THE STRESS OF EDUCATIONAL PDA TECHNOLOGY

By

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A research paper submitted in partial fulfillment of the requirements for the degree of:

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Washington State University – Spokane
Intercollegiate Center for Nursing

May, 2004
To the faculty of Washington State University:

The members of the Committee appointed to examine the project of Ryan P. Townsend find it satisfactory and recommend that it be accepted.

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Abstract

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This study addresses the stress reported in the utilization of Personal Digital Assistants (PDA's) in Psychiatric Mental Health Nurse Practitioner (PMHNP) students. The purpose of this study is to provide an accurate picture of the perceived stress response of PDA's in graduate nursing programs. Due to the negative impact of stress on learning (McEwen, 2000), there is a need to study stress in response to PDA implementation in the educational setting. Thirteen PMHNP students in the practicum and internship phase of their graduate studies were provided with a PDA manufactured by Symbol and powered by Microsoft Windows CE. Stress response was measured by a 14-item Likert type scale that measures the impact of PDA usage. Results indicate 50% of students perceived stress.

Keywords: PDA, Stress, Psychiatric Mental Health Nurse Practitioner Program
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Abstract

This study addresses the stress reported in the utilization of Personal Digital Assistants (PDA’s) in Psychiatric Mental Health Nurse Practitioner (PMHNP) students. The purpose of this study is to provide an accurate picture of the perceived stress response of PDA’s in graduate nursing programs. Due to the negative impact of stress on learning (McEwen, 2000), there is a need to study stress in response to PDA implementation in the educational setting. Thirteen PMHNP students in the practicum and internship phase of their graduate studies were provided with a PDA manufactured by Symbol and powered by Microsoft Windows CE. Stress response was measured by a 14-item Likert type scale that measures the impact of PDA usage. Results indicate 50% of students perceived stress.

Keywords: PDA, Stress, Psychiatric Mental Health Nurse Practitioner Program
THE STRESS OF EDUCATIONAL PDA TECHNOLOGY

Chapter 1

Introduction and Background

Within the professional nursing environment many types of stressors cause positive or negative impacts. Computer technology provides many potential stressors and may produce anxiety. The Personal Digital Assistant (PDA), a small portable micro-computer, provides practitioners with updated clinical facts and references at the point of patient care (Chin, 2000). Due to the value of the PDA in the healthcare setting, Rice (2003) believes familiarity with the PDA must begin during the educational process. However, learning is hampered due to the negative effects of stress associated with the use of new technology.

In the Pacific Northwest one nursing institution utilizes PDA’s in the Masters of Nursing Psychiatric/Mental Health Nurse Practitioner Program (PMHNP). The PDA was used as a tool to access drug information, document patient findings, and schedule and track personal tasks. This study details the stress frequency reported by subjects during PDA implementation in the educational process.

Statement of the Problem

With all of the changes in educational tools and learning due to the increasing availability of technology, there is a need to evaluate the stress related to this process. To date little is known of the level of stress caused by educational technology at the graduate level for users of PDA technology in the educational process.

Statement of the Purpose

The purpose of this pilot study is to examine the frequency of stress experienced by PMHNP students as they use PDA devices in their practicum and internship clinical courses.
Conceptual Framework

The conceptual model for this study is based upon Callista Roy’s Adaptation Model. Roy’s conceptual model focuses “on the responses of the human adaptive system to a constantly changing environment” (Burgess, 1998, p.51). “Adaptation is the central feature of the model. Problems in adaptation arise when the adaptive system is unable to cope with or respond to constantly changing stimuli” (Burgess, 1998, p. 51).

Roy describes three forms of stimuli, which include focal, contextual, and residual stimuli (Roy & Andrews, 1999). These stimuli are received by the human adaptive system and the result is an adaptation level, which can be integrated, compensatory, or compromised (Roy & Andrews, 1999). The integrated level could be viewed as an optimal level of adaptation, while the compensatory level occurs when the system is challenged and a functional response is made. However, when the integrated and compensatory response is ineffective the resulting adaptation level is termed compromised. Roy’s model indicates this is the point in time where adaptation becomes negative (Roy & Andrews). In response to this decrease in adaptation levels the human adaptation system utilizes coping systems (Roy & Andrews).

