literature review that encompasses suicide prevention, risk factors, previous UI and UX studies focused on intervention, and perceptions of a lack of privacy. Chapter 3 outlines the methodology used to assess perceptions of UI and UX of two mental health intervention websites. This chapter also explains the protocol for a task-based usability study created to evaluate the ease of navigation, design, layout, and helpfulness of each website. Chapter 4 provides study results. Chapter 5 provides a discussion about the key findings, as well as recommendations for future research.

Chapter 2: Literature Review

This literature review explores topics relevant to the importance of why suicide prevention websites should consider improving usability (UI) and user experience (UX) as a route for decreasing the suicide rate in the United States. Topics covered include suicide prevention, risk factors, previous UI and UX studies focused on intervention, and perceptions of a lack of privacy.

Suicide Prevention

In 2015, the World Health Organization (WHO) reported the suicide rate had increased 60% worldwide over the past 45 years. WHO represents the suicide rate as “one death every 40 seconds” and predicts that in the year 2020, the rate will increase to “one every 20 seconds” (World Health Organization, 2019, para. 1). The CDC has found “factors like family and community support, or ‘connectedness,’ and easy access to health care can help decrease the risk for suicidal thoughts and behavior” (World Health Organization, 2019, para. 2). Suicide prevention resources exist in many forms, including websites that are stocked with suggestions, call lines, and chat capabilities. An analysis on suicide prevention websites should be perceived as beneficial due to high Internet use correlating with a risk of self-harm (Stiglic & Viner, 2019). Due to the tendency for people to seek mental health support online and their high Internet use, examining the perceptions of the websites used as a resource could have a positive effect.

Around the world, nations have gathered to develop policies and initiatives focused on improved insurance coverage of mental treatment with a goal to decrease the suicide rate by 10% in the year 2020 (Arensman, et al., 2020). This collaboration was largely the result of a WHO initiative launched in 2014 (Arensmann, e, al., 2020). Data for this initiative was collected when the Department of Mental Health and WHO conducted a global survey to better understand how

the community viewed the importance of suicide reduction (WHO, 2014). The results of this survey demonstrated that 61% on the responding countries perceived suicide as a significant public health concern (WHO, 2014). However, despite the high level of concern recorded by WHO, only 31% countries had an action plan in place to decrease the suicide rate (Arensmann, et al., 2020). The established plan of action included the ability to identify those at-risk, reduce accessibility to items that cause harm, increase awareness, and improve the way society viewed mental health (WHO, 2014). In 2018, the Institute for Health Metrics and Evaluation (IHME) found that the suicide rates, as an entire nation, were beginning to decrease. However, the Centers for Disease Control and Prevention depicts an increase in the suicide rate within the United States (Figure 1).

Figure 1: Suicide rates by gender in the United States 1999-2018 (cdc.org)

The difference in data, leads organizations to ask what accounted for the change (Turcotte, 2019). While a decrease in the suicide rate would be ideal, one of the ongoing

challenges in suicide prevention is the data itself. According to researchers in England, the most difficult obstacles for suicide prevention is the accuracy and reliability of data (Tollefsen, et al., 2012). The WHO also agrees with these findings but acknowledged the perceived privacy barrier that would affect implementation of better data collection (WHO, 2014). Research conducted within a high-risk demographic demonstrates what elements can lead to a reduced suicide rate across a variety of communication channels. Reger, et al. (2017) found the most important factors to reduce the risk of a suicide attempt to be: perceived connectivity, appropriate language, and the ability to connect to a person via phone or text. While this study identified items that cause change, the prevention approach continues to test additional modes of communication while performing ongoing follow-ups with the participants.

Risk Factors

In the past, an individual's risk of suicide was closely connected to mental health. However, the CDC confirmed that more than half of the individuals lost to suicide did not have a known mental health disorder. Marchant, et al. (2017) found a strong correlation between a high level of Internet use and self-harm behaviors. Individuals at risk of suicidal behavior have been found to be a group of people "who would probably benefit the most from receiving anonymous treatment online, wherein they can openly discuss their feelings without being exposed to the stigma and taboo of discussing mental health issues and suicidality" (Durkee, et al., 2011, p. 3945). Individuals seeking help online provide researchers a space to define possible improvements based on online usage. Previous research has allowed for platform improvements and additional resources; however, some have been scrutinized due to perceived invasion of privacy.

Search Engine Optimization often populates sites with frequent content updates, as well as high user traffic sites, within the top positions of a search query (Thurrow, 2008). Identifying chat rooms as a popular resource for a user attempting to collect suicide methods, should be concerning when users are exclusively social online. When communication primarily takes place online, an individual is likely to feel lonelier and could be more prone to depression or suicidal behavior (Masuda, et al., 2013). When social interaction is primarily performed online, the number of users a person is able to communicate with could expose them to risks or hazards they would not typically face in their geographical setting (Fairall, et al., 2012). Heavy online usage has also been linked to an increasing amount of mental health disorders (Tripathi, 2017). While the Internet can expose a user to additional people, the time a user spends online also increases their “risk of overall psychiatric disorder morbidity and suicide-related behavior” (Kim, et al., 2017, p. 8).

