

**Prospectus**

**How Design of Interfaces Affects the Effectiveness**  
(Technical Topic)

**The Embedded Ideas of Users in Interface Design**  
(STS Topic)

By

Halle Wine

11/21/2019

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: *Halle Wine*

Approved: *[Signature]* Date 12/16/2019  
Ben Laugelli, Department of Engineering and Society

Approved: *Laura Barnes* Date 11/22/19  
Laura Barnes, Department of Engineering Systems and Environment

## **Introduction**

There is an overwhelming population of citizens in the United States that possess some form of mental illness, anxiety being the most common. Around 1 in 5 adults (roughly 47.6 million people) in the United States have been diagnosed with a mental illness, but not everyone receives the treatment needed (NAMI, 2019, p.1). A major source of this is the lack of accessible treatment for those who need it (Olfson, 2000). In attempts to remedy the issue of accessibility, mental health care has made the transition to online apps, where more people can have greater access to health care. However, online e-health programs face the problem of attrition, retaining the attention of users and getting them to come back and complete the programs offered to receive the help they need.

MindTrails is an online e-health intervention program that was created to help those who live with anxiety alter the way they perceive situations by helping them navigate different anxiety inducing scenarios. Over the process of six-weeks, users continue to imagine themselves in anxiety-producing situations and eventually learn to think about them differently. To address the technical concerns about the interface, I will propose solutions such as personalization and goal-setting re-redesigns that will increase retention and return rates. However, there are important social factors that influence the effectiveness of MindTrails. For example, not only must the designs be updated but the identity and needs of users must be considered as well. If designers of e-health apps such as MindTrails do not improve both the apps' design and their understanding of their users' identity, then these programs will not be able to offer effective help to those who need it.

Therefore, in order to provide users the help they need, apps such as MindTrails need to incorporate and consider both technical and social aspects. Below I will describe a technical process for the redesign of the MindTrails program to make the scenarios more personalized and

provide users defined goals and a plan of action. I will also employ the science, technology, and society (STS) framework user configuration to analyze how designers of the e-health app Care embedded misguided ideas about users into their design.

### **Technical Problem**

Mental illnesses are extremely prevalent in the United States with one in five adults being diagnosed, yet less than half of those diagnosed received treatment in the past year (NAMI, 2019, p.1). This could be attributed to the lack of accessible treatment, the belief that therapy would not help them, uncertainty of where to go to seek treatment, and concern over how their friends and family might react (Olfson, 2000). Focusing in on college-aged students, it has been observed that one fourth of the disease burden on young adults comes from mental disorders, which is concerning because this can adversely affect academic success and productivity (Hunt & Eisenberg, 2010). According to Spielberger, college students who were affected by emotional problems were not able to function at levels that correspond to their intellectual ability and potential (Spielberger, 1966, p.381), therefore demonstrating the adverse effects anxiety has on education and learning.

MindTrails is an existing online intervention program that uses cognitive bias modification (CBM), a procedure in which there is an attempt to replace negative and anxious ideations with positive ones, to alter the way the participants think about situations they would perceive as negative or anxiety inducing. Following the scenario, users are prompted with another ambiguous scenario and are asked to fill in a missing letter in a word fragment at the end of the scenario. This is done over the process of six weeks, and the program tasks users with imagining themselves in a given scenario, reflecting on their emotions from that scenario, and recording their level of anxiety. Coming from a place where there are not enough psychologists

to see everyone, MindTrails aims to use weekly sessions with these common anxiety inducing scenarios to reduce the overall effects of anxiety within an individual.

However, it runs into issues within their scenarios and post-session implementation. Its first issue revolves around MindTrails' lack of personalization within the scenarios they present to the participants. The app presents the same scenarios to every user, and often times the user can not relate to the scenario at hand, resulting in a 23% drop out rate after the first session (Stevens, R., Polk, K., Merrill, C., et al., 2018). Additionally, engagement in the program is low due to a lack of implementation intentions and goals for the participant to work towards. If MindTrails is not updated then they stand to lose their participants and fail in their attempts to aid participants in alleviating their anxiety.

