THE AFFECT OF MOBILE PERFORMANCE SUPPORT DEVICES ON ANXIETY AND SELF-EFFICACY OF HOSPITAL FLOAT STAFF

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Floating describes the act of staff moving from one unit to another based on the needs of the patients in a hospital. Many staff who float to different units express negative feelings, including anxiety and lack in self-efficacy. However, floating is both an economical and efficient method to use staff across the hospital, especially with current staffing shortages in the United States.

This study investigated how the use of mobile performance support devices may help reduce anxiety and increase self-efficacy for those staff who float to different units. With access to multiple resources available on the mobile device, Bandura's social learning theory and self-efficacy concept set the framework through modeling, observing, and imitating others in order to reproduce certain behaviors and tasks and believe in one's capability to perform. A quantitative study incorporating the retrospective pretest-posttest design was conducted using the population of float staff, including both nurses and respiratory therapists, from Children's Medical Center of Dallas. Both the State-Trait Anxiety Inventory and General Self-Efficacy Scale, along with a basic demographic tool, were used to explore anxiety and self-efficacy in relation to the usage of mobile performance support devices. Findings can be used to impact the negative feelings of staff towards the idea of floating.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

As baby boomers age, there is a growing demand upon the healthcare system, including pressure on the workforce (Fox & Abrahamson, 2009). The U.S. Bureau of Labor Statistics indicates that "the growth in the demand for health occupations is twice that of non-health occupations, resulting in the need for more than 4.3 million health professions workers to fill the job openings created by departures and new positions between 2004-2014" (as cited in Swenson, 2008, p. 64). The increased demand for more healthcare workers is problematic, and the need to work smarter and more efficiently may play a major role in addressing this issue. Both nursing and respiratory therapy, two groups that represent a large population in the healthcare workforce, are experiencing shortages. The American Association of Respiratory Care asserts that "staff shortages are the largest long-term problem affecting hospitals and will require changing the nature of employees' jobs and retention of employees" (as cited in Heisler, 2007, p. 1). According to the American Association of Colleges of Nursing (AACN, 2011), there is no empirical evidence to support the fact that the nursing shortage has ended or will end in the near future; however, the AACN is working with collaborative groups to identify strategies to address the shortages. Several surveys in the past few years have aligned with a generally negative overall view of the healthcare system concerning workforce shortages and the resulting demands on the staff (Buerhaus, Donelan, Ulrich, Norman, & Dittus, 2005a, 2005b). Good and Bishop (2011) point to retention as the key:

> One of the issues facing nursing leaders includes the projected need for 587,000 new RN jobs by 2016 related to retirement of the baby boomers and the increased aging population introduced into the healthcare delivery system. Retention of nurses is

paramount to ensure adequate staffing and successful provision of quality care. (p. 233) With these shortages, the healthcare industry must find ways to work sharper and more resourcefully.

Thinking strategically about how to do more with less is a challenge that healthcare organizations must face. Hospitals should consider a number of strategies for dealing with labor shortages, especially if these are long-term problems. These strategies include helping staff to develop their skills to work in other areas, redesigning work processes, and introducing new technologies to increase efficiency and effectiveness (Carlson, 2010). Stimac (2011) agrees that in order to address staffing shortages, "it is critically important for healthcare organizations to provide staff with the right technology to maximize resources and skilled labor" (p. 19). Hospitals must seek out these strategies in order to leverage their current resources in a more useful way.

Need for the Study

There is a need to study strategies that may address the healthcare worker shortage: "As a result of the nursing shortage, the practice of floating nurses has become very prevalent in today's healthcare industry" (Kane-Urrabazo, 2006, p. 95). Floating is one type of strategy that can help alleviate the burden and consequences of shortages (Kane-Urrabazo, 2006). Floating occurs when staff from one unit are sent to work in another unit based upon patient census and acuities. For example, if one unit has a low census and has available nurses or respiratory therapists, and another unit has a high census with patients of higher acuity, staff who may have not been oriented to that specific unit are required to work there for a shift. "Floating, also referred to as pulling, is a staffing strategy that involves sending a nurse from his/her permanently assigned unit, or home unit, to a unit that needs staff" (Good & Bishop, 2011, p.

231). The literature implies that there is no set standard of who can and cannot float, as well as a certain percentage of staff who float. These decisions are made by the hospital's leadership based upon need. While floating allows hospitals to use current staff in a more thoughtful way, it can also be a stressful situation for float staff, including nurses and respiratory therapists. The act of floating to different units brings out several emotions, including insecurity, apprehension, and high anxiety (Kidner, 1999). Also, "they anticipate that they are going to have to work outside their comfort and safety zone, in an environment of uncertainty that is external to their area of expertise" (Strayer & Daignault-Cerullo, 2008, p. 51). The floating of staff implies that nurses work as generalists, but providing specialized care to ensure that demands of patients are met is reality. Literature suggests that, for many reasons, the idea of floating is perceived negatively and is associated with words such as *uneasiness, anxiety-producing, burdensome*, and *uncomfortable* (Banks, Hardy, & Meskimen, 1999; Dziuba-Ellis, 2006; Kane-Urrabazo, 2006; Nicholls, Duplaga, & Meyer, 1996; Strayer & Daignault-Cerullo, 2008). According to Good and Bishop (2011), "One of the most prevalent concerns voiced by nurses about floating is the level of discomfort produced by going to an unfamiliar unit" (p. 231). Unfamiliarity with a unit's processes, which may include making assignments, storing equipment and supplies, and basic nursing functions, may be more time-consuming. The level of stress and dissatisfaction from floating has triggered the creation of committees across organizations to target the problems and develop solutions (Dziuba-Ellis, 2006).

Frequently, float staff are given support when they work on different units. This support can come in many forms. For example, some units give swift and direct orientation time, while others may find it easier to assign the less challenging patients in order to omit orienting the floaters (Good & Bishop, 2011). Basic patient assignments seem to be a familiar way for units

to deal with float staff coming on to their floor. Lugo and Peck (2008) suggest that float staff could find reference guides and checklists as useful resources as they move from unit to unit. Literature indicates that no common structural approaches or resources are proactively available for float staff, only designs that meet different organizational needs (Banks et al., 1999; Dziuba-Ellis, 2006; Lugo & Peck, 2008). Another approach that targets the negative aspect of floating includes clustering. Clustering refers to floating staff only to areas with which they feel familiar and in which they are competent, as opposed to any unit in the hospital, to alleviate unfamiliarity and support (Dziuba-Ellis, 2006). Many types of support systems may be used as resources, but little-to-no research suggests that technology has been used or studied in a floating environment.

Although the concept of electronic performance support systems (EPSS) has existed for many years, there has been an evident shift to mobile devices. EPSS are programs that assist workers' performance when they need it; however, these programs are typically performed on a computer (Lee & Liu, 2006). As workers become more mobile and the demand for training and development increases, there will be a need for flexible and creative delivery methods for employees (Brown, 2010). The mobility of technology now includes the lightweight, handheld, portable devices including smartphones, tablets, and PDAs (personal digital assistant), to name a few. Not only can these devices provide learning, but they can also act as performance support tools. While mobile learning and mobile support are related, they are not the same (Rossett, 2010). According to Rossett (2010), "Performance support attends to outside influence and is what people turn to for help when stumped by a question, symptom, or decision" (para. 3). McManus and Rossett (2006) suggest that performance support advantages include "user's ability to quickly access large amounts of information, support for simultaneous multiple users, support anywhere and at any time when the delivery technology is available..."(p. 8). Rossett describes

two types of mobile performance support as sidekicks and planners: Sidekick performance support tools are with individuals as they are performing a task, whereas planners are performance support tools prior to and after the task. Both types of mobile performance support devices can assist users at any time. Performance support delivers quick, valued assistance available when and where the user needs it and it can target priorities (Rossett, 2010). While the perils of floating may continue to create an environment of uneasiness, hospitals look toward alternative strategies to alleviate these reservations (Banks et al., 1999; Kane-Urrabazo, 2006; Nicholls et al., 1996; Strayer & Daignault-Cerullo, 2008). Perhaps performance support can address the on-demand need for float staff.

Children's Medical Center of Dallas recently received a grant from Hospital U, which was used to purchase 100 mobile devices, specifically 100 iPod Touches. Hospital U is a not-for-profit collaborative organization helping health systems implement technological solutions. Each iPod houses clinical applications, including videos, articles, reference tools, patient education tools, reference guides, and other memory joggers to be used when staff need performance support on the floor or at the bedside. A project team at Children's wanted to find the best use for the mobile devices, so a request concerning current research was made to Hospital U to identify how other hospitals have implemented the mobile devices. The response affirmed that little-to-no data have been collected to support best practices. This feedback presented a need to study how the mobile devices could best be utilized, which led Children's to decide to pilot the devices on variable staff who float to various units, including registered nurses (RNs) and respiratory therapists (RCPs), to identify a performance support solution. The project team reached out to the managers of the variable staff to solicit volunteers to utilize the devices.