Previous UX and Usability Studies Focused on Intervention

In an effort to make service and care more convenient, it is becoming more common for manufacturers and academic researchers to use technology in an effort to facilitate a healthy conversation for a user that appears to be considering suicide (Andrade, et al., 2018). A Sanford study identified a usability gap in intelligence for personal assistance devices, which encouraged manufacturers such as Siri, Google Assistant, and Alexa to edit the scripts with more appropriate responses (Miner, et al., 2012). These researchers found that when a user asked a personal assistance device a mental health question the device often did not find the question concerning. While the performance of the personal assistance device has room for improvement, the framework for the devices relies heavily on “a clear verbal indication of suicidal thoughts” (Andrade, et al., 2018, p. 671).

Another use of technology occurred with a Twitter application, Samaritans Radar, which was developed as an opt-in feature on October 29, 2014. This program was specifically designed “after a 2013 study found an association between rates of tweets per users determined to be at risk for suicide, and actual suicide rates” (Samaritans Radar, para. 5). According to Samaritans, the plug-in “used a list of keywords and phrases to identify tweets that indicated someone [they know] might be struggling to cope” (para. 2). When the algorithm flagged a tweet, the opt-in user would receive an email with the flagged tweet or tweets as well as suggestions on how to help users. The application was suspended due to user concerns nine days post launch and terminated less than five months later. Main user concerns appeared to have been due to user A having the ability to receive flagging alerts from user B’s tweets without permission from user B. In this instance, the application's flagging capability affected users’ perceived credibility of an online resource by decreasing the level of trust and privacy individuals had in the platform.

In 2017, Fitzpatrick, et al. published evidence on how a depressed or anxious user responded to a fully automated conversational agent. They documented that “75% of college students that need [mental health services] do not access clinical service... stigma is considered the primary barrier to accessing psychological health services” (p. 2). The study facilitated by the Stanford researchers compared pre and post surveys after each user spent two weeks communicating with the Cognitive Behavior Therapy chatbot (CBT), Woebot. This application can be found on Facebook, as well as through anonymous applications for iOS and Android (Andrade, et al., 2018). Woebot was “designed to deliver CBT in the format of brief, daily conversations and mood tracking” (Fitzpatrick, et al., 2017, p. 3). The chatbot features empathic responses, tailoring responses based on user mood, goal setting, accountability, motivation, engagement, and reflection. The Stanford study ultimately found that the chatbot significantly

reduced users' measured depression, and users found the system convenient enough to use frequently (Fitzpatrick, et al., 2017). While the participant sample size was small, the results mirror a similar, but longer, eight-week study performed by Burns, et al. in 2011.

A Vanderbilt University research group published a study that complements the Stanford Cognitive Behavior Therapy by attempting to predict suicide attempts through machine learning. Walsh, et al. states, "the ability to predict suicide attempts has been near chance for decades" (2017, p.1). Early forms of predictive analytics focused on isolation and depression, but according to Walsh, et al. (2017), machine learning would allow for higher complexity. The Vanderbilt researchers gathered and coded two decades of medical data from the Vanderbilt University Medical Center, isolating self-injury codes. Predictive factors to gauge a suicide attempt were found to include: depression with psychosis, schizophrenia, schizoaffective disorder, opioid dependency, sedative-hypnotics, and cannabis (Walsh, et al., 2017, p. 8). Additional medical classifications listed poisoning, injuries by firearms, and nonclassified injuries. Walsh, et al. conclude their research by stating that the algorithms they developed will aid in identifying *who* is at risk of a suicide attempt, but failed to predict *when* an event could happen.

Crutzen and Goeritz (2010) tested different user experiences to navigate health intervention websites around hepatitis information. One set of participants navigated the site with low user control and had to view the site by navigating page to page in a set order. The other group of participants had high user control and the "freedom of choice to skip pages" (Crutzen & Goeritz, 2010, p. 5). The goal of the study was to increase knowledge retention and time spent on the Website. Both goals were met within the low user control participants, but the group also reported lower efficiency of knowledge retention. While a guided path could be an option, the

desired outcomes should consider other elements such as credibility. A set path seems as though it would automatically increase pages viewed and time spent on the page and a lower reporting of efficiency is intriguing since the group retained more knowledge than the alternative test group.

The increasing problem of suicide prevention has led to the creation of new platforms instead of exploring the efficacy of what is already available. Although technology allows for new platform development, it is possible for new systems to have findability issues. Since no one can identify when a suicide attempt is near, it is important to not only have multiple resources, but also that all resources provide a positive UX and usability experience. Suicide prevention websites are a common tool used in 49 states in the U.S. Research has shown that predictive analytics have been perceived as invasive; chatbots can be powerful but take a lot of time to perfect due to continuous data collection and forcing site navigation can cause negative user perceptions. By applying UX and usability testing to existing suicide prevention websites, it would be possible for a site visitor to be more likely to engage with the site for help (Brien, 2018).

