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Development of a HIPPA-Compliant Mobile Application to Assess Moral Distress in Nurses

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How Mobile Applications Can be an Effective Method of Moral Distress Intervention

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A Thesis Prospectus

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In STS 4500

Presented to

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The Faculty of the

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School of Engineering and Applied Science

University of Virginia

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In Partial Fulfillment of the Requirements for the Degree

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Bachelor of Science in Biomedical Engineering

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By

Taylor Brooks

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November 1, 2021

George Miroulis, Keegan Pezella

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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.

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ADVISORS

Bryn Seabrook, Department of Engineering and Society

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Timothy Allen, Department of Biomedical Engineering

Introduction

In the past decade, registered nurses and other healthcare professionals have repeatedly identified moral distress as a serious problem requiring urgent attention yet are still met with a lack of adequate solutions (Pauly et al., 2012).

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2017). This term was originally coined pertaining to nurses and is now researched in context of all healthcare professionals (McCarthy, 2013). In morally distressing situations in the healthcare

industry, the constraining factors preventing the healthcare professional from taking what they believe to be the ethical action are typically institutional. Although moral distress is now a well-recognized phenomenon among all healthcare professions, few evidence-based strategies have been published to address it (Morley et al., 2021). In order to address this lack of moral distress intervention for healthcare workers, the final technical deliverable will be a HIPAA-compliant phone application used to detect moral distress in nurses and provide real time resiliency tools. In addition to providing real time relief, the application will aggregate moral distress data to be sent to the unit lead in order to initiate institutional change.

There are currently numerous mobile applications focused on self-guided interventions to address mental health issues, with varying levels of success (Lau et al., 2020, 2021). Providing nurses, and ultimately all healthcare professionals, with a resource to report and relieve moral distress is a step in the right direction, however it is first necessary to determine whether developing an application is the most effective means of addressing moral distress. In order to

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determine whether this technical approach is the most constructive solution, it is crucial to investigate what makes an intervention strategy successful. The STS section of this project will analyze the sociotechnical factors involved in moral distress to determine how mobile applications can be an effective method of moral distress intervention.

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Technical Deliverable

Nurses are experiencing rapidly increasing burnout rates across the country (Haddad et al., 2021). The effects of the COVID-19 pandemic have only exacerbated this problem as hospitals are more frequently at capacity, turning away patients with less than life threatening needs. The overcrowding of hospitals accounts for significant increases in moral distress, and without the ability to seek support, the distress cascades into a cycle of further decrease in quality of care. In order to reduce burnout and improve patient care, nurses need a system in which they can report their emotional states and receive proper help.

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The technical project will focus on the software development of a mobile device application. Moral distress is notorious for having a lack of support services, which is why this application will be targeted toward helping solve ethical dilemmas and the associated problems (Epstein & Delgado, 2010). This application will serve as a point of contact between nurses and higher-level hospital staff, as well as provide real time strategies to alleviate problems associated with moral distress. In a world built around communication, speaking out about mental health often creates a negative portrayal of the speaker to their peers (Stuart, 2006). The anonymity that is supported through the application will help to increase the number of reports and ensure a healthy workplace environment. The work for this project will be completed through the fall

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2021 and spring 2022 semesters. The project will work on a timeline according to the chart depicted in Figure 1.

Figure 1

Gantt Chart: Fall 2021-Spring 2022 Technical and STS Research Projects Timeline



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Note. This figure shows the timeline of when each aspect of the technical and research projects will be completed over the course of the 2021-2022 academic year. This includes research, development, and testing. (Brooks, 2021)

Introduction

In the past decade, registered nurses and other healthcare professionals have repeatedly identified moral distress as a serious problem requiring urgent attention yet are still met with a lack of adequate solutions (Pauly et al., 2012). Moral distress is a major problem facing healthcare professionals around the world, and it has only been exacerbated by the pandemic. Moral distress is ~~when healthcare providers~~ when an individual believes that they are being involuntarily complicit in acting unethically by doing something that they believe to be morally wrong but have little power to act differently or to change the situation (Hamric & Epstein, 2017). This term was originally coined pertaining to nurses and is now researched in context of all healthcare professionals (McCarthy, 2013). In morally distressing situations in the healthcare industry, the constraining factors preventing the healthcare professional from taking what they believe to be the ethical action are typically institutional. Although moral distress is now a well-recognized phenomenon among all healthcare professions, few evidence-based strategies have been published to address it (Morley et al., 2021). In order to address this lack of moral distress intervention for healthcare workers, the final technical deliverable will be a HIPAA-compliant phone application used to detect moral distress in nurses and provide real time resiliency tools. In addition to providing real time relief, the application will aggregate moral distress data to be sent to the unit lead in order to initiate institutional change.