Theoretical Framework

The theoretical framework for this study is Bandura's (1977) social learning theory and self-efficacy. Bandura's theory and concepts help create a foundation for using mobile performance support devices that takes into account observation, modeling, and imitation as a way to reinforce learning. Self-efficacy provides the groundwork behind one's belief that, with the support of a mobile device, one can perform a task successfully.

Bandura's Social Learning Theory

Bandura's social learning theory is rooted in many of the basic concepts of a traditional learning theory; however, he adds an influential social element which was used as the foundation for this study. His case is that people learn new behaviors and information by observing, imitating, and modeling other people. According to Bandura (1977), "Fortunately, most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed, and on later occasions this coded information serves as a guide for action" (p. 22). Modeling, or observational learning, is used to help explain a wide variety of behaviors. In order for modeling to be effective, four conditions are necessary, including attention, retention, reproduction, and motivation (Bandura, 1977).

"Attention" includes the various factors that can either increase or decrease the level of focus on the concept. "People cannot learn much by observation unless they attend to, and perceive accurately, the significant features of the modeled behavior" (Bandura, 1977, p. 24). Some concepts that influence attention involve characteristics of the subject or content; for example, if the subject or content is eye-catching or dramatic, the learner will tend to pay more attention. Often an instructional designer will design and develop an attention-getter to introduce the session or learning event. Grabbing the learner's attention quickly can make the learner more

likely to dedicate his or her interest to the topic. Distracters in the learning environment may inhibit the beginning of the learning process.

The next condition revolves around retention, or the ability to store information. According to Bandura (1977), "People cannot be much influenced by observation of modeled behavior if they do not remember it" (p. 25). Through the use of symbols, mnemonic devices, images, and other memory strategies, the learner is able to retain the information. Bandura suggests that observational learning consists of two types of representations, including imagery and verbal, but it depends on the learner as how it is processed. Retention can be affected by a variety of factors, but the ability to retrieve the information at a later time and reciprocate is essential to observational learning.

Reproduction is another condition important to modeling, which consists of replicating or performing the behavior that is observed and retained. The more the behavior is practiced, the more it leads to improvement and advancement in skills. "In most everyday learning, people usually achieve a close approximation of the new behavior by modeling, and they refine it through self-corrective adjustments on the basis of informative feedback from performance" (Bandura, 1977, p. 28).

Finally, in order for observational learning to be successful, the learner must be motivated to imitate the behavior; therefore, motivation is the fourth and final condition. Bandura (1977) suggests that "they are more likely to adopt modeled behavior if it results in outcomes they value than if it has unrewarding or punishing effects" (p. 28). Reinforcement and punishment play a key role in motivation.

These four conditions are accepted and displayed in various ways, even if the same behavior is being reproduced. On-the-job performance support is an example of how the social

aspect of the social learning theory is used in training and development today. Many tasks that have already been taught may require an additional support tool while one is on the job. DeWitt (2003) suggests that the traditional U.S. approach to medical education, "see one, do one, teach one," aligns with the social learning theory of modeling behavior (p. 756). DeWitt addresses incorporating skills into practice by adding that "it is necessary to know how to motivate learners at all levels of training" (p. 756). The motivation may be presented, but learners must also believe they have the ability to perform the task.

Self-Efficacy

Self-efficacy is another important concept from Bandura. Self-efficacy is a person's belief in his or her ability to succeed in a particular situation or task. Bandura (1977) defined self-efficacy as a concept formed by the "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainment" (p. 3). The four sources of self-efficacy include enactive mastery experiences, vicarious experiences, verbal persuasion, and psychological or affective states.

Through mastery of experiences, successes build a strong belief in one's personal efficacy. These types of experiences can also provide resiliency if they are filled with obstacles. Typically, once learners become convinced that they have what it takes, they can persevere in tough times and quickly rebound from impediments. Vicarious experiences can be provided through observation. Observing people similar to oneself increases beliefs that one can also succeed. Learners seek to model those who possess the competencies to which they aspire. Verbal persuasion is another source of self-efficacy. Those who are persuaded verbally that they can master a certain task or skill are more likely to exert greater effort than those who have doubts about their capabilities. Finally, psychological responses to situations, including moods,

emotional states, reactions, and levels of stress, can play a role in how a person feels about their capabilities in a certain situation. Lowering stress levels and increasing moods when faced with challenging situations or tasks may help to improve self-efficacy. The key to successfully learning a new skill is for learners to believe they can, which may lead to better performance. Mahon, Nickitas, and Nokes (2010) also suggest that "nursing faculty are aware that persistence and practice are foundational for the self-efficacy that leads to successfully acquiring new knowledge and skills" (p. 616).

Bandura's theory and concepts help lay the groundwork for applying mobile performance support devices that allow for observation, modeling, and imitation to emphasize the learning that has already taken place. Self-efficacy provides the basis of one's belief that, with the aid of a mobile device, one can successfully perform a task.

Purpose of the Study

The purpose of this study is to investigate how the use of mobile performance support devices affect the anxiety levels and self-efficacy of RNs and RCPs who float throughout the hospital. These variable staff who float were measured on their perception of anxiety and self-efficacy levels both prior to (then) the usage of mobile performance support devices and after (now) usage to determine any statistically significant differences. The measures were through self-report using a posttest (now) and retrospective pretest (then) survey. With the foundation of the social learning theory and self-efficacy concept, the mobile performance support device will provide multiple resources that staff can observe, imitate, and model in order to perform necessary tasks on various units in the hospital. The findings of the study can be used to design and develop additional customized resources that lend support to reduce anxiety levels among float staff and promote self-efficacy.

Hypotheses

H_1: There will be a statistically significant decrease in anxiety level, as measured by the State-Trait Anxiety Inventory, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

H_2: There will be a statistically significant increase in self-efficacy, as measured by the General Self-Efficacy Scale, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

Limitations

Several limitations may have affected the study, such as the willingness, honesty, comfort level, and stress of the participants.

- It is difficult to predict the willingness of participants to stay actively involved and return completed surveys.
- Participants may not have been honest due to the nature of the information requested, which included self-assessments.
- Float staff's anxiety could be attributed to other situations.
- The participants' comfort level with mobile devices could be a factor.
- The ability to generalize results to other staff outside of Children's is limited.
- There may be bias in how participants respond to then and now survey items based on formatting the survey items vertically, as opposed to an adjacent format (Nimon, Zigarmi, & Allen, 2010).

Delimitations

Multiple delimitations may have affected the study, including the number of participants, roles, use of devices, and type of measurement tools used.

- The population study was limited to only variable float staff at Children's Medical Center Dallas, who are those who float a majority of the time (more than 50%).
- Float staff include both registered nurses and respiratory therapists.
- Float staff utilized the mobile performance support device based on their needs on the floor and at the bedside.
- Participants completed surveys at the end of the study as a posttest, as well as a retrospective pretest.
- Measurement tools identified in the use of the study were the State-Trait Anxiety Inventory (STAI), the General Self-Efficacy Scale (GSE), and a demographic survey.

Definitions of Terms

Anxiety: a pervasive feeling of apprehension and distress in response to an undefined or unknown threat, often a response to unconscious conflicts, insecurities, and impulses (Spielberger, 1983).

Floating: occurs when staff from one unit are sent to work in another unit based on census load and patient acuities (Kane-Urrabazo, 2006).

Performance support: tools that provide critical information or advice needed at a particular moment in time (McManus & Rossett, 2006).

Registered nurse: a nurse who has graduated from an accredited nursing program, has passed the state examination for licensure, and has been registered and licensed to practice by a state authority (Registered nurse, 2006)

Respiratory therapist: the healthcare discipline that specializes in the promotion of optimum cardiopulmonary function and health from which they identify, treat, and prevent acute

or chronic dysfunction of the cardiopulmonary system (American Association for Respiratory Care, 2009).

Self-efficacy: conviction that one can successfully execute the behavior required to produce the outcomes (Bandura, 1977).

State anxiety: a diffuse, situational state of fear in response to perceived danger, resulting in persistent feelings of anxiety and fear (Spielberger, 1983).

Trait anxiety: an enduring personality characteristic which leads to the perception that stressful situations are dangerous (Spielberger, 1983).

Variable: able or apt to vary **:** subject to variation or changes (variable, 2011)

Summary

As hospitals continue to face staffing shortages, they must utilize methods for working more efficiently. One method that may address shortages is floating staff across different units to fill in staffing gaps. While floating may either be a short-term solution or a long-term issue, it is one way to make working environments more resourceful. Many float staff possess feelings of anxiety and discomfort in less familiar units. While some units specialize in certain procedures, float staff must reacquaint and orient themselves quickly with the types of processes they tend to perform less frequently. Mobile performance support devices function as an on-demand resource that staff can utilize to jog their memory for certain procedures or tasks on different units; they may also be used for patient education for the families. The study investigated how the usage of these support devices may affect anxiety and self-efficacy levels of staff who float across the hospital.