Medical Privacy Perception

While technology continues to evolve, negative user experiences occur, even when developer intentions are to affect a population positively. A 2013 study “assessed the perceptions and behaviors of U.S. adults about the security of their protected health information” (Agaku, et al., 2013, p. 1). Researchers identified markers within the Health Information National Trends Surveys from adults 18 years and older. Measures included perceptions on the security of medical records; security of transmitted medical records; and their ability to control the collection and sharing of their own records. In addition to perceptions, they also analyzed

“withholding of health information because of concerns over security and privacy of health information” (p. 2). The study found that a privacy concern is common when information is shared via fax or shared electronically. Participants also indicated they withheld information from their doctors when they felt a lack of control in how their medical data was being used. Withholding information can be classified as “public health concern, since such surveillance systems depend on accurate data to monitor existing and emerging trends in health outcomes and provide the basis for policy and population-based interventions” (p. 4). Depending on the severity of misinformation, the results could be minimal, or it could “inadvertently put the lives of others at increased risk” (p. 4). An example of a large-scope catastrophe would include omitting infectious, medical information around recent areas of travel. Limitations of the study included questionnaire language, information was self-reported, and the survey response was considered low at a 36.7% response rate.

Additionally, a 2017 study evaluated the privacy concerns of personal health data stored electronically, with an emphasis on possible data breaches (Walker, et al., 2017). The research “aimed to understand how privacy concerns may be shifting patient behavior” (p. 1). The study also tested survey responses from the Health Information National Trends Survey (HINTS) during the 2011 and 2014 responses, totaling more than 4,000 participants. The researchers stated the increase of electronic health records allows for better physician care, improved decision making, and an increase in patient safety. Survey results were weighted and adjusted with “the dependent variable of interest for this study was whether the respondent had ever withheld any protected health information ‘PHI’ from a medical provider out of privacy or security concerns” (p. 4). From 2011 to 2014, the study concluded that there had not been a change in patient-physician information, despite raised concerns of digital privacy. A limitation

included the way HINTS stated the question connected to the dependent variable. “HINTS asked whether a person had *ever* withheld information from their provider, leaving open the possibility that withholding behavior preceded concerns about privacy and security, or quality perceptions” (p. 6).

Studies focused on health history and privacy have also been conducted in the past and suggest people are willing to share their medical health information when they understand the holistic benefits of sharing this information and trust their physician. Abdelhamid, et al. (2017) aimed to identify reasons patients omit personal health information when in physician care. By assessing 1600+ surveys researchers found “low income, ethnic diversity, general health status, certain personality traits, and existing medical conditions (e.g., depression) have all been identified as factors that hinder engaging in PHI sharing practices” (p. 2). Additional findings included that the trust and relationship the patient perceives with their physician affected information sharing. The omission of medical information then becomes their ability to control what is being digitally recorded, but this can also put their health at risk. In an effort to increase information sharing, the study suggests medical practices be more transparent on how medical records are contained and protected.

Lifeline Crisis Centers

The National Suicide Prevention Lifeline (NSPL) consists of a “network of crisis centers” (para. 1) throughout the United States. The organization defines a crisis center as “a resource for individuals going through mental health crises” (NSPL, para. 2). These centers provide free emotional support via text, chat, and by phone. The resources are documented and encouraged within their own locally hosted website. In addition to supporting those affected by mental health, each crisis center also provides “training and educational resources on suicide prevention

and mental wellness” (NSPL, para. 4). In 2018, a study determined that call intervention was beneficial. By surveying 550 crisis center calls that occurred in 2008, the researchers concluded that 79.6% were stopped the self-harm attempt and 90.6% of callers perceived the intervention kept them safe (Gould, et al., 2018). Callers reported feeling supported and better informed on how to limit triggers. According to NSPL, in 2018 they received 2,261,297 phone calls; however, chat and text data is not publicly posted. In 2018, New Jersey crisis centers reported 46,700 calls and the state has recorded the lowest suicide rate in the United States. In comparison, in 2018, the crisis centers of New Mexico received 17,870 calls and the state reported the second highest suicide rate in the United States.

Due to the stigma around mental health and the privacy concerns around increased data collection, research has shown an opportunity to evaluate user experience dimensions on health intervention websites. While the WHO asserts that increasing surveillance would decrease the suicide rate, studies have demonstrated the importance of privacy when discussing mental health. As outlined in this literature review, research has shown that predictive analytics have been perceived as invasive and can cause negative user perceptions. Rather than increasing data collection, previous research suggests applying the dimensions of usability, credibility, and desirability to existing suicide prevention websites, it would be possible for a site visitor to be more likely to engage with the site for help (Brien, 2018). By applying these user experience dimensions, this research can better understand the perceptions of two websites and how they might differ.

Chapter 3: Methodology

This study used a mixed-methods approach that included both quantitative and qualitative research methods. Instruments included online survey questionnaires intended to compare user perceptions of two different suicide prevention websites. Results were collected in Loop 11, a remote user testing tool that allows for qualitative and quantitative data collection, analysis, and comparison.