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The moral distress thermometer, seen in Figure 2, is a screening tool to measure moral distress in nurses who practice in the hospital setting (Wocial & Weaver, 2013). The validity and effectiveness of this tool was proven through psychometric testing and a cross-sectional survey design to compare the thermometer to the outdated Adult and Pediatric Moral Distress Scales (Wocial & Weaver, 2013). This moral distress thermometer will be integrated into the design of the mobile application as the first step in assessing moral distress levels in nurses. The application will also contain a survey developed by moral distress researchers to determine the cause of the moral distress. The application will then aggregate the data from the thermometer and survey, and this information will be reported to the Nurse Unit Manager, or an individual in a similar position to make the necessary changes to eradicate the cause of moral distress. Lastly,

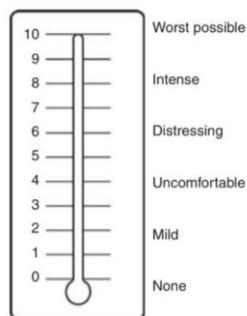
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upon completion of the survey, the application will provide resources for real time relief if the nurse requires it.

Figure 2

Moral Distress Thermometer



Note. The Moral Distress Thermometer, developed and psychometrically tested by Lucia Wocial and Michael Weaver is a tool proven to accurately assess levels of moral distress in nurses (Wocial, 2013).

The project team consists of eight team members: three undergraduate biomedical engineering students, three nurses and moral distress researchers, and two members with extensive computer science backgrounds. Once [the](#) application development is completed, ~~it~~[the research team](#) will begin the iterative testing process. The application will first be tested by a group of 15 UVA nursing PhD students to assess the usability and effectiveness of the application. Once the application receives positive feedback from this group, it will be tested with multiple units of nurses at the UVA hospital. This application is superior to the current methods of Moral Distress intervention because it allows for anonymity, provides real time

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relief, and gives nurses the opportunity to communicate with management level employees to initiate institutional changes.

The outlined project will be successful if nursing populations find the application both useful and unrestrictive to the natural flow of their work. This implementation will ideally result in a long-term reduction of moral distress levels, which can be monitored through data collected from the application. It should also have an effect in reducing nursing burnout which will be difficult to monitor on a large scale. However, small scale data can be collected on single hospital mortality rate and patient satisfaction to indicate the application's efficacy by correlating lower mortality rate and higher patient satisfaction with lower levels of moral distress in nurses. The project and associated data will be presented in the form of a technical report.

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STS Framework

Moral distress can have a significant negative impact on a healthcare team and the patients they treat, demonstrating the importance of research ing how a mobile application can be an effective method of moral distress intervention. The consequences of untreated moral distress include negative perception of provided patient care, increased danger to patients, and, eventually, burnout. Burnout is the exhaustion of motivation that leads a healthcare worker to quitting and is a major contributor to nurse turnover (Henrich et al., 2017). Analyzing methods of reducing moral distress in hospital working environments will lead to improved mental health, better patient care, and a higher retention rate of nurses (Frost, 2021). As it was originally defined, moral distress occurs “when one knows the right thing to do, but institutional constraints make it nearly impossible to pursue the right course of action” (Jameton, 1984). When considering the complex institutional and social problems at the root of all cases of moral distress, it is evident that there are many stakeholders and artifacts involved. These stakeholders

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include patients and their families, nurses, doctors, hospital management, and support services such as the Moral Distress Consultation Service (MDCS). The MDCS is group of consultants within a hospital trained to deal with cases of moral distress, however has proven ineffective in many ways (Hamric & Epstein, 2017). In order to assess the effectiveness of mobile applications as an alternative and superior solution to moral distress, the Actor-Network Theory (ANT) framework will be used to describe and analyze the problem, and a thorough understanding of a technological fix will help assess solutions.