CHAPTER 2

LITERATURE REVIEW

The purpose of this study is to identify whether there is a significant difference in anxiety levels and self-efficacy of float staff prior to (then) and after (now) the use of mobile performance support devices. The review of literature includes studies regarding current issues surrounding the idea of floating, and those examining the impact of performance support devices in various environments. Little-to-no research is available regarding how mobile performance support devices affect anxiety and self-efficacy of float staff; however, the following studies provide a framework that supports the uneasiness of float staff and how a variety of performance support tools have suggested a positive effect. Thus, the reviews create a foundation for the hypotheses of the current study.

Float Staff Studies

Several studies have focused on current float staff attitudes toward the act of floating (Banks et al., 1999; Lugo & Peck, 2008; Nicholls et al., 1996; Strayer & Daignault-Cerullo, 2008). The studies help support the need to find a long-term strategy that float staff can utilize in order to feel more confident and less anxious about moving through different units across the hospital. Each of these studies focuses on aspects of anxiety and confidence relating to the current study and the results of implementing different floating strategies.

Although the literature review revealed no studies utilizing mobile performance support devices as a possible intervention, they did align with the notion that finding a specific strategy is necessary to address the negative feelings and feedback towards floating. Nicholls et al. (1996) reviewed the positive and negative aspects of floating to other units at St. Francis Medical Center in LaCrosse, Wisconsin. The most common negative response included inadequate orientation

to the unit to which they floated, leading to common themes such as disorganization, anxiety, and uneasiness. Some nurses felt that floating gave them an opportunity to gain new experience and practice their skills. Nicholls et al. suggest that the practice of floating staff from one unit to another unit clearly is a stressful experience for nurses, based on the negative comments suggested in the study. This particular study implies that future studies should focus on strengthening relationships between float staff and unit-based staff as a strategy for creating a less stressful environment.

Providing staff with an array of resources to help fill workflow gaps between units has been a strategy source for several studies (Banks et al., 1999; Lugo & Peck, 2008). A study at a 500-bed trauma center focused on implementing several interventions affecting staff's attitudes towards a recent change in their floating policy, such as fact sheets about each unit, the buddy system, and cheat sheets. The change came after a response to budget changes in which floating would now be open across the hospital, as opposed to closed to certain units. This triggered immediate negative responses by staff (Banks et al., 1999). Similarly, a Florida Hospital Altamonte looked at developing a strategy for clustering similar units for reassignment, reeducation, welcome resources for each unit, pocket guide with protocols, checklists, and guidelines (Lugo & Peck, 2008). This strategy emerged from a shared-governance approach to mitigate negative feelings towards floating. Sharing decision making optimizes the variety of perspectives of both bedside nurses and administrators in order to identify concerns and find solutions. Both studies were able to conduct and use data from formal and informal surveys to support their solutions. Descriptive surveys were administered to the participants of the trauma center study, evaluating their experience of floating, comfort level, and helpful versus ineffective unit-based responses to floating. This resulted in a 69% positive response rate, including staff

feeling more comfortable in their environment, but still having a lack of familiarity with some units (Banks et al., 1999). Similarly, the Florida Hospital study conducted informal surveys from ICU nurses, with a response rate over 90% with feelings of discomfort, isolation, and "unsupported" when asked if they wanted to float. Data from the hospital's nursing satisfaction survey, National Database of Nursing Quality Indicators (NDNQI), confirmed the same negative results. Through the development teams, made up of direct care staff representatives from the nurse practice council, managers, nursing directors, educators, evidence-based nursing coach, and nurse representatives from units across the hospital, they worked towards finding a solution. Through anecdotal information, literature reviews, and best practices from other hospitals, both studies were able to create and implement a strategy consisting of multiple resources available to float staff that ultimately affected survey results post-implementation (Lugo & Peck, 2008).

A study of critical care nurses from the Miriam Hospital in Providence, Rhode Island, focused on using a closed staffing approach as a way to reduce the stress of floating (Strayer & Daignault-Cerullo, 2008). The purpose was to support the closed staffing method as a way to create a decentralized and clustered strategy for critical care nurses. The transformation from closed staffing to an open staffing approach was the focus of an earlier study that proved to be quite stressful for clinical staff. Banks et al. (1999) studied staff from a hospital where the floating approach transition from being closed to open across the hospital on certain units, creating a negative environment. Strayer and Daignault-Cerullo (2008), focusing on the closed staffing strategy, suggest that "floating can be such a difficult and anxiety-producing experience that organizations are responding in a variety of ways, such as creating committees to improve this staffing arrangement" (p. 51). While the open staffing strategy eventually resulted in more positive feelings towards floating, the closed staffing approach did as well, suggesting that both

open or closed staffing strategies can be successfully implemented. After 6 months of closed staffing as a float method, a questionnaire about nurses' feelings toward floating was distributed with a 75% response rate. In regards to questions focused on job satisfaction, 100% of the respondents stated that they had less anxiety related to floating than they had prior to the study. Multiple studies reveal that no one particular strategy solves the floating issue for staff, but rather the implementation of solutions targeted to the needs of the staff.

Performance Support Studies

While almost no research focuses on the use of mobile devices as floating support resources, many studies highlight the use of technological and non-technological tools for performance support in various environments. Several studies encourage the idea of performance support tools and devices playing a major role in learner attitudes (Broyles, Cyr, & Korsen, 2005; Cibulka & Crane-Wider, 2011; Dominick et al., 2009; Nguyen, 2009).

Nguyen (2009) conducted a survey with 78 employees from multiple companies that were randomly selected to be in one of three groups, including training only, electronic performance support systems (EPSS) only, or a combination of the two. A posttest-only control group design was used to focus primarily on user attitudes. The training-only group received training prior to completing the required tasks, whereas the EPSS-only group received no training but had access to the performance system while completing the tasks. Finally, those participants in the combination group received both training and access to the EPSS in order to complete their tasks. Results from the study highlighted usefulness of training and support, quantity of learning, and satisfaction with the system. Several key themes were extracted based on the results of the tools, including requests for some sort of performance support tool in order to assist with task completion, as well as the training-only group being less satisfied than the other

groups. Nguyen (2009) suggests that institutions "incorporate any performance support systems that will be available to performers on the job" as a reinforcement to the training (p. 112).

McManus and Rossett (2006) took a different approach to this strategy by looking at performance support which focused on individuals who work for organizations that either develop or employ electronic performance support systems. The researchers sent letters to 18 professionals experienced in EPSS or performance support tools, with a total of 6 respondents. While the respondents from the McManus and Rossett study represented a small group, rich information was gathered through an open-ended questionnaire. Results highlighted several areas, including participants' role within their organization, descriptions of how performance support programs were being used, effectiveness of the tools, factors influencing successful implementation, rollout strategies, and recommendations. Key themes suggested that the organization's use of performance support had average success. Desmarais, Leclair, Fiset, and Talbi noted the potential benefits of using EPSS: "increased productivity; lower training costs; increased work self-sufficiency; increased product quality due to standardized practices; and establishment of a means to capture, store, and grow an organization's knowledge capital" (as cited in McManus & Rossett, 2006, p. 15). While there is optimism in the usage of performance support systems, such as EPSS, the focus is on the technique to effortlessly mesh task with support to benefit the user.

Another system support tool studied, housed on the Internet, evaluated the efficacy and anxiety of recently bereaved individuals (Dominick et al., 2009). The support tool is an Internet-based intervention designed to help users better understand their grief and find positive ways to cope with their loss. The tool includes interactive exercises, videos, and checklists for the users to reference. The Oregon Center for Applied Sciences conducted the study by reaching out

nationally to grief support Web sites, listservs, online message boards, Internet advertising, newsletters, e-mail announcements, and newspaper ads in three large metropolitan areas. The hypothesis was that improved attitudes and self-efficacy would be connected to reductions in anxiety about the individual's loss. Multiple assessments were administered to participants after 1 month's use of the intervention support tool, including the State-Trait Anxiety Inventory measuring anxiety levels. Results indicated that both anxiety and self-efficacy levels were significantly and substantively affected, supporting the use of the tool. Treatment participants were found to have large gains compared to the control group on all posttest measures, strengthening the idea that performance support tools result in positive outcomes.

Similar to the focus of this current study, with the use of iPods as a performance support device Cibulka and Crane-Wider (2011) studied the use of personal digital assistants (PDAs) from a group of nursing students' perspectives. Following a mandate from the National League for Nursing for the reform of preparing nursing students to utilize technology while practicing in a healthcare environment, the faculty at a university in the Midwest reviewed current curricula. "Our most significant gap occurred in the use of mobile technologies that provide quick access to information" (Cibulka & Crane-Wider, 2011, p. 115). The PDAs were introduced and used in two courses, including a pharmacology and adult health course. The software used as part of the project was loaded onto memory cards that could easily be installed into the devices. Several teaching strategies were used to level the playing field on how students utilized the functionality of the device and referenced the content, similar to the approach used in this current study. Results at the end of the semester highlighted the students' behaviors, use of the device, barriers to the device, and degree of satisfaction. Common themes include an assessment of whether the

devices made them feel more secure and confident, contributed to their learning, and helped them feel more organized.