Websites

This research focuses on two suicide prevention websites: Agora Cares (agoracares.org, Figure 2) and Caring Contact (caringcontact.org, Figure 3). Each website serves as an online resource with public access. The Agora Crisis Center site includes multiple ways for individuals to seek help, including through a phone call, online chat, email, and phone texting. The site also provides information about how to volunteer for the crisis center, upcoming events, local resources for specific needs, and community education. The Agora Cares Crisis Center provides free support for those in need through state funding and community donations. According to the website, this organization was founded by the University of New Mexico after experiencing a tragic event on campus. Agora Cares claims to have been one of the first free, confidential, and compassionate crisis center in the United States.

The Caring Contact site encourages visitors to use a provided phone number or a text support line to receive services. When users visit the site, they are presented with two pop ups. One pop up contains a request to donate, while the other informs users of their 24/7 hotline phone number. The site also provides information about how to get support, how to give support, an applied suicide intervention skills training, and background about Caring Contact. Caring Contact is a non-profit organization and receives support funding through public donations.

According to the website, this organization was founded in 1975, receives more than 13,000 calls each year, and supports the New Jersey community.

Figure 2. Agora Cares Crisis Center Homepage (Retrieved from agoracares.org, 2020)

Figure 3. Caring Contact Homepage (Retrieved from caringcontact.org, 2020)

Survey

The user testing survey was built to explore participant perceptions of each website. The survey data was then compared to better understand any differences in survey responses. The

survey was created to generate information on the perceptions of the language and navigation, visual and content judgments, and if the attractiveness of a website affects how users judge the usability of the website. In addition to these perceptions, the survey also gathered demographic information that identified gender, age range, and device type.

The survey included eight tasks and 12 questions (Appendix A) for participants to complete. After completing demographic questions, participants were asked to complete a task and evaluate their level of agreement or perceived attractiveness to a site element referred to in the task. The first 10 questions were measured using a five-point Likert scale rating, strongly agree to strongly disagree or a scale of very attractive to very unattractive. In addition, the survey also included an adjective list to better understand the desirability of the website. The adjective options were generated from the Microsoft Desirability Toolkit (Appendix B) that allows for a mix of positive and negative terms (Benedeck & Miner, 2002). In addition to the required questions, an optional question was included to allow participants to document what they liked most about the website.

Participants

Participants were recruited through social media and by email to complete an online survey. The survey was designed to elicit feedback about the usability and UX of one of the two websites outlined above. A link to the survey was posted on social media and sent through email. Participants could be male or female and were required to be older than 18.

Measures and Data Analysis

The post-task questions were reviewed through a comparison analysis, and responses to survey questions were compared according to the following dimensions: usability, credibility, and desirability. Usability was measured for tasks related to site use and value, navigation, and

action. Credibility was measured for tasks that focused on up-front disclosure, comprehension, and connection. Desirability was measured for tasks focused on perceptions of the design and layout.

An analysis of the adjective list allowed for a better understanding of desirability. The terms were reviewed by how frequently each was selected to describe the website. Once terms were grouped by frequency, a comparison was conducted to determine whether differences were present. In addition to the adjective list, responses to open-ended questions were coded and grouped by topic to capture any common themes.

Chapter 4: Results

Results were generated using quantitative and qualitative analysis to evaluate the dimensions of usability, credibility, and desirability of two suicide prevention websites.

Qualitative statements consisted of an optional fill-in-the-blank statement regarding what the participant liked most about the website.

Survey Results

Of the 40 completed surveys for Agora Cares, 28 identified as female and 12 identified as male. For the Caring Contact, a total of 42 surveys were completed, 27 participants identified as female and 15 identified as male.

The most common age range identified by participants was 25-34 (25.5%). The least common age range was 45-54 (8.65%) (Figure 5).

Both the Agora Cares and Caring Contact websites are mobile compatible; however; the design differs from desktop to mobile. Device use for survey completion among participants breaks down as follows: 53.75% completed the survey on a mobile phone, 41.35% were on a desktop or laptop, and 4.9% reported being on a tablet.

Figure 4. Gender demographic reported during survey

Figure 5. Age demographic reported for survey respondents

Participants were first introduced to the homepage of the website for five seconds and asked to rate the design and layout by attractiveness. The average attractiveness rating for Agora Cares was 3.43, falling between attractive and neutral. The average attractiveness rating for Caring Contact was 4.52, falling between attractive and very attractive (Figure 6).

When asked to locate the purpose of the website, participants reported whether they agreed or disagreed with classifying the task as easy. Agora Care participant responses averaged 3.73, falling between agree and neutral. The average level of agreement recorded for Caring Contact was 3.98 (Figure 7).

Figure 6. Comparison of attractiveness; Agora Cares (blue) & Caring Contact (orange)

Figure 7. Comparison of task difficulty; Agora Cares (blue) & Caring Contact (orange)

Participants were also asked to rate how easy or difficult it is to locate information about how to help a friend. Agora Care participant responses averaged 3.9, falling close to agree. The average level of agreement recorded for Caring Contact was 3.83 (Figure 8).

Participants were also asked to identify how many ways the website offers support. Forms of support participants could identify included:

- **Intangible Social Support:** Phone Number, Chat/Text, Email, Social Media Page
- **Informational Social Support:** Website Text, Resource Guide

- **Companionship Social Support:** Community Education, Events

Agora Care participant responses averaged 3.85 ways they perceived the site offered support.