Actor-Network Theory

ANT is a framework for understanding and analyzing the complex relationships between the human and non-human actors in a system. The ANT framework is useful for understanding how social effects are generated as a result of these relationships and interactions (Cresswell et al., 2010). In order to understand the problem of moral distress through the lens of ANT, actors must first be identified. The actors involved in this system include nurses, Nurse Unit Managers, doctors, hospitals or similar institutions, patients, patient's families, the Moral Distress Consult Service team, medical devices and technologies, and even political policies and regulations. Popular critiques of ANT assert that minimizing humans to positions in a network is dehumanizing and denies power to consciousness as well as does not account for power dynamics among humans (Dankert, 2021). However, because the most common cause of moral distress is an institutional or technological issue, it is necessary to consider the humans, technologies, and institutions' involvement with equal weight, rather than prioritizing the human actors.

Technological Fix

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A technological fix is a means of resolving an issue solely with the use of technology and little to no social intervention (Johnston, 2018). Although there are advocates for technological fixes in certain situations, the most popular consensus is that technological fixes are only beneficial for solving specific, well-defined, and stationary problems, and can have detrimental effects when used as the sole solution for more complex problems (Johnston, 2018). As [discussed](#) when considering ANT, there are many factors and complex relationships involved in moral distress, making it far from a well-defined and stationary problem. [Due to the complexity of the problem,](#) it is necessary to assess the success of mobile applications as moral distress intervention by determining whether it incites societal change or is strictly a technological fix.

Research Question: How is a mobile application an effective [sociotechnical solution for moral distress intervention for healthcare professionals?](#)

A combination of documentary research methods, interviews, and policy and network analysis will be utilized to answer this research question by better understanding how the actors and networks interact. Network and policy analysis will first be conducted on hospitals and similar institutions that are the workplace of nurses with moral distress. This analysis is necessary because the definition of moral distress asserts that the root of the issue is typically institutional, so the policies and structure of the institution must be fully understood in order to go beyond a technological fix and address the societal and institutional factors at play. Interviews and documentary research methods will then be used to fully understand the problem of moral distress and the current intervention strategies. The following key phrases will be used to find scholarly articles addressing the topic: “moral distress,” “moral distress thermometer,” “moral distress intervention,” “mental health mobile applications,” and “moral distress in

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nurses.” There are no current moral distress resolution applications, therefore researching mobile applications created to address other mental health issues will provide useful insight as to how a similar application for moral distress can be successful or unsuccessful. Lucia Wocial, PhD, RN, an expert in moral distress and nursing ethics, will be interviewed to better understand the problem and her tool for moral distress intervention, the moral distress thermometer. This research will be very beneficial because the moral distress thermometer is a tool that could potentially be incorporated into a mobile application. Interviews with members of the UVA nursing staff will also be conducted to discuss the practicality of a moral distress intervention application, and how the current UVA moral distress intervention strategies are failing. These interviews with human actors will also be a useful tool for identifying a more complete list of the non-human actors involved in order to successfully apply ANT. Utilization of the described researched methods will allow for a complete understanding of the problem of moral distress and how a mobile application can be a successful tool for intervention.

Conclusion

This proposal introduces the design of a mobile application as a novel method of detecting and resolving moral distress in nurses. The team will create a mobile application where nurses can rate their level of moral distress, explain the cause of the distress, and report it to an individual in a position to resolve the issue. It is superior to previous methods of moral distress intervention because it allows for anonymity, provides real time relief, and gives nurses a platform to communicate with the decision makers of their institution. The goal of this technical project is to decrease moral distress levels among nurses, and eventually decrease nurse turnover and burnout at the institution. In order to achieve this goal, it is crucial to research and assess how a mobile application can be an effective method of moral distress intervention. This requires

perceiving the problem through the lens of ANT to fully understand how the stakeholders and artifacts interact with one another and contribute to the problem. The two projects have a mutualistic relationship, where each project helps improve the other. Not only does the development of a mobile application act as a case study to better answer the research question, but the information found through research will likely be applied to the application in order to improve its effectiveness in reducing moral distress.

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Bibliography

Brooks T. (2021). *Gantt Chart: Fall 2021-Spring 2022 Technical and STS Research Projects*

Timeline. [Figure 1]. *Prospectus* (Unpublished undergraduate thesis). School of Engineering and Applied Science, University of Virginia. Charlottesville, VA.