Roy’s model states that given any level of adaptation, there are coping mechanisms within the human adaptation system (Roy & Andrews, 1999). Roy terms this cognator and regulator subsystems (Roy & Andrews). The cognator coping subsystem involves cognitive and emotional responses and the regulator coping subsystem involves neural, chemical, and endocrine system responses (Roy & Andrews). As the human adaptation level decreases to a compromised level, efforts to cope utilizing the cognator and regulator subsystems are increased (Roy & Andrews, 1999). When at an optimal level of adaptation the use of these coping subsystems is less needed. The end result of the initial stimuli, adaptation level, and coping efforts according to Roy’s Model is behavior.
Roy’s model suggests that a major stimulus for all individuals is stress. Roy defines stress as:

“the transaction between the environmental demands requiring adaptation and the individual’s cognator and regulator coping processes” (Roy & Andrews, 1999, p. 357).

Selye’s definition of stress which Roy’s definition is partly based on includes that stress is the “state manifested by a specific syndrome which consists of all the nonspecifically-induced changes within a biologic system” (Selye, 1976, p. 64). This study will use Roy’s definition based on Selye’s definition to define stress.

The adoption of new technology results in individual stress adaptation. This adaptation includes a behavioral response. The behavioral response is defined by a series of extraneous factors, including the environmental demands, the prior experience with technology, and the individual’s resiliency or ability to cope. While the level of stress associated with the adoption of new technologies varies depending on the individual and background characteristics, there is a behavioral response which may affect the student’s learning experience (Dupin-Bryant, 2002).

However, the use of new technology contains a behavioral response directly associated with the technology and independent of the students’ learning goals or environment. The amount of stress directly associated with the technology is dependent on the individuals’ familiarity with that technology or ability to cope, and to some extent, technology in general. Some individuals who grew up using computers may be less uncomfortable with new technologies than those who have not (Dupin-Bryant, 2002) which based on Roy’s model delineates what level of adaptation they are operating at.

The stress stimuli directly associated with the adoption of new technology is variable and may be different with different technologies. This variable stress response results in different levels of adaptation, which in turn may affect the student’s behavior or learning experience.
Thus, a key element in using new technologies in educational settings must be an evaluation of the level of stress associated with the use of PDA's for educational uses.

**Literature Review**

There are many studies that focus on the subject of stress and learning (Bremner, et al., 2004). It is well known that “repeated stress also impairs cognitive function in animal models and repeated glucocorticoid elevation or treatment in humans is accompanied by cognitive dysfunction” (McEwen, 2000, p. 727). Other studies have examined physiological mechanisms and established that high levels of glucocorticoids adversely affect memory function (Roozendaal, 2002, p. 578). The literature indicates that the negative effects of stress on learning “include cognitive impairment on spatial recognition memory and increased anxiety” (McEwen, 2003, p. 202).

The literature about stress in response to PDA use in school is sparse. However, a related topic in the literature is computer anxiety. Anxiety is an important manifestation of stress. Table 1 outlines some of the literature reviewed on the topic of computer anxiety and the findings. Since the PDA is a micro computer, these findings may extend to its educational use.

**Table 1:**

<table>
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<tr>
<th>Author/ Year</th>
<th>Conceptual Focus</th>
<th>Findings</th>
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<tr>
<td>Yang, H.H., Mohamed, D., &amp; Beyerbach, B. (1999).</td>
<td>An investigation of computer anxiety among vocational-technical teachers</td>
<td>Identifies that technology can effect education negatively. COMPAS scale used to identify</td>
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</table>
The literature indicates that "30-40% of the population" experience computer anxiety (Orr, n.d., ¶3). This anxiety is prevalent even in college students. Gos reports computer anxiety "afflicts one third of college students" (Gos, 1996, ¶1). Methods of decreasing anxiety include a comfortable environment, computer exposure, computer experience, and a capable instructor (Benson & Yang, 1999; Dupin-Bryant, 2002; Orr, n.d.; Selwyn, 1997). However, one report notes negative correlations between anxiety and performance despite training and usage (Speier, Morris, & Briggs, n.d.). Some evidence indicates computer anxiety leads to computer avoidance (Lian, 1997).
The literature documents that stress impacts learning and that computers in educational environments may produce similar anxieties to that described in the literature. PDA’s are microcomputers and the anxiety generated by the use of computers is directly applicable to PDA’s.