The average number of ways the site offers support for Caring Contact equaled 3.24 (Figure 9).

Both Agora Cares and Caring Contact provide over six methods of support.

Figure 8. Comparison of task difficulty; Agora Cares (blue) & Caring Contact (orange)

Figure 9. Support channels identified on Agora Cares (blue) & Caring Contact (orange)

Participants were also asked to rate how easy or difficult it was to locate a call to action on the site. Agora Care participant responses averaged 4.1. The average level of agreement recorded for Caring Contact equaled 4.26 (Figure 10).

When asked how they perceived the language used on the website, participants reported whether they felt the language was excellent or very poor. Agora Care participant responses averaged 4.18. The average level of language perception recorded for Caring Contact equaled 4.07 (Figure 11).

Figure 10. Comparison of task difficulty; Agora Cares (blue) & Caring Contact (orange)

Figure 11. Comparison of language; Agora Cares (blue) & Caring Contact (orange)

Participants were also asked to rate how easy or difficult it is to locate who runs the website. Agora Care participant responses averaged 3.78. The average level of agreement recorded for Caring Contact equaled 4.29 (Figure 12).

This study found that users who viewed the Caring Contact website found it statistically significantly easier (2.23 ± 1.25) to find who runs the site compared to those who viewed the Agora Cares website ($1.71 \pm .995$), $t(80)=2.052$, $p=0.043$. There were no other individual items in the survey that yielded statistically significant results, likely due to the relatively small participant sample size.

Participants were also asked to evaluate the language used on the donation page. Agora Care participant responses averaged 3.58. The average level of agreement recorded for Caring Contact equaled 3.86 (Figure 13).

In addition to evaluating the language used on the donation page, participants were asked to rate the attractiveness of the design. The average attractiveness recorded for Agora Cares donation page was 3.3, falling between attractive and neutral. The average attractiveness recorded for the Caring Contact donation page was 3.19, again falling between attractive and neutral (Figure 14).

Figure 12. Comparison of task difficulty; Agora Cares (blue) & Caring Contact (orange)

Figure 13. Comparison of language; Agora Cares (blue) & Caring Contact (orange)

Figure 14. Attractiveness; Agora Cares (blue) and Caring Contact (orange)

Participants were also asked to rate how easy or difficult it is to locate testimonials of the website. Agora Care participant responses averaged 1.93. The average level of agreement recorded for Caring Contact also equaled 1.93 (Figure 15).

Tasks related to site use and value, navigation, and action were indicative of participants' assessment of site usability. There was not a statistically significant difference between perceptions of usability found using a T-test $t(80) = .623$, $p = .535$. Tasks that focused on up-front disclosure, comprehension, and connection were indicative of participants' perceptions of

website credibility. Compared to Agora Cares, participants found Caring Contact had a marginally significant difference between perceptions of credibility, $t(80) = 1.795$, $p = .076$. Finally, tasks focused on perceptions of the design and layout were indicative of users' perceptions of desirability. Compared to Agora Cares, participants found Caring Contact had a significant level of higher desirability, $t(80) = 2.425$, $p = .018$.

Figure 15. Comparison of task difficulty; Agora Cares (blue) & Caring Contact (orange)

Figure 16. Website comparison by dimension (A=Agora Cares and B=Caring Contact)

The final task asked participants to select five adjectives that describe the website. The adjectives were generated using Microsoft's Desirability Toolkit using a combination of positive, neutral, and negative terms (Figure 17). A total of 375 words were collected from Agora Cares (n=173) and Caring Contact (n=202). The most common adjective recorded for Agora Cares was *professional*. Participants who identified as male frequently defined the site as *boring* and *old*, while women recorded *calm* and *trustworthy* at the highest rate. The terms *exciting* or *expensive* were never selected during the data collection. Figure 17 illustrates a breakdown of the positive and negative adjective selections.

Responses for Caring Contact were also evaluated using the same adjective list. The most common term to describe the site was *trustworthy*. Participants who identified as male most frequently defined the site as *calm*, *familiar*, and *trustworthy*, while women recorded *professional* and *trustworthy* at the highest rate. The term *unprofessional* was never selected as an adjective to describe the site. Figure 18 provides a breakdown of the positive and negative adjective selections.

The survey concluded with an optional open-ended question that 71% of participants (n=58) opted to complete. Of the responses, participants (n=23) contributed additional site feedback for Agora Cares. The feedback was coded by topic and

Agora Cares

Figure 17. Positive (green) and negative (red) adjectives recorded for the Agora Cares website. Top Terms: *Professional, Trustworthy, Calm, Familiar, and Boring*

Caring Contact

Figure 18. Positive (green) and negative (red) adjectives recorded for the Caring Contact website. Top Terms: *Trustworthy, Professional, Calm, Familiar, and Inspiring*

analyzed by percentage as well as number of times it was mentioned (Table 1). The most common statement related to the ease of navigation and contributed to positive statements of usability. Two negative statements were left: “plain looking” [P11] and “The call outs of where to get help however they need to be in a more prominent location. In an iPhone you have to scroll to find” [P38]. While the website was mobile responsive, the layout became longer making it harder to find due to the need to scroll down.