In order to effectively help the MindTrails team, our team plans to integrate personalized scenarios and design ideas backed by literature and case studies. Members on the MindTrails team will create the personalized scenarios and implementation intentions (if-then plans), while our team will develop the designs. By collecting information on the participants when they sign up for the program, our team can help our psychology colleagues create personalized scenarios that are tailored to each individual. Through wireframing, an illustration of a page's interface- and the given if-then implementation intentions, our team will see how to layout the questions in order to achieve maximum engagement. Studies have shown that when implementation intentions are included in mental health interventions, participants are more likely to act on the goals they set for themselves (Gollwitzer, 1999).

To test the effectiveness of our work, we plan to perform usability testing on potential users to ensure that their information requirements are fulfilled. Without proper usability testing,

there is no way to ensure that our design delivers information in a way that is clear and accessible for users (Breakey, Vicky R, et al., 2013).

### **STS Problem**

Mindfulness and meditation interventions have grown in popularity over the past three decades and the trend making the move towards mobile applications in more recent years. The interest is said to have come from studies showing the benefits of the interventions, which include mental, physical, and cognitive, just to name a few (Creswell, 2017). Mindfulness is defined as the state of being aware and attentive to ourselves and the world around us (Brown et al., 2007). According to Shapiro, premedical and medical students report less anxiety and depression symptoms after an eight-week mindfulness-based stress reduction (MBSR) program compared to a control group (Shapiro et al., 1998) MBSR programs have recently been transformed into mobile applications, which has helped overcome the issue of accessibility for those who could not previously reach these programs (Cavanagh et al., 2014). An example of an application that has been created with the MBSR goals in mind is Calm, a mindfulness and mental health application that has different programs and features designed to help in a variety of areas (McGowan, 2018). Calm's target audience is those under stress, individuals who live with anxiety, those who are overwhelmed, or those who want to be more mindful.

Calm creates a soothing and tranquil atmosphere for the users to experience, aiming to teach the users to be more mindful and therefore less cell-phone dependent (Blanda, 2019). It is easily traversable and understandable and uses dark colors and a minimalistic design in order to focus the users and help them work towards their goals. When they first join Calm, users are prompted with goals, letting them pick what they want to work on and where they think they need assistance. Once they create an account, they are offered a variety of tools such as modules,

calming songs, a breath helper, and sleep stories. The Calm creators designed the app so that the users can complete the exercise they need and then move on, emphasizing and measuring success by number of sessions per week instead of total screen time on the app (Blanda,2019). Additionally, the app is customizable by allowing the users to pick their home screen in order to find the most relaxing image and sound for them. The app serves as a quiet space for the users to focus their thoughts and attention, having no ads or pop-ups, and only having a once a day notification to remind the users to take a break from whatever they are doing and relax/meditate.

Despite offering different types of services, Calm fails to recognize key information about the users and has embedded misguided ideas about users into its design. Although distraction free while in-app, the Calm creators failed to recognize that users can be distracted by factors outside of the app. Whereas in person sessions and classes offer a distraction free environment, the disadvantages to an application are that there is no designated distraction free environment or a guarantee that the user will have complete focus on the application. Another flaw in Calm is that the developers have, in a way, pushed their agenda onto the users. While the user's goal for having the app is to grow as an individual, the developer's goal is to make money. This can be seen through the subscription feature in the app. Calm is free to download, but once people start using the app they see that very few options are available to those who do not wish to pay. This demonstrates how the developers saw the user as a consumer. By not allowing people access to a majority of the features of the app, the designers push their reasons for creating the application onto the user (Harris, 2016) and show their idea of the user being a consumer in the app. Lastly, it has been found that mindfulness trainings have great positive effects, but many 'mindfulness' applications, including Calm, do not offer trainings or explicitly explain the practice of mindfulness or address common misconceptions. Mindfulness is more

than meditating, breathing, and reflecting. While those practices are important to mindfulness, understanding bodily and mental experiences, and breaking out of the pattern of experiential avoidance work together with those contemplative practices to form MBSR (Monteiro, 2014).

Therefore, by not including the meaning of mindfulness, the creators project their idea of the users as intellectuals and educated or experienced in mindfulness onto the application.

Applications that plan to use these practices might want to think of mindfulness in terms of education so that the practice is more effective (Mani, 2015). If calm fails to reconcile these issues, then the effectiveness of their application decreases and their overall purpose for creation is not fulfilled. A better understanding of how Calm configures the user and how that understanding differs from the actual users is required in order to effectively help the user reach their goal.