Cresswell, K. M., Worth, A., & Sheikh, A. (2010). Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare. *BMC Medical Informatics and Decision Making*, 10(1), 67. <https://doi.org/10.1186/1472-6947-10-67>

Dankert, R. (2021). *Actor network theory*. Actor Network Theory - an overview | ScienceDirect Topics. Retrieved October 28, 2021, from <https://www.sciencedirect.com/topics/social-sciences/actor-network-theory>.

Epstein, E. G., & Delgado, S. (2010). Understanding and addressing moral distress. *The Online Journal of Issues in Nursing*, 15. <https://doi.org/10.3912/OJIN.Vol15No03Man01>

Frost, A. (2021, July 27). *Working conditions, understaffing is driving nurses to quit*. opb. Retrieved October 28, 2021, from <https://www.opb.org/article/2021/07/21/working-conditions-understaffing-is-driving-nurses-to-quit/>.

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Haddad, L. M., Annamaraju, P., & Toney-Butler, T. J. (2021). Nursing Shortage. In *StatPearls*. StatPearls Publishing. <http://www.ncbi.nlm.nih.gov/books/NBK493175/>

Hamric, A. B., & Epstein, E. G. (2017). A Health System-wide Moral Distress Consultation Service: Development and Evaluation. *HEC Forum: An Interdisciplinary Journal on Hospitals' Ethical and Legal Issues*, 29(2), 127–143. <https://doi.org/10.1007/s10730-016-9315-y>

Henrich, N. J., Dodek, P. M., Gladstone, E., Alden, L., Keenan, S. P., Reynolds, S., & Rodney, P. (2017, July 1). *Consequences of moral distress in the intensive care unit: A qualitative study*. American Journal of Critical Care. Retrieved October 28, 2021, from <https://aacnjournals.org/ajconline/article/26/4/e48/4380/Consequences-of-Moral-Distress-in-the-Intensive>.

Jameton, A. (1984). *Nursing Practice: The Ethical Issues*. Eweb:51336. <https://repository.library.georgetown.edu/handle/10822/800986>

Johnston, S. (2018). Alvin Weinberg and the Promotion of the Technological Fix. *Technology and Culture*, 59, 520–561. <https://doi.org/10.1353/tech.2018.0061>

Lau, N., O'Daffer, A., Colt, S., Yi-Frazier, J. P., Palermo, T. M., McCauley, E., & Rosenberg, A. R. (2020). Android and iPhone Mobile Apps for Psychosocial Wellness and Stress Management: Systematic Search in App Stores and Literature Review. *JMIR MHealth and UHealth*, 8(5), e17798. <https://doi.org/10.2196/17798>

Lau, N., O'Daffer, A., Yi-Frazier, J. P., & Rosenberg, A. R. (2021). Popular Evidence-Based Commercial Mental Health Apps: Analysis of Engagement, Functionality, Aesthetics, and Information Quality. *JMIR MHealth and UHealth*, 9(7), e29689.

<https://doi.org/10.2196/29689>

McCarthy, J. (2013). Nursing Ethics and Moral Distress: The story so far. *Nursing Ethics*, *Online Special Issue*, 1–4.

Morley, G., Field, R., Horsburgh, C. C., & Burchill, C. (2021). Interventions to mitigate moral distress: A systematic review of the literature. *International Journal of Nursing Studies*, *121*, 103984. <https://doi.org/10.1016/j.ijnurstu.2021.103984>

Pauly, B. M., Varcoe, C., & Storch, J. (2012). Framing the Issues: Moral Distress in Health Care. *Hec Forum*, *24*(1), 1–11. <https://doi.org/10.1007/s10730-012-9176-y>

Stuart, H. (2006). Media Portrayal of Mental Illness and its Treatments. *CNS Drugs*, *20*(2), 99–106. <https://doi.org/10.2165/00023210-200620020-00002>

Wocial, L. D., & Weaver, M. T. (2013). Development and psychometric testing of a new tool for detecting moral distress: The Moral Distress Thermometer. *Journal of Advanced Nursing*, *69*(1), 167–174. <https://doi.org/10.1111/j.1365-2648.2012.06036.x>

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