<i>Feedback gathered by free-response survey question</i>	<i>Percentage Occurrence</i>	<i>Number of Statements</i>
Positive statements about usability	54.84%	17
Positive statements about desirability	16.13%	5
Positive statements about credibility	22.58%	7
Easy to find phone numbers	9.68%	3
Color	3.23%	1
Images	3.23%	1
Straight forward	16.13%	5
Easy Navigation	35.48%	11
Positive emotions	3.13%	1
Content	6.45%	2
Call to action visibility	9.68%	3
Language	6.45%	2
Negative statement about desirability	3.23%	1
Negative statement about usability	3.23%	1
Plain looking	3.23%	1
Location of phone number on mobile	3.23%	1

Table 1. Analysis of responses to post-test survey question for the Agora Cares website

To conclude the survey for Caring Contact, participants (n=34) recorded feedback before exiting the survey. The feedback was coded by topic and analyzed by percentage, as well as number of times it was mentioned (Table 2). The most common topic was related to the color of the website and contributed to positive statements of desirability. One negative statement was left: “what I found annoying was the drop down every time I went to the homepage” [P2].

<i>Feedback gathered by free-response survey question</i>	<i>Percentage Occurrence</i>	<i>Number of Statements</i>
Positive statements about usability	33.33%	18
Positive statements about desirability	44.44%	24
Positive statements about credibility	20.37%	11
Easy to find phone numbers	3.70%	2
Easy to donate	5.56%	3
Color	24.07%	13
Images	3.70%	2
Straight forward	11.11%	6
Easy Navigation	18.52%	10
Professional	1.85%	1
Felt personal	1.85%	1
Positive emotions	7.41%	4
Purpose of Content	7.41%	4
Call to action visibility	3.70%	2
Text style	1.85%	1
Language	5.56%	3
Communication options	1.85%	1
Negative statement about desirability	1.85%	1
Didn't like pop up on homepage	1.85%	1

Table 2. Analysis of responses to post-test survey question for the Caring Contact website

Chapter 5: Discussion

This research compared two suicide prevention websites to identify perceived usability and user experience differences. This study was guided by three primary research questions: **RQ 1:** How do users' perceptions of helpfulness and satisfaction for two different suicide prevention websites affect overall perceptions of usability? **RQ 2:** How do users' perceptions of trust, engagement, and interest for two different suicide prevention websites affect overall perceptions of credibility? **RQ 3:** How do users' opinions about the design and layout of two different suicide prevention websites affect overall perceptions of desirability?

Overall, participants found the Caring Contact website to be more aesthetically pleasing than the Agora Cares site. However, on all dimensions, there were no statistically significant differences between how participants rated either site. Following is a brief analysis of how the sites fared according to each research question.

Regarding RQ1 – *How do users' perceptions of helpfulness and satisfaction for two different suicide prevention websites affect overall perceptions of usability?* – participants did not rate either site as significantly better than the other on helpfulness or satisfaction. On all related usability dimensions, both sites were rated slightly above average. Additionally, for both sites, a prominent display of call to action and contact information seemed to contribute to a positive user experience. While Caring Contact often averaged stronger ease of use scores than the Agora Cares site, the difference between the two sites did not result in significant statistical data.

Qualitative responses to open-ended questions indicated that participants were most concerned about how effectively the sites presented contact information and ease of navigation. Participants often focused on the ease of getting help and ease of use. Because both sites

provided clear and easy-to-find information about resources for at-risk individuals, participants generally responded positively, which also improved overall usability scores.

Regarding RQ2 – *How do users' perceptions of trust, engagement, and interest for two different suicide prevention websites affect overall perceptions of credibility?* – participants did rate Caring Contact significantly better than Agora Cares on trust. Responses indicated difficulty finding testimonials, however this did not negatively affect the perception of overall trustworthiness. On engagement and satisfaction, both sites were rated slightly above average. Additionally, for both sites, the purpose and content of the site seemed to contribute to a positive user experience.

Qualitative responses to open-ended questions indicated that participants were most concerned about the topic of the website and the need for the resource. In addition, the responses from the adjective collection indicated that participants' level of trust was not affected by the elements of either website. Participants often focused on the subject of the website and information available. Because both sites provided clear purpose and content on how they can help at-risk individuals, participants generally responded positively, which also likely improved overall credibility scores.

Regarding RQ3 – *How do users' opinions about the design and layout of two different suicide prevention websites affect overall perceptions of desirability?* – participants did rate the first impression of Caring Contact significantly better than Agora Cares on design and layout. Responses indicated the design and layout of Agora Cares was more attractive. However, on all related desirability dimensions, both sites were rated slightly above average. Additionally, for both sites, the calm design and familiar layout seemed to contribute to a positive user experience. While the first impression of Caring Contact averaged stronger attractiveness than the Agora

Cares site, the Microsoft Desirability assessment did not show a difference in overall desirability despite the statistical analysis.