Understanding the stress associated with the use of the PDA’s is needed because of the professional demands in medicine and education (Table 2).

Table 2:

**Literature review on the value and capabilities of PDA’s.**

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<tr>
<th>Author/Year</th>
<th>Conceptual Focus</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fonteio, P., Ackerma, M., &amp; Locatis, C. (2003).</td>
<td>PDA to access knowledge sources in a wireless setting.</td>
<td>Evidences increasing use of handhelds and ability for mobility due to wireless networks. Evidences 25% increase in use among MDs.</td>
</tr>
<tr>
<td>Grasso, B.C., &amp; Genest, R. (2001).</td>
<td>Reduction of errors in discharge medication lists by utilizing PDAs.</td>
<td>Evidences discharge medication lists error rate of 22% when handwritten versus 8% when utilizing PDAs.</td>
</tr>
<tr>
<td>Chin, T. (2000).</td>
<td>Pilot project utilizing PDAs to download patient data.</td>
<td>Evidences the value of using PDAs with instant patient databases to give answers at point of care.</td>
</tr>
<tr>
<td>Wilcox, R.A., &amp; La Tella, R.R. (2001).</td>
<td>Utilizing PDAs at the point of care.</td>
<td>Evidences that 50% of surveyed individuals cited that using a drug database “prevented at least one adverse drug event per user per week.” Evidences that future use of PDAs by MDs will be as essential as a stethoscope.</td>
</tr>
<tr>
<td>Duncan, R.G. &amp; Shabot, M.M. (2000).</td>
<td>Secure remote access to a clinical data repository using wireless PDA.</td>
<td>Evidences the ability to have confidentially and security in using PDAs.</td>
</tr>
</tbody>
</table>
PDA literature indicates usage is increasing within the healthcare professions because the PDA is a valuable tool. Reports state that the PDA is valued for its mobility and the wealth of data that can be accessed by providers at the point of care for patients (Chin, 2000; Fontelo, Ackerman, & Locatis, 2003; Martinez de Castro, 1997). The literature also supports decreases in medication error rates and adverse drug events due to PDA utilization (Grasso & Genest 2001; Wilcox & La Tella, 2001). Studies indicate that PDA’s can ease the provider burden in scheduling, billing, and overall communication (Blackman, Goman, Lahensohn, Kraemer, & Svingen, 1999). PDA’s can maintain security and confidentiality, which is so important in the healthcare arena (Duncan & Shabot, 2000). Wilcox and LaTella (2001) argue that PDA’s will become to some providers as important as the stethoscope in terms of providing care.

The literature argues for educational use of PDA technology in healthcare learning environments. Rice (2003, ¶ 1) when addressing PDA’s and deficits in care in rural areas stated:

“The advent of the Personal Digital Assistants and their use in health care possess the potential for resolving many of these resource problems. Yet, health care professionals familiarity with the PDA’s must begin in their educational programs.”

In support of this need for familiarity with PDA’s in educational programs the National League for Nursing (2002) “made ‘infusing technology into concepts, structures, and processes of nursing education’ one of the nursing education research priorities to ensure nursing graduates’ competency for the 21st century” (McCannon & O’Neal, 2003, p. 338). This position by the National League of Nursing supports use of new technologies in the PMHNP program.