Drawing on user configuration, I argue that when designing, designers have an idea of the users in mind and set limits upon what they can do. It is defining the user's capacity and future actions in relation to the technology which then defines the technology in terms of the its configured user (Woolgar, 1990). I will use user configuration in my analysis in order to understand design decisions and, in turn, recognize missing elements within the design.

## **Conclusion**

Above, the technical and social solutions revolve around the idea of the users that suffer from anxiety on a daily basis but lack the accessible, effective treatment required to live with the mental illness. The capstone team plans to address these concerns with a redesign of the program, incorporating personalization into the scenarios and specific goal setting features in order to ensure the work is being put in by the users outside of the program sessions.

Additionally, we will analyze the complex users and ensure that all potential qualities of the user

are considered and accounted for within our design. Without these changes and insights, the effectiveness of the program cannot be ensured, failing to help those who especially need it.

**Word Count:** 1,964 words



## References

- Blanda, S. (2019, April 2). Calm, the anti-app. Retrieved October 13, 2019, from <https://www.invisionapp.com/inside-design/calm-design-technique-ui/>.
- Breakey, V. R., Warias, A. V., Ignas, D. M., White, M., Blanchette, V. S., & Stinson, J. N. (2013). The value of usability testing for Internet-based adolescent self-management interventions: “Managing Hemophilia Online.” *BMC Medical Informatics and Decision Making*, *13*(1). doi: 10.1186/1472-6947-13-113
- Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: Theoretical foundations and evidence for its salutary effects. *Psychological Inquiry*, *18*(4), 211–237. doi: 10.1080/10478400701598298
- Cavanagh, K., Strauss, C., Forder, L., & Jones, F. (2014). Can mindfulness and acceptance be learnt by self-help?: A systematic review and meta-analysis of mindfulness and acceptance-based self-help interventions. *Clinical Psychology Review*, *34*(2), 118–129. doi: <https://doi.org/10.1016/j.cpr.2014.01.001>
- Cresswell, J. D. (2017). Mindfulness interventions. *Annual Review of Psychology*, *68*(1), 491–516. doi: 10.1146/annurev-psych-042716-051139
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, *54*(7), 493-503.
- Harris, T. (2016, May 18). How technology is hijacking your mind - from a magician and Google design ethicist. Retrieved October 16, 2019, from <https://medium.com/thrive->

global/how-technology-hijacks-peoples-minds-from-a-magician-and-google-s-design-ethicist-56d62ef5edf3.

Hunt, J., & Eisenberg, D. (2009, October 28). Mental health problems and help-seeking behavior among college students. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1054139X09003401>.

Mani, M., Kavanagh, D. J., Hides, L., Stoyanov, S. R., Mani, M., Mani, M., & Institute of Health & Biomedical Innovation. (2015, August 19). Review and evaluation of mindfulness-based iPhone ppps. Retrieved from <https://mhealth.jmir.org/2015/3/e82/>.

McGowan, S. (2019, September 6). UX case study: Calm mobile app. Retrieved October 13, 2019, from <https://usabilitygeek.com/ux-case-study-calm-mobile-app/>.

Monteiro, L. M., Musten, R. F., & Compson, J. (2014, April 29). Traditional and contemporary mindfulness: finding the middle path in the tangle of concerns. Retrieved from <https://link.springer.com/article/10.1007/s12671-014-0301-7>.

National Alliance on Mental Illness. (2019, September). Mental health by the numbers | NAMI: National Alliance on Mental Illness. Retrieved September 17, 2019, from <https://www.nami.org/learn-more/mental-health-by-the-numbers>

Olfson, M. (2000). Barriers to the treatment of social anxiety. *American Journal of Psychiatry*, 157(4), 521–527. doi: 10.1176/appi.ajp.157.4.521

Shapiro, S. L., Schwartz, G. E., & Bonner, G. (1998). Effects of mindfulness-based stress reduction on medical and premedical students. *Journal of Behavioral Medicine, 21*(6).

Stevens, R., Polk, K., Merrill, C., et al. (2018). User experience design to enhance the effectiveness of mobile technologies for the treatment of mental health, 2018 Systems and Information Engineering Design Symposium, 135-140.

Spielberger, C. D. (1966). *Anxiety and behavior*. New York: Academic Press.

Woolgar, S. (1990). Configuring the user: the case of usability trials. *The Sociological Review, 38*(1\_suppl), 57–92. doi: 10.1111/j.1467-954x.19