Qualitative responses to open-ended questions indicated that participants enjoyed the colors used on Agora Cares due to the simplicity and participants enjoyed the use of color on Caring Contact due to the emotion it evoked. In addition to the qualitative responses, the adjectives selected indicated the design and layout did not affect the overall desirability. Because both sites used color and a familiar layout, participants generally responded positively, which also improved overall desirability scores.

In spite of the fact that participants rated both websites as usable, desirable, and credible, there is still room for improvement. Sites that serve such a critical need among a high-risk demographic should always be looking for ways to improve usability and user experience. For both the Caring Contact and Agora Cares websites, participants were generally pleased that resources like this exist at all. They recognized the importance of such resources, and as a result were less critical than expected about the nature and quality of the content and presentation. However, possible options to improve each site should not be ignored.

For example, it's possible that adding a bit of color could increase user satisfaction and increase the users' perception of the homepage during first impressions. In addition, Agora Cares could implement language on the donation page that allows users to understand how much their donations benefit the organization. This research determined that participants noticed and appreciated the statement, "\$1,000-Volunteer training materials for 1 year." By outlining the effect of donations, the organization could increase funds and generate more tools to support the community. Additionally, for Caring Contact, the first impression that the site is attractive may help draw in users; however, it is also important to account for resource findability. By

prominently laying out all the methods of support, users may consider the site to be more helpful. Finally, the colors used on the donation page could be improved to simplify the visual appeal. While vibrant colors can be attractive, the overuse of color can deter users from engaging with the content on the page.

Limitations

During this research there was a significant limitation: small sample size. Due to remote user testing and the low number of participants, the outcome of this comparison cannot be generalized. The small sample size renders the results indeterminate. During the data collection, several willing participants communicated compatibility issues with their device type and the platform the survey was hosted on, which contributed to a low sample size.

It's also worth noting one other possible limitation: Aside from a user's first impression of a website, an individual can also gauge credibility based on the content within a site using cognitive judgement (Selejan, et al., 2016). Edward Thorndike's halo effect principle is useful for exploring how the aesthetic perception of suicide prevention websites could affect an individual's overall experience. The halo effect is defined as "one trait of a person or thing is used to make an overall judgment of that person or thing" (Nielsen & Cardello, 2013, para. 1). According to the halo effect, aesthetic design influences the perception of usability, and good design can even lead an individual to disregard poor user experience elements (Hartmann, et al., 2008). Because participants' first task was to assess aesthetics, their generally positive reactions may have led to a halo effect that may have influenced subsequent responses. In addition, the positive evaluation of the site purpose and content of the site could have affected overall responses.

Future Research

Participants were not asked questions that would reveal at-risk attributes. Future research should consider an evaluation of the websites within an at-risk audience. If time allowed, specific elements would provide additional findings: if the language generates a feeling of trust, how the colors affect emotion, and if aspects of the site make users feel safe.

Research should also consider investigating how the pop-up is perceived within the target demographic.

- *Does it make contact information easier to see?*
- *Does it increase the chance of action?*
- *Does it feel invasive?*

In addition to the participant demographics, future research should consider user observation to better understand any verbal or nonverbal information.

Finally, it would also be beneficial to research how support is defined relative to this specific health intervention. The results from both surveys demonstrated that users recorded support methods to be half of what each site offers. Both sites offer:

- **Intangible Social Support:** Phone Number, Chat/Text, Email, Social Media Page
- **Informational Social Support:** Website Text, Resource Guide
- **Companionship Social Support:** Community Education, Events

Throughout the qualitative statements, neither community education nor events were mentioned. The at-risk demographic could benefit from companionship social support: community events. If this method of support was overlooked during the research, it could be a possible area of improvement.

If a mental health intervention website allowed research partnership, additional findings could be determined through UI/UX implementation. By partnering with the organizations, it would be possible to A/B test a second variation of the website. Developing a variation of the site with more color on Agora Cares, could test for perceived desirability. The site would also be able to change the language on the donation page to explore if the language aids in higher funding for the organization. Similarly, the same can be done within Caring Contact. By launching a variation of the site, the organization would be able to examine how simplifying the use of color of the donation page affects funding. This research should collect longitudinal data to better understand if the credibility and desirability is improved. By comparing the differences through qualitative data analysis, research has the potential to optimize the websites for user experience.

Conclusion

Positive user experiences encourage users to engage with the site and explore more content. The stigma that exists around psychological issues has made it difficult for individuals to recover. Identifying opportunities to improve a website would be a significant step towards providing better access to resources. The research analyzed what elements of a website contributed to a positive user experience and attempted to find differences between the two websites. The results of this research indicate that the use of color is appealing but does not affect the overall user experience. Overall, participants felt the most important elements within a health intervention site are usability and credibility, but additional research would be needed to validate those dimensions.