Although the present study focused on the use of mobile devices as performance support tools, research suggests that the use of non-technological performance support tools can also have a positive impact (Broyles et al., 2005). More specifically, students from the University of Vermont Medical School in the Family Medicine Clerkship were studied to determine whether the use of a textbook as a support tool would have an impact on student achievement, tension and stress reduction, preparation methods, utilization of the textbook, and overall feelings about the process of allowing support tools. The textbook would be used during the clerkship exam. While technology was not the focus of this particular study, reference resources and the ability to find information efficiently through support tools were essential to physicians and clinical staff. "Over 80% of the respondents described their feelings when entering the testing situation to be less anxious, less stressful and more comfortable" (Broyles et al., 2005, p. 459). Other respondents described the process as more closely aligned with a real clinical setting in which other support tools are used. More than 60% of respondents had positive comments regarding the new process because it allowed them to focus on principles rather than rote memorization.

Summary

The goal of this study is to identify whether there is a significant difference in anxiety levels and self-efficacy of float staff prior to (then) and after (now) the use of mobile performance support devices. The review of literature guides the idea that staff feel anxious and stressed in a floating environment and that strategies to intervene are necessary. The literature also reveals that various types of support tools are providing the needed resource for learners to perform certain tasks more successfully and with less stress. The intent of this study is to close

the literature gap of float staff utilizing performance support tools, specifically mobile tools, to address anxiety and self-efficacy. Chapter 3 presents the methods used in this research.

CHAPTER 3

METHODOLOGY

The target of the study is to investigate whether the usage of mobile performance support devices is related to anxiety and confidence levels. The content of this chapter includes the discussion of the research design of the study, population, and the research instruments. Data collection and analysis procedures are also described.

Research Design

This study used a quantitative research design incorporating the retrospective pretest-posttest control group design to explore anxiety and confidence levels in relation to the usage of mobile performance support devices. Lamb and Tschillard (2005), Martineua (2004), and Raidl et al. (2004) suggest that "replacing the traditional pretest in pretest-posttest designs with the retrospective pretest as a practical and valid means to determine program outcomes, mitigating the effects of experience limitation, pretest sensitization, maturity, and mortality" (as cited in Nimon, 2007, p. 1). Data were collected from variable float staff from Children's Medical Center of Dallas at one time.

Population

The study population was made up of current variable float staff, including RNs and RCPs, from Children's Medical Center of Dallas hospital. Registered nurse floaters made up about 30% of the study population, whereas respiratory therapist floaters represented about the other 70% of the study population. Variable float staff are those who float to varied units based on patient census and clinical need as part of their job. A minimum of 41 participants was recommended through the G-Power analysis in order to provide enough statistical power to support statistical significance. A G-Power analysis is conducted to help increase the probability

that the test will find a statistically significant difference (Faul, Erdfelder, Lang, & Buchner, 2007). The type of G-Power statistical *t* test selected focused on the difference between two dependent means (matched pairs). The effect size was set at .4, along with a .05 alpha. According to Cohen (1988), .30-.50 effect size defines a moderate to medium effect. The projected power was set at .80, so there is an 80% or greater chance of finding a statistically significant result when, in fact, there is one.

Instrumentation

Data were collected using surveys as a retrospective pretest (then) and posttest (now). The State-Trait Anxiety Inventory for Adults (STAI) is used to measure anxiety in adults, differentiating between a temporary condition or feeling and a long-standing quality (Spielberger, 1983). The General Self-Efficacy Scale (GSE) is used to assess a general sense of perceived self-efficacy, or the ability to cope with daily, stressful situations. Both of the instruments are self-report and were administered at the same time. Each instrument was used as a posttest after (now) the use of the mobile performance support device, as well as a retrospective pretest (then). The use of the retrospective pretest helped to avoid a response-shift effect, which may occur when the participants' frame of mind or reference changes significantly during a study because they do not put it into context (Lamb, 2005). In order to connect the use of mobile devices to the instruments, participants answered the questions regarding anxiety and self-efficacy in terms of the use of the devices rather than in general terms. Demographic data were also collected using a survey developed by the researcher to help describe the study population.

State-Trait Anxiety Inventory

The State-Trait Inventory (STAI) is a self-reporting instrument used extensively in clinical practice (Spielberger, 1983). The principles of state and trait anxiety were first introduced by Cattell (1966). This instrument clearly differentiates between how an individual is currently feeling versus how one typically feels in regards to his or her anxiety level. The STAI consists of two 20-item scales measuring temporary and permanent levels of anxiety. The first 20 items address how individuals are feeling at a given moment, whereas the second set of 20 items addresses how they feel in general. All 40 items use a 4-point Likert scale ranging from *not at all* to *very much so*, in regards to the statements listed. The scores are added for each of the two sections to identify anxiety level. Anxiety scales can vary from a minimum of 20 to a maximum of 80.

The original STAI is known as Form X, while Form Y replaced the original in 1980. "While much of the research has been based on Form X, correlations between Form X and Form Y were uniformly high, ranging from .96 to .98" (Seebode, 2003, p. 66). Form Y was validated on over 5,000 participants, including military recruits, high school students, college students, and working adults. The STAI has been found to be reliable and internally consistent, with a test-retest reliability ranging from .65 to .75 and with a median reliability coefficient of .695 (Spielberger, 1983). Spielberger (1983), Bruchon-Schweitzer and Paulhan (1993), Gauthier and Bouchard (1993), and Fountoulakis et al. (2006) note that "the STAI-Y showed good internal consistency, test-retest reliability and construct validity in samples of healthy younger adults" (as cited in Potvin et al., 2011, p. 870). In addition, Stanley et al. (1996), Kabacoff et al. (1997), Bouchard et al. (1998), Fuentes and Cox (2000), and Stanley et al. (2001) suggest that "for older adults, the reliability and the validity of the STAI-Y are also satisfactory" (as cited in Potvin et

al., 2011, p. 870). A study conducted using a short form of the state scale of the STAI reported a Cronbach's alpha of .93 from the full form, as opposed to a .83 with the short form, suggesting that the full form contains a higher reliability than what has been reported (van der Bij, de Weerd, Cikot, Steegers, & Braspenning, 2003). "The STAI has correlated well with other personality measures, suggesting good convergent and divergent validity" (Seebode, 2003, p. 69). Permission was granted to purchase and use the instrument, but reproduction in published material, such as a dissertation, was not (see Appendix A).

The General Self-Efficacy Scale

The General Self-Efficacy Scale (GSE) is a self-report instrument used to measure a general sense of perceived self-efficacy that predicts coping with daily problems, as well as adapting after experiencing various stressful life events (Jerusalem & Schwarzer, 1992). Self-efficacy is defined as people's judgments of their capabilities to organize and execute tasks required to reach designated types of performances (Bandura, 1986). According to Schwarzer and Scholz (2000), general self-efficacy basically describes having a broad sense of personal competence in order to effectively deal with stressful situations. The GSE consists of 10 items, using a 4-point Likert scale. Answers range from *not at all true* to *exactly true*. The scores are added yielding a composite score with a minimum of 10 and a maximum of 40. "A score greater than 25 is considered moderate to high general self-efficacy" (Collins, 2005, p. 42).

The instrument has been tested in 27 languages, and samples from 23 nations yield a Cronbach's alpha ranging from .76 to .90 (Schwarzer, 2004). Chen, Gully, and Eden (2001) and Scholz, Gutierrez-Doza, Sud, and Schwarzer (2002) also reported good internal consistency for the instrument. Scherbaum, Cohen-Charash, and Kern (2006) compared three general self-efficacy instruments and reported criticisms that, based on their research, concerning the average

reliability may not be justified. Criterion-related validity has been addressed documenting both positive coefficients as well as negative coefficients (Jerusalem & Schwarzer, 1992).

Demographic Data

A demographic data instrument, consisting of 10 questions, was developed by the researcher in order to gain information from the participants (see Appendix A). This information described the participants in terms of results and statistical characteristics of the study population. The instrument was included in the survey packet given to participants.

Data Collection Procedures

The Institutional Review Board (IRB) process was completed through the University of North Texas (UNT), as well as through the University of Texas Southwest (UTSW), as part of Children's and UTSW's working relationship to conduct studies. Approval documents from each location are located in Appendix B. A project team from Children's Medical Center of Dallas reached out to managers and directors of the float staff to explain the purpose and expectations of the study and to assist in encouraging their float staff to participate. Once participants were identified, the project lead of the mobile performance support device project at Children's Medical Center of Dallas conducted 8 to 10 one-hour training sessions before using the devices. This was an attempt to create consistency, with all participants having a baseline knowledge of how to use the device. These sessions occurred the week before devices were used in the clinical setting. Each session consisted of 5 or 6 participants and focused on four topics. These included basic expectations of the project, etiquette when using the device, basic terminology and functionality of the device, and completion of several scenarios describing common ways in which the device can be utilized. Each session began with an overview and purpose of the

project, including the expectations and etiquette of using the devices. The devices were then distributed, with a focus on the functionality of the device as well as several scenarios, in order to provide a hands-on approach. The participants were given the device during the training sessions to increase their ability to become more familiar with them before using on the actual units. For 3 months, from the middle of August to the middle of November, participants used the device as a support tool with resources such as videos, articles, reference tools, patient education tools, reference guides, and other memory joggers to assist them as they floated to various units throughout the hospital.