Yet, there is little information on the level of stress directly associated with the use of the PDA. The current literature does not address the stress involved in using PDA’s in healthcare education. When posed with this issue the need for this study on stress associated with PDA usage in educational health care settings becomes increasingly important.
Research Question

A descriptive correlational design was chosen to describe the occurrence of stress associated with the use of PDA's in PMHNP students. The research question addressed in this study is: What is the frequency of stress responses in PMHNP students in the process of utilizing Personal Digital Assistants in the PMHNP program practicum and internship clinical courses?

Definition of Terms

A clarification of terms is necessary to define certain conditions utilized in this study. For this study, the central concepts will be defined as follows:

Stress will be defined as “the transaction between the environmental demands requiring adaptation and the individual’s cognator and regulator coping processes” involving neuroendocrine responses which Seyle termed the “general adaptation syndrome” (Roy & Andrews, 1999, p. 357).

Personal Digital Assistant (PDA) will be defined for this study as a personal digital assistant manufactured by Symbol, powered by Microsoft Windows CE with Dr. Drug pharmacy application and scheduling capability.

Blackboard is defined as “a Web-based server software platform that offers industry-leading course management, an open architecture for customization and interoperability, and a scalable design that allows for integration with student information systems and authentication protocols” (Blackboard, 2004).

Whets or the Washington Higher Education Television System is defined as “interactive video technology that delivers courses to WSU campuses and learning centers across the state. WHETS utilizes compressed video and other synchronous technologies including videostreaming to share courses and provide videoconferencing to students, facility and administrator throughout the WSU community” (WHETS, 2004).
Significance to Nursing

There is limited nursing knowledge on the usage of educational technologies and the resulting student stress. The stress impact of PDA technology needs to be assessed due to the negative effects of stress on learning (McEwen, 2000). Currently, there is sparse information on the stress associated with educational technology in the form of PDA's. However there is

Acknowledgements

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First I would like to thank my committee on this clinical project. Your time, effort, and feedback were greatly appreciated. You have assisted me in finishing a project that I can be proud of.

Dr. Michael Rice, thank you for being a promoter of the students you teach, you have been an awesome resource and mentor through this process.

And most importantly to my wife, Kristin, you are my driving force. My life has been so much brighter with you along my side! The achievements in my life would not be possible without your smile and loving support.

To my children Caden, Paige, and Lance, everyday I leave the house to go to work or school, I think of all of you, and how much love I have for you.

To my mother, Cheri, you have been gone for some time now, however, I think of you everyday! You always believed in me, and that has given me the courage to dream big dreams, what a wonderful gift!

And lastly to my Dad, you have had high expectations from day one, thank you so much for expecting the most of me! I love you!
Chapter 2- Method of Study

Introduction

This chapter covers the descriptive correlational design of the reported stress of using a personal digital assistant during practicum and internship phase of the PMHNP program. The chapter includes a clarification of the terms pertinent to the highly technological setting described in this study and identifies the population who engaged in PDA utilization. Also presented is the scale used to identify the stress frequency of PDA utilization and the rationale for this use of this new scale. The data collection and data analysis procedures utilized to uncover the importance of this study’s findings is reported in this chapter as well.

Design

This study utilized a descriptive correlational design to provide more information on the phenomena of stress occurrence in response to Personal Digital Assistant utilization of PMHNP graduate students in their practicum and internship clinical courses.

Setting for Study

The settings for this study included the rural and medically underserved clinical sites where the graduate students used the PDA’s in their practicum and internship clinical courses. Over seventy percent of these sites are located in rural and medically underserved areas which extended over 100,000 square miles (Rice, 2003). Medically underserved areas lack mental healthcare provider service (United States Department of Health and Human Services, 1997). The goal of the nursing college in this study is to increase the number of PMHNPs who practice in rural underserved areas (Rice n.d.). Rural students use distance educational technologies to complete their degrees. The purpose of PDA implementation was to increase informational resources for rural providers.
The “Stress of Educational PDA Technology” scale was available on the web via Blackboard (Appendix A). The Blackboard site was available for students and printed copies of the scale were mailed to students at study sites as well. Thus, students in far flung rural areas, often more than 100 miles from the main campus, could answer the scale anywhere they could log on to the school Blackboard site.