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APPENDIX A

User Testing Survey Design

<i>Survey Design</i>	Selection Options					
<i>Demographic Questions</i>						
What is your gender identity?	Female Male Non-binary Prefer not to say					
Please select the range that best identifies your age.	18-24 25-34 35-44 45-54 55-64 65+ Prefer not to say					
What device are you using to complete this survey?	Mobile Tablet Desktop/ Laptop					
How would you rate your level of confidence in using your device for browsing a website?	Poor Fair Good Excellent					
Which of the following indicates how much you know about user testing?	I don't know anything I know a little, but I could learn more I am an expert					
Quick Exposure Task (5 Seconds)						
Please look at the design and layout of the homepage.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
What is your impression of the design and layout of the website?						
<i>Site Use & Value Task</i>						
Locate the purpose(s) of this website						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
It was easy to find the purpose of this website.						
Navigation & Perception Task						

You have a friend that you're worried about and you would like to find ways you can help them. Find information on how you can help your friend.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
It was easy to identify information on how I could help a friend.						
<i>Up-Front Disclosure & Perception Task</i>						
Your friend can be pretty reserved about how they're feeling. Navigate the website and count how many ways your friend could receive support						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i> <i>7</i>
How many ways does this website offer support?						
<i>Action Task</i>						
Locate an element that motivates someone to take action.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
It was easy to identify a call to action.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
The language used on the website is:						
<i>Comprehensive Task</i>						
Locate who runs this website.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
It was easy to find who runs the website.						
<i>Connection Task</i>						
Please evaluate the language and design of the donation page.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
The language on this page encourages me to donate to this website.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
The design of this page is:						
<i>Connection Task</i>						
You would like to make sure this resource has helped people in the past. Navigate the site to find testimonials.						
<i>Question</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	
It was easy to find testimonials.						
<i>Question</i>						
Based on the experience you've had on the during this survey, select five words that best describe this website. (Appendix B)						
<i>Question</i>						

Optional: What did you like most about the website?
(Appendix C)

APPENDIX B

Shortened Microsoft Desirability Tool Kit

<i>Shortened Microsoft Desirability Tool Kit</i>	
Positive Terms	Negative Terms
Calm	Busy
Creative	Cheap
Cutting-edge	Unprofessional
Exciting	Intimidating
Familiar	Old
Fresh	Boring
Impressive	
Innovative	
Inspiring	
Professional	
Expensive	
Trustworthy	

APPENDIX C

Full response record from Agora Cares open-ended question

<i>Agora Cares Open Ended Responses</i>
I liked that you were not told that they would solve your problems but were assured that they would give you directions you could choose to follow toward solutions.
Mostly easy to find resources if in need
The site was fairly user-friendly from a mobile perspective. It was easy to navigate through the site and each page within the site doesn't overwhelm the user with too much information.
Easy to find things
Informative
plain looking
The menu structure was fairly easy to navigate.
It had a lot of information about the agency, services, and resources.
Most in people would have little difficulty finding phone numbers to call.
Call to action
The purpose of the organization is very clear.
Ease of use
How easy it was to get to chat or get information.
Easy to navigate
Easy to navigate
The website gives the information someone might need in a direct way.
some of the images
The call outs of where to get help however they need to be in a more prominent location. In a iPhone you have to scroll to find. Need to make sure the site is mobile responsive.
Clear call to action.
The color palette and most of the written information were both well done.
Easy to navigate
I liked that the most important information is on the front page: getting help for someone in a crisis with a call to action
It had clearly labeled headers that were easy to navigate through

APPENDIX D

Full response record from Caring Contact open-ended question

<i>Caring Contact Open Ended Responses</i>
Easy to find the phone numbers and easy to donate
Nothing but what I found annoying was the drop down every time I went to the homepage.
Good design, good use of color and illustration. Pretty straightforward. Able to find info about who created it.
Professionally done. Bright colors. Easy to navigate.
Color
Easy to find information quickly.
It was a website. It wasn't particularly flashy, nor was it "too little". What I liked about it most is the fact that it felt "personal". As in, it didn't feel like a corporation's obligation to create the site. It felt like a small company put it together which would make me feel more like an actual caring human being would be at the other end.
Its purpose
The colors and graphics are uplifting and cheerful.
Colors are calming, and pictures of real people
The subject, suicide prevention is a needed resource.
It was very easy to donate
Colors. "You could save a life" jumps out at you. Purpose
The color scheme is decent.
The colors and layout of the website caught my attention but were not distracting. I also really like the layout because it is easy to navigate.
I like the design and the fact that it is easy to navigate!
The home page had all of the information needed and was very clear about services.
The sans serif body text.
I thought the focus on listening and the reassurance that calling in won't result in a lecture was nice to see.
I liked how the menu in the top left was standardized and the menu options made it fairly easy to navigate.
The subject and helping people
Well put together, informative and direct
Clean and simple arrangement and presentation of information of the website.
General impression of openness, lack of mention of any groups of influence.
It seemed as though the purpose was easy to define and how to make contact easily found.
I love the color scheme. It draws you in. And the first thing you read is to donate or volunteer.
Clear communication of the lines to reach out for assistance when needed.
-The many ways it had to receive help/support.

Color palette
That the layout was pretty clean.
Design colors
The immediate call to action on the front page.
I liked how the on the donations page, it showed what the website could do with your donations.
I like the color scheme and the overall navigation layout. Things were relatively easy to find.