At the end of the 3-month period, participants were e-mailed by the project lead asking them to participate in the completion of three surveys. There were 2 to 3 weeks of open lab times provided through November, in various locations, for convenience around shifts. During this time, a verbal consent process with a script was used before completion of the surveys (see Appendix C). The verbal consent script provided basic information about the study, including confidentiality of data collected. Verbal consent is the preferred method at Children's, in order to keep the data and participants anonymous. The specifics on how to complete the surveys were described clearly on the instruction sheet (see Appendix D). Upon arrival at the lab, participants were given a packet containing the State-Trait Anxiety Inventory, the General Self-Efficacy Scale, and basic Demographic survey, as well as instructions for completing the surveys. Both the STAI and GSE tools were answered as then and now. Specifically, as participants addressed each question from the survey, they answered the question twice. They answered it once from the perspective of how they felt in terms of anxiety and self-efficacy levels prior to (then) the use of the device, as well as a second time from their perspective after (now) the use of the device. The submission of the sealed, completed packet to the researcher was a second consent to use

their data. Participants were each given a $20 Dining Card gift card to be used at participating restaurants at the hospital after completion of the surveys. After the data collection period ended, the researcher began to analyze the data.

Data Analysis

The data were analyzed to determine the acceptance or rejection of each hypothesis of the study using SPSS version 19.0. An alpha level of .05 was used for both research questions to determine statistical significance, while a medium effect size of .4 was used to determine practical significance. Several statistical assumptions were made before running the *t* tests. The statistical assumptions included the following: Observations are independent of each other, the dependent variable is measured on an interval scale, and the differences are normally distributed in the population. The paired samples *t* test assumed that the differences were normally distributed, which was assessed by producing a Q-Q Plot in SPSS. The statistical test, conducted in SPSS, was a paired samples *t* test on each tool to compare the means of the dependent variables of the mobile support device then and now.

Hypothesis 1

The first hypothesis is as follows. There will be a statistically significant decrease in anxiety level, as measured by the State-Trait Anxiety Inventory, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

The STAI scores from then and now were added to determine whether there is a difference in mean between anxiety levels from the use of a mobile performance support device. Statistical significance occurred if the paired samples *t* test was less than .05 between time 2 and time 1. Using a medium effect size of .4 helped to compare the effectiveness, and practical

significance, between usage of the device and anxiety level. If the results were not statistically significant, it could then be assumed that the use of the device had no impact on anxiety level.

Hypothesis 2

The second hypothesis is as follows. There will be a statistically significant increase in self-efficacy, as measured by the General Self-Efficacy Scale, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

The GSE was determined by summation of scores from then and now to validate whether there was a difference in mean between self-efficacy from the use of a mobile performance support device. Statistical significance occurred if the paired samples *t* test was less than .05 between time 2 and time 1. Using a medium effect size of .4 focused on the practical significance between usage of the device and self-efficacy. If the results were not statistically significant, it could be assumed that the use of the device had no impact on self-efficacy.

The demographic data were analyzed using descriptive statistics in SPSS. There was an analysis of the demographic data instrument in order to provide additional information relating to the use of mobile performance support devices.

Summary

Using a combination of three instruments, the State-Trait Anxiety Inventory, the General Self-Efficacy Scale, and a demographic data tool, information was gathered from variable float staff at Children's Medical Center of Dallas. Participants in the study helped determine whether there was a statistically significant difference, and practical significance, in both anxiety level and self-efficacy prior to (then) and after (now) the usage of a mobile performance support device. Data collection was completed via paper surveys, which were distributed and collected

by the researcher. The analysis procedures were identified and carried out using a series of *t* tests in SPSS. Chapter 4 presents the findings of the study.

CHAPTER 4

FINDINGS

Overview

The purpose of the study was to investigate the effect of anxiety and self-efficacy of float staff in a hospital setting through the application of mobile performance support devices. Both float staff nurses and respiratory therapists were measured on their anxiety levels and self-efficacy prior to (then) the use of the device and after (now) using a retrospective pretest and posttest to determine whether there were any statistically significant differences. This chapter presents the data collected and the findings related to the descriptive statistics, instrument analysis, hypothesis analysis, and summary features.

The total number of participants was 45 float staff out of 50 who were distributed a mobile support device at Children's. Participation was based on the staff's willingness to partake in a research study, with a 90% overall participation in completing the surveys. Surveys were assessed for missing data. There were no missing data from the State Trait Anxiety Inventory (STAI) or the General Self-Efficacy Scale; however, there were missing data from the demographic survey. SPSS was used to test for reliability for coefficient alpha and paired samples *t* tests for statistical significance.

Descriptive Statistics

Demographic information was collected from each participant in order to determine different classifications. Survey respondents were 20% male and 80% female; 4% were between 18-25 years old, 56% were between 26-40 years old, and 40% were between 41-60. The ethnicity breakdown consisted of 62% Caucasian, 7% African American, and 13% Hispanic, with 11% classifying themselves in the Other category (7% missing). The highest level of education had a

majority of 53% with a bachelor's degree, while 42% had an associate's degree (4% missing). Registered nurses made up 31% of the participants, while 69% were respiratory therapists. The majority of participants at 71% , had spent 0-5 years floating at Children's. Of 45 participants, 58% floated between 0-2 times per week, 40% between 3-5, and 2% over 8 times per week. Of the survey respondents, 53% reported that they receive resources when they float, while 45% report receiving no resources (2% missing). A majority of the participants, 53%, had used a mobile device similar to the one in the study between 0-2 years; 29% had used one between 3-5 years; and 9%, between 6-8 years, with 9% missing data. (see Table 1).

Table 1

Demographics

Question	Frequency	Percentage
Gender		
Male	9	20
Female	36	80
Age		
18-25	2	4
26-40	25	56
41-65	18	40
Over 65	0	0
Gender		
Caucasian	28	62
African American	3	7
Hispanic	6	13
Other	5	11
Missing	3	7
Highest		
Associate's Degree	19	42
Bachelor's Degree	24	53
Master's Degree	0	0
Doctorate Degree	0	0
Missing	2	4

Table 1 (*continued*).

Question	Frequency	Percentage
Current Role		
RN	14	31
RCP	31	69
Years Spent Floating		
0-5	32	71
6-10	8	18
11-15	3	7
Over 15	2	4
Times/Week Floating		
0-2	26	58
3-5	18	40
11-15	0	0
Over 15	1	2
Resources Provided		
Yes	24	53
No	20	45
Missing	1	2
Years Using Similar Device		
0-2	24	53
3-5	13	29
6-8	4	9
Over 8	0	0
Missing	4	9

The researcher anticipated that the breakdown of roles would be closer to 50% RN and RCP; however, more respiratory therapists participated in the study than did RNs. There was a split in question 9 regarding whether resources are provided to float staff when they move to different units. Of those reporting, all received resources when they float; the types of resources listed on the survey include job aids, tip sheets, team lead resource, computer-on-wheels, and floor binders. A majority of the resources listed were paper-based as opposed to online or actual coworkers on the unit. Questions 3, 4, 9, and 10 had missing data, as reported in Table 1.

Instrument Analysis

The State-Trait Anxiety Inventory differentiates between how an individual is currently feeling versus how one typically feels in regards to his or her anxiety level. The STAI consists of two 20-item scales measuring temporary and permanent levels of anxiety, using a 4-point Likert scale. The first 20 items address how individuals are feeling at a given moment, while the second set of 20 items addresses how they feel in general terms. The General Self-Efficacy Scale helps describe a broad sense of personal competence with which to deal effectively with stressful situations. The GSE consists of 10 items, also using a 4-point Likert scale.

Reliability

Cronbach's alpha was calculated for each of the instruments and then analyzed to determine their reliability, as shown in Table 2. The internal consistency reliability of the STAI and GSE was established for this study using coefficient alpha. The reliability for the STAI overall then instrument was .935, while the overall now was .923, which suggests an excellent reliability. The breakdown of the STAI into state and trait provides greater insight into the instrument's reliability. The state then was .891, while the trait then was .874. The state now reported at .860, while the trait now was .935. These results still reflect a good reliability, with the trait now reflecting the highest reliability. The GSE instrument was also broken down into then and now, with a .907 and .917, respectively. According to Kline (2005), above .90 is an "excellent" reliability coefficient, above .80 is "very good," and above .70 is "adequate."

Table 2

Reliability Coefficients for Instruments

Instruments	Cronbach's alpha
STAI Overall Then	.935
STAI Overall Now	.923
State Then	.891
Trait Then	.874
State Now	.860
Trait Now	.935
GSE Then	.907
GSE Now	.917

Validity

The type of pretest-posttest group design helps control for threats to validity, including history, maturation, instrumentation, and mortality. The group was not tested at different times in vastly different settings between Time #1 and Time #2 because a retrospective pretest was used, thus controlling for differences that may have affected the results. Instrumentation was controlled through the use of self-report surveys instead of observers or interviewers, which may have had an effect on the results. Among those who actually used the mobile device, no one dropped out of the study; however 5 decided not to participate in completing the surveys. The instruments were used in a fashion similar to other studies that had used them, and they measured what they were supposed to measure: anxiety and self-efficacy.