**Population and Sample**

The sample available for this study was the graduate students at the nursing college who in the PMHNP program in their advanced practicum and internship clinical experiences.

**Sample Criteria**

The sample met the following criteria:

1. were 21 and older,
2. included males or females,
3. included all ethnic backgrounds, and
4. there were no restrictions placed on income, current job classification, or race or setting of clinical experience.

Inclusion criteria also included that the student were in the graduate ICN PMHNP program of study. All participants had to be in the practicum phase or internship courses in the PMHNP curriculum.

**Data Collection Procedure**

Data collection occurred during clinical practicum and internship courses. For the Spokane and Tri Cities graduate students, all data were collected from the Blackboard site and printed copies filled out by students. Students in Vancouver mailed a copy of the scale via WSU courier service to the investigator.
Instrumentation: Reliability and Validity

In order to measure the stress of PDA utilization a scale needed to be developed due to the lack of identification of a preexisting scale within the literature. The “Stress of Educational PDA Technology” scale is a modified stress scale originally designed by Horowitz (1979) to measure traumatic stress responses. Approval was given to use this scale by Mardi Horowitz. This scale was then modified to gauge the level of stress associated with using PDA technology. The reliability of this scale was unknown prior to this study as it was a new scale.

The original stress scale by Horowitz had 15 items. However, as one of the items did not have relevant face validity for this investigation, “The Stress of Educational PDA Technology” scale was modified to 14 items. Each of the 14 items were altered to address the issues of stress response to using PDAs. The scale asks students to rate perception with answer values ranging from 0-five points using a Likert type scale. Answers indicating more stress are given a value of 5 and conversely answers that indicate no stress are given a value of zero. The values are then totaled for all items on the scale.

Data Analysis

Once the results were collected from Blackboard and printed copies obtained from students the data analysis was performed. All responses were printed out on paper and scored. The paper copies were stored in a file only accessible to the investigators in this study. Data were entered from these paper copies into SPSS 10.1, which is a computer program that is utilized for data entry and compiling statistical results. Internal consistency of the scale was established, statistical tests on the data included “frequency distributions, percentages, proportions, percentiles in text, histograms, tables, and graphs” (Ryan-Wenger, 1992, p.392). Correlations between survey questions were performed. The rationale for using these tests is based on the
recommendations of Ryan- Wenger’s (1992) critique guidelines, which indicates these tests are appropriate for the descriptive research question under investigation in this study.

Human Subjects Consideration

WSU-IRB gave approval to work with human subjects. Each participant signed a research participation consent prior to study enrollment (Appendix C) for the parent study. An amendment approved by the IRB allowed for “The Stress of Educational PDA Technology” scale. Participants could ask questions prior to enrollment. Signed consent pages were collected by the primary investigator and filed with the parent study.
Chapter Three-Findings

Results

The data for the study were analyzed in terms of the sample, reliability of the instrument, frequencies and relationships among the variables.

Sample Characteristics

Sample demographics of thirteen subjects were collected separate from the scale data. The sample was 76.9% female and 23.1% male. About half of the sample (53.8%) was age 40-49. Twenty three point one percent of the sample were 30-39 years old and 23.1% were 50-59 years old. The sample lived in both urban and remote site campuses. A total of 61.5% of the sample utilized the main campus and 38.5% utilized outreach program sites. Five responders reported completing the stress survey during the first third of the semester and 80% perceived their computer ability as intermediate, 20% stated they were experts.

Scale Reliability

“The Stress of Educational PDA Technology” scale consisted of 14 items after modification. The scoring assigned answers values ranging from 0-five points. Answers that indicate a more stress are given a value of 5 and conversely answers that indicate no stress are given a value of zero. The breakdown of scores for this study comprised of three total scale scores below 8, five scores in the 9-25 range, and five scores greater than 26. The highest score was a 45 and the lowest score was zero. The average score for all of the students was 21.5.