Hypothesis Analysis

Hypotheses were analyzed using paired samples *t* tests to compare the mean of float staff's anxiety prior to (then) and after (now) the use of the mobile device, as well as comparing the mean of float staff's self-efficacy prior to (then) and after (now) using the device. Several

statistical assumptions were made in the previous chapter before running the *t* tests. The statistical assumptions included the following: Observations are independent of each other, the dependent variable is measured on an interval scale, and the differences are normally distributed in the population. The dependent variables were measured on an interval scale using self-report scores with equal intervals between values on both instruments. The observations are independent of each other because it was assumed that no person's score had been influenced by other people's scores. Q-Q Plots were run to determine normal distribution (see Figures 1-4). An extreme value test was also run in SPSS to confirm the Q-Q Plots.

Figure 1 provides a Q-Q plot of the State-Trait Anxiety then, while Figure 2 depicts now, which suggests that the data are normally distributed because the data points are close to the diagonal line; however, one outlier was removed in order for the criteria for the paired samples *t* test to meet the third assumption. This was also confirmed in the extreme values test run in SPSS; however, the following has been noted:

> Box (1953), Norton (1953), Boneau (1960), and many others have investigated the effects of violating, both independently and jointly, the underlying assumptions of *t*. The general conclusion to be drawn from these studies is that for equal sample sizes, violating the assumption of homogeneity of variance produces very small effects. (Howell, 2007, p. 203)

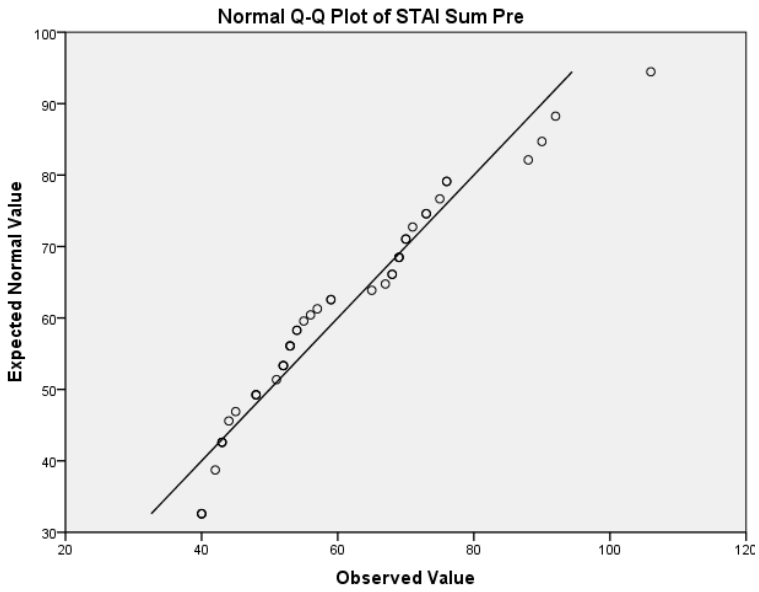

Figure 1. Q-Q plot of STAI then.

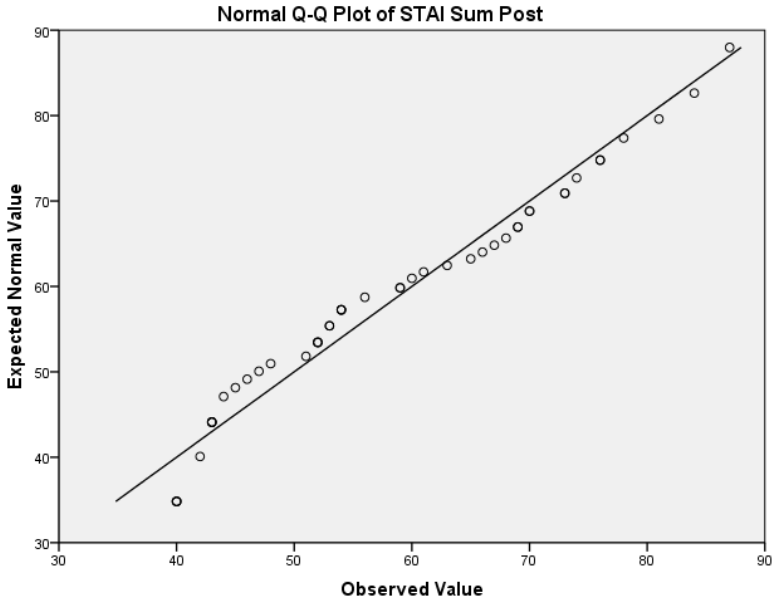

Figure 2. Q-Q plot of STAI now.

H_1: There will be a statistically significant decrease in anxiety level, as measured by the State-Trait Anxiety Inventory, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

A paired samples *t* test was performed to determine whether there was a statistically significant difference between then and now of anxiety levels. Table 3 reflects the analysis, for a 95% confidence rating. The results indicate no statistically significant difference between the mean of anxiety prior to (then) the use of the mobile devices ($M = 59.4$, $SD = 13.96$) and after (now) ($M = 58.2$, $SD = 12.99$) the use of the mobile devices; $t(43) = 1.70$, $p = .096$; thus, the hypothesis is rejected. Similarly, when anxiety is broken into its two components of "state" and "trait," the results are not significant. The results indicate that for the "state" component (Questions 1-20 of the survey), there is no statistically significant difference between the mean of the anxiety prior to (then) the use of mobile devices ($M = 28.9$, $SD = 7.59$) and after (now) the use of mobile devices ($M = 28.3$, $SD = 6.94$); $t(43) = 1.42$, $p = .164$; also, the results for the "trait" component (Questions 21-40) indicate no significant difference prior to (then) ($M = 30.5$, $SD = 7.05$) versus after (now) ($M = 30.0$, $SD = 6.83$); $t(43) = 1.78$, $p = .082$. These results suggest that overall anxiety does not decrease when float staff utilize mobile performance support devices.

Cohen's *d* was determined to be the appropriate measure of effect size to use with paired samples *t* tests. Effect size is a measure of the strength of a relationship between two variables, which indicates practical significance. The Cohen's *d* was determined using an online calculator with the following formula: $d = M_1\text{-}M_2/S_{pooled}$ where $S_{pooled} = \sqrt{(n_1\text{-}1)s_1^2 + (n_2\text{-}1)s_2^2/n_1 + n_2}$ (Becker, 2000). For the STAI data, the *d* was calculated at .09, where .20 is generally an indicator of a small effect; .50, a medium effect; and .80, a large effect size (Cohen, 1988). Breaking down the overall STAI, the "state" *d* was calculated at .08, a very small effect size.

The "trait" *d* was reported as .07, signifying less than a small practical significance for a statistically significant result.

Table 3

State-Trait Anxiety

Dependent Variable	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
Overall Anxiety			1.70	43	.096	.09
Then	59.4	13.96				
Now	58.2	12.99				
State Anxiety			1.42	43	.164	.08
Then	28.9	7.59				
Now	28.3	6.94				
Trait Anxiety			1.78	43	.082	.07
Then	30.5	7.05				
Now	30.0	6.83				

For the second hypothesis, Figure 3 and 4 also provides a Q-Q plot, but with normally distributed data for the General Self-Efficacy then and now; thus meeting the criteria for the paired samples *t* test by removing the same case as an outlier from the anxiety data.

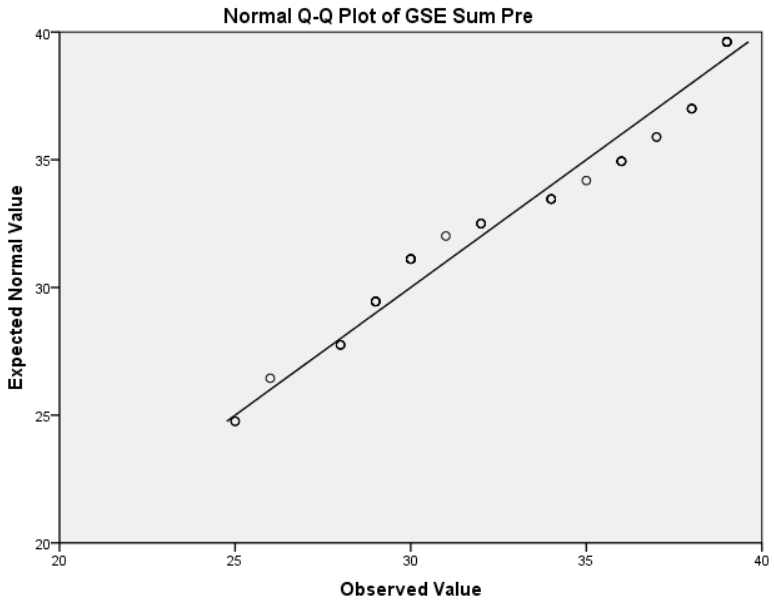

Figure 3. Q-Q plot of GSE then.

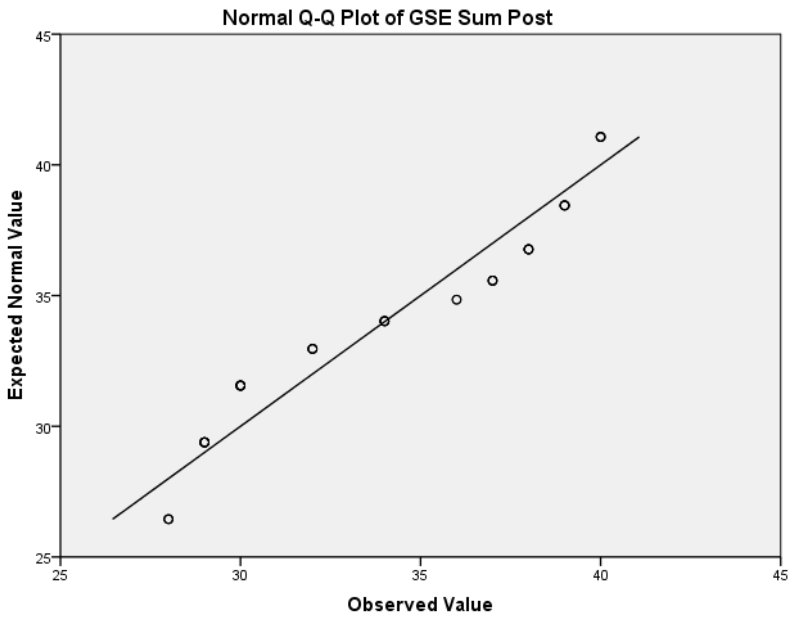

Figure 4. Q-Q plot of GSE now.

$H_{2:}$ There will be a statistically significant increase in self-efficacy, as measured by the General Self-Efficacy Scale, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

A paired samples *t* test was also performed to determine a statistically significant difference between then and now of self-efficacy levels using 95% confidence rating (see Table 4). The results indicate that a statistically significant difference exists between the mean of self-efficacy prior to (then) the use of mobile devices ($M = 33.4$, $SD = 4.22$) and after (now) the use of the mobile devices ($M = 34.1$, $SD = 4.21$); $t(43) = -3.44$, $p = .001$); thus, the hypothesis fails to be rejected. Cohen's *d* was computed, using the online calculator, to be .17, which indicates a very small effect size.

Table 4

Self- Efficacy

Dependent Variable	Mean	*SD*	*t*	*df*	*p*	Cohen's *d*
Overall Self-Efficacy			-3.44	43	.001*	.17
Then	33.4	4.22				
Now	34.1	4.21				

*Statistically significant

Summary

This chapter addressed the data collected and the statistical tests performed, including several *t* tests as well as effect size and instrument reliability in order to validate the hypotheses. Statistical tests included Cronbach's alpha and paired samples *t* tests. From the two hypotheses examined, one (H_2) was found to have statistical significance. Chapter 5 provides a summary of the study, discussion of the findings, and recommendations for future research.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Overview

This chapter includes a summary of the findings section, which provides an overview of the study methodology and results; a conclusion section containing a discussion and inferences of the findings for each hypothesis; and a recommendations section, which provides areas for further research. Implications for the field of performance improvement is also addressed.

Synthesis of Findings

The purpose of this study was to examine both anxiety and self-efficacy of float staff in a hospital setting prior to (then) the use of a mobile device, and after (now), to determine any statistical differences. The study was comprised of 45 float staff, including registered nurses and respiratory therapists, at Children's Medical Center of Dallas. Two self-assessment surveys were administered to the participants after the mobile devices had been used for 3 months. Participants answered the 40 questions of the State-Trait Anxiety Inventory on how they felt about the use of the device then versus now through a retrospective pretest and posttest approach. The same strategy was used for the 10 questions on the General Self-Efficacy questionnaire. The results from the two surveys, as well as the demographic survey were entered into an Excel spreadsheet, assigning each group of surveys a random number. The demographic data collected were utilized to classify the float staff into RN or RCP, as well as a variety of questions concerning floating.

The data for each hypothesis were tested using the paired samples *t* test statistical technique. As a result of the test, Hypothesis 1 was rejected for overall anxiety ($p = .096$, $p <. 05$) and failed to reject Hypothesis 2 for overall self-efficacy ($p = .001$, $p <. 05$). In addition to

the quantitative data, several pieces of anecdotal information were collected. Some comments included, "more Children's specific videos would have added more value," and "supplying clips to attach to our scrubs would have enabled me to carry the device more often." Other suggestions included, "wasn't exactly sure when it was appropriate to use with patients and families," and "videos specific to our floors at Children's would have been helpful." Many of these comments have been considered and addressed in the recommendations for future studies section.

Conclusions

H_1: There will be a statistically significant decrease in anxiety level, as measured by the State-Trait Anxiety Inventory, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

The study found no statistically significant difference in anxiety levels of the float staff prior to (then) the use of mobile performance support devices and after (now). This finding adds to the literature of Strayer and Daignault-Cerullo (2008), which found that using a closed staffing strategy on floating reduces the amount of anxiety related to floating. Since this study showed no effect on the anxiety level through the use of mobile performance support devices, perhaps using a more strategic approach rather than a performance support device can impact the level of anxiety in float staff.

H_2: There will be a statistically significant increase in self-efficacy, as measured by the General Self-Efficacy Scale, of float staff prior to (then) the use of a mobile performance support device and after (now) the use of a mobile performance support device.

The study found a statistically significant difference in self-efficacy of the float staff prior to (then) the use of mobile performance support devices and after (now). Several studies have focused on current float staff attitudes toward the act of floating , including Banks et al. (1999), Lugo and Peck (2008), Nicholls et al. (1996), and Strayer and Daignault-Cerullo (2008), in terms

of needing to find a long-term strategy that float staff can use in order to feel more confident about moving through different units across the hospital. This finding supports the need for implementing an approach to address these issues.

This finding supports the conclusions of Banks et al. (1999) and Lugo and Peck (2008), whose studies focused on providing staff with resources to help mitigate negative feelings towards floating. This finding also adds to the literature of utilizing mobile performance support devices as one of those resources. Mobile devices were not considered a resource in the two studies, but the concept that float staff will be more confident adds to the idea that providing staff with resources can help address negative feelings.

This study helps to support the study of Dominick et al. (2009), which used a support tool on the Internet to increase self-efficacy. This is an addition to the literature suggesting that mobile performance support devices also affect and increase self-efficacy, but with a target audience of float staff in a hospital setting.

While Cibulka and Crane-Wider (2011) focused on nursing students utilizing PDAs as mobile performance support devices, this finding supports the idea that mobile devices impact confidence levels. The PDAs were loaded with content on specific topics familiar to the students, similar to the approach used in this study. Findings from both support the concept that using mobile performance support devices will increase confidence.

Recommendations

1. Additional research is needed to determine whether the devices would have made a larger impact if more specific Children's-related videos were added to the playlist of the devices. Several pieces of anecdotal information were collected in which participants made this request. As each participant floats to a different unit, more specific information about that particular floor

and how it is operated at Children's may influence anxiety and self-efficacy. A limited number of resources and time from the Children's project team limited the ability to create and implement this specific information into a variety of formats onto the actual device.

2. Future studies should focus on using the same approach, but with a completely different audience. New graduate nurses or those interning at Children's could produce different results. Although the literature supports the idea that float staff experience higher anxiety and lower self-efficacy, than other staff members, some literature suggests that new graduates and interns experience some of the same feelings. Using participants who are new to the hospital environment could provide insight into whether mobile performance support devices greatly impact anxiety and self-efficacy. The majority of float staff used for this study had been floating either at Children's or a previous hospital for several years or more. This may have affected true anxiety and self-efficacy, as opposed to participants who are completely new to the hospital environment.

3. All components of this research study should be tested in other hospitals close to Children's to determine whether float staff have similar results on the usage of performance support devices. In order to generalize the findings to float staff in the Dallas/Ft. Worth area, several other hospitals in the area that conduct business in a similar fashion as Children's should be studied.

4. Future studies may implement more specific guidelines on the actual use of the device during the 3-month period. While the researcher allowed float staff to use the device as they saw fit, using guiding principles on when it was most appropriate to use in certain situations could have had a different impact on the results. Perhaps a mentor or coach could be available to each

participant during the first week of the study in order to orient him or her to the device and types of scenarios in which the performance support device would have the most impact on the user.

5. This study did not focus on the impact the device may have had on the patients and families of those float staff using the device. While the participants were allowed to use the various videos and reference tools to educate the patients and families while they were providing care, future studies may focus on also capturing the anxiety and self-efficacy of that particular audience. Comparing similarities and differences between anxiety levels and self-efficacy among float staff, patients, and families could provide additional insight into the impact of using mobile performance support devices.

Implications

Practical

As institutions continually strive to utilize the most appropriate modalities and resources to educate and improve performance, it is apparent through the literature review that the use of new technology is lacking in the hospital setting. With the fast-paced environment of a hospital, it is vital that staff have access to and use the most suitable support tools to improve performance. While many hospitals use state-of-the-art equipment and devices for their patients and families, the same striving for excellence should also be considered for the staff that care for the patients and their families. With hospital staff, especially floaters, always on the move in different departments and patients' rooms, mobile performance support devices are key to giving them the reinforcement, resources, and technology needed to execute their work. With staffing at a low point, hospitals must make every attempt for the staff to work smarter. Being able to use staff where they are most needed and providing them with mobile tools to support their performance can benefit the hospital environment on many levels. It is essential for healthcare

organizations to provide staff with the right technology to maximize resources and increase performance.

Research

While several literature review studies have focused on some parts and pieces of this study, and the results of this particular study support certain aspects of other research, no refereed studies were found which specifically examined float staff using mobile performance support devices as a way to increase self-efficacy. Likewise, in a review of literature, no refereed studies were found which examined float staff using mobile performance support devices as a way to decrease anxiety levels. This study should serve as a starting point for further investigation for examining both anxiety and self-efficacy, and the affect it has on the use of mobile performance support devices. Utilizing a larger sample size and applying the framework to similar hospitals to examine these concepts would strengthen the literature available.

Theory

Through the use of mobile performance support devices, the concepts of modeling, observing, and imitating as the social aspects from Bandura's social learning theory are apparent. Applications or programs available on these devices lend themselves to being observed and imitated while they are correctly modeling how tasks should be completed. The four conditions of modeling align with the usage of mobile support devices. The programs and applications themselves gain the attention of the user through color, animation, and interactivity in order to promote retention. Once users have observed a certain task on the device at the moment they need it, they will likely have an easier time reproducing the same task. Access to the device anytime and anywhere may address the condition of motivation to imitate and perform the task

correctly. Self-efficacy plays a large role in providing the confidence in one's ability to succeed. Using the device as support either prior to, during, or after a certain task lends itself to believing in one's capabilities.

Summary

This study provides a foundation for research related to mobile performance support tools and its affect in a hospital setting. The study found that the tools do increase self-efficacy for float staff, affirming a need to continue to implement strategies to strengthen the act of floating as a viable and resourceful use of staff in a hospital setting. This study also provides useful information to professionals in the field of performance improvement who may consider additional mobile performance support methods for healthcare organizations, as tools become more integrated with new technologies and staff must be flexible to stay mobile across the hospital setting.

APPENDIX A

QUESTIONNAIRES

mind garden

www.mindgarden.com

To whom it may concern,

This letter is to grant permission for the above named person to use the following copyright material;

Instrument: ***State-Trait Anxiety Inventory for Adults***

Authors: ***Charles D. Spielberger, in collaboration with R.L. Gorsuch, G.A. Jacobs, R. Lushene, and P.R. Vagg***

Copyright: ***1968, 1977 by Charles D. Spielberger***

for his/her thesis research.

Five sample items from this instrument may be reproduced for inclusion in a proposal, thesis, or dissertation.

The entire instrument may not be included or reproduced at any time in any other published material.

Sincerely,

Robert Most
Mind Garden, Inc.
www.mindgarden.com

DEMOGRAPHICS

Directions: Please answer the following questions about your background by circling or writing in your response.

1. Gender	Male Female
2. Age	18-25 26-40 41-65 Over 65
3. Ethnicity	
4. What is your highest level of education?	
5. What is your current role at Children's?	RN RCP
6. How many years have you worked in this position at Children's?	
7. How many years have you floated at Children's?	
8. How many times a week do you float to a different unit? (Floating to one unit counts as one time)	
9. Are you currently provided any resources when you float to a different unit?	Yes No If yes, list kinds of resources?
10. How many years have you used a mobile device similar to the mobile device used in this study?	

APPENDIX B

IRB APPROVALS

UNT
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NORTH TEXAS
Discover the power of ideas.

OFFICE OF THE VICE PRESIDENT FOR RESEARCH AND ECONOMIC DEVELOPMENT
Research Services

November 2, 2011

Dr. Jeff Allen
Department of Learning Technologies
University of North Texas

Institutional Review Board for the Protection of Human Subjects in Research (IRB)
RE: Human Subject Application #11-303

Dear Dr. Allen:

The UNT IRB has received your request to modify your study titled "Do Mobile Performance Support Devices Affect Anxiety and Self-Efficacy Levels of Float Staff in a Hospital Setting?" As required by federal law and regulations governing the use of human subjects in research projects, the UNT IRB has examined the request to modify your informed consent process. The modification to this study is hereby approved for use with human subjects.

Please contact Jordan Harmon, Research Compliance Analyst, at (940) 565-3940, or Boyd Herndon, Director of Research Compliance, at (940) 565-3941, if you wish to make changes or need additional information.

Sincerely,

Boyd Herndon for PK

Patricia L. Kaminski, Ph.D.
Associate Professor
Chair
Institutional Review Board

PK/ jh

1155 Union Circle #305250 | Denton, Texas 76203-5017 | TEL 940.565.3940 | FAX 940.565.4277
TTY 940.369.8652 | http://research.unt.edu

UT SOUTHWESTERN MEDICAL CENTER eIRB System

From: Ahamed Idris
Institutional Review Board Chairperson
IRB - 8843

To: Megan Riley

Date: October 27, 2011

Re: Exempt

IRB Number: STU 082011-044

Title: Do Mobile Performance Support Devices Affect Anxiety and Self-Efficacy Levels of Float Staff in a Hospital Setting?

Documents: Protocol

The UT Southwestern Institutional Review Board (IRB) determined on October 26, 2011 that this research is exempt in accordance with 45 CFR 46.101(b). Further review of this study by the IRB is not required unless the protocol changes in the use of human subjects. In that case, the study must be immediately resubmitted to the Board. Please inform the IRB when this research is completed.

If you have any questions related to this approval letter or about IRB policies and procedures, please telephone the IRB Office at 214-648-3060.

Thank You

University of Texas Southwestern Medical Center
Institutional Review Board

5323 Harry Hines Boulevard
Dallas, Texas 75390-8843
Room C1.206
phone: 214-648-3060
fax: 214-648-2171

APPENDIX C

CONSENT SCRIPT

Hello, my name is Megan Riley. I am in the Learning Institute here at Children's Medical Center conducting a study about the use mobile performance support devices for float staff and its possible effects on anxiety and self-efficacy. Your participation is completely voluntary. This means that you do not have to participate in this study unless you want to. Would you be willing to fill out 3 short surveys that focus on these particular areas of interest? The surveys will take you *about 20 minutes of your time. (If yes, continue. If no, thank them for their time).*

Thank you for letting me tell you about the study. The purpose of this research study is to determine if the usage of mobile performance support devices (the iPods you have been using for the past 3 months) have any effect on your anxiety and self-efficacy (or confidence) level as float staff. As part of our formal study, we need you to understand that all information that we collect, will be strictly confidential and will be kept under lock and key.

You will not be identified. Information that would make it possible for anyone to identify you in any presentation or written reports about this study will not be used. There is no expected risk to you for helping us with this study. There are no expected alternatives or benefits to you either. When we get all the information of everyone who has agreed to participate, we will group all together in a report or presentation. There will be no way to identify individual participants.

Remember, your participation is voluntary; you do not have to take part in this study. If you do not agree to verbally consent to participating in this study there will be no risks to you or to your employment here at Children's. To do this research, we will only collect information in survey format that is needed for the research.

Do you have any questions? You may also call Dr. Jeff Allen at 940-565-4918 from the University of North Texas, who is assisting me with this study, with questions about the research. You may also call the UT Southwestern Institutional Review Board (IRB) at 214-648-3060 regarding any concerns you may have about your participation.

Do you want to participate in the study?

APPENDIX D

INSTRUCTION LETTER FOR QUESTIONNAIRES

INSTRUCTION LETTER

Thank you for participating in this research study. As a doctoral candidate at the University of North Texas, I am conducting this study to identify if anxiety and self-efficacy (or confidence levels) are affected as result in the usage of mobile performance support devices (the iPod Touches) by float staff, including both RNs and RCPs here at Children's.

The results and your identity will be confidential and will not be included in the information reported. There are no foreseeable risks and by participating in this study you are helping us identify the best possible ways to implement and use these mobile devices.

The 3 questionnaires included in this packet should take you no more than 10 minutes to complete**. While completing the surveys, please relate the questions to how you feel regarding floating with and without the mobile device. If at any time during the completion of the surveys you wish to discontinue your participation, you will not be penalized.** If you have any questions or concerns, or would like to request a follow-up interview to provide additional information, please use the contact information below. Thank you again for taking the time to participate in this study.

Megan Riley
University of North Texas, Graduate Student

Jeff Allen
University of North Texas, Professor and Committee Chair
940-565-4918
jallen@unt.edu

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