The reliability of “The Stress of Educational PDA Technology” was determined using SPSS. Analysis of the data indicated that the Crohnbach’s alpha was .76. The reliability estimate of .76 indicated that the scale had a strong level of internal consistency.
Frequency of Stress Responses

The analysis of the data indicated that there were some variances in the student responses. Several of the students felt that the PDA’s interfered with their learning. Almost half, (46.2 percent) of the subjects provided answers that ranged from “rarely,” “sometimes,” or “often” about feelings that the stress of using the PDA devices interfered with their learning (Figure 1).

Figure 1: Bar Graph on “The stress of using my PDA interferes with my learning.”

The scale determined that 46.2 percent of subjects became upset when they thought about using the PDA (Figure 2).

Figure 2: Bar Graph on “I got upset when I thought about using my PDA.”
Also 53.8 percent of subjects felt some degree of being overwhelmed by their feelings about PDA usage (Figure 3).

Figure 3: Bar Graph on “I was overwhelmed by my feelings of PDA usage.”

When prompted with “I tried to talk about the PDA use to get more comfortable” 61.5 percent of subjects responded “rarely,” “sometimes,” or “often” (Figure 4).

Figure 4: Bar Graph on “I tried to talk about the PDA use to get more comfortable.”

Non stressed Students

While approximately half of the subjects had problems with the use of the PDA’s, a significant percentage of the subjects were not stressed with the use of the PDA’s. Analysis of Figures 1-2, indicate that greater than 50% of the subjects were not bothered at all by the adaptation of the PDA’s. This subset of the sample consistently reported comfort in the use of the PDA’s. As indicated in Figure 5, 46.2% of subjects were not overwhelmed with the use of
PDA’s. However, in Figure 6, the percent that not distressed by the use of the PDA’s dropped to 38.5%, but this was still a large section of the population.

Figure 5: Bar graph on “I was overwhelmed by my feelings of PDA usage.”

Figure 6: Bar graph on “I tried to talk about the PDA use to get more comfortable.”

The data identified two different sets of responses in this study. One group did not display a stress response in adapting to PDA technology and the other group reported stress. This is best represented in Figure 7, which is the sum of scale answers plotted on a bell curve. The size of these two groups is almost equal as indicated by the graph.
Relationships Between Feelings

Relationships between the variables were analyzed using Pearson’s correlations (Table 3). Strong relationships above .7 were found to exist among scale items that indicate a negative level of stress. An example would be the scale item “I got upset when I thought about using my PDA” and the scale item “the stress of using my PDA interferes with my learning” had a .974 correlation (p=.001). However, the same scale item “I got upset when I thought about using my PDA” had weak correlation with positive scale items such as “I had thoughts on how to use PDA in clinical” resulting in an insignificant correlation. The correlations generally indicated consistently strong relationships between items that reflect negative levels of stress. The analysis indicted that those who had stress consistently had stressful responses through out the use of the PDA’s.
### Correlations Table

<table>
<thead>
<tr>
<th></th>
<th>The stress of using my PDA interferes with my learning</th>
<th>I got upset when I thought about using my PDA</th>
<th>I tried to remove thoughts of POA from my memory</th>
<th>I had trouble falling asleep or staying asleep</th>
<th>I did not have strong feelings about PDA usage</th>
<th>I did not have dreams about PDA usage</th>
<th>I stayed away from reminders of PDA usage</th>
<th>Thoughts about PDA usage pop into my mind</th>
<th>Other things kept making me think of PDA usage</th>
<th>I was not aware that I had feelings of PDA use</th>
<th>I tried not to think of PDA use</th>
<th>I tried to talk about the POA use to get more comfortable</th>
<th>Thoughts about POA usage pop into my mind</th>
<th>I was overwhelmed by my feelings about PDA usage</th>
<th>Correlation is significant at the 0.01 level (2-tailed).</th>
<th>Correlation is significant at the 0.05 level (2-tailed).</th>
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<tbody>
<tr>
<td>The stress of using my PDA interferes with my learning</td>
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<td>I got upset when I thought about using my PDA</td>
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<td>I tried to remove thoughts of POA from my memory</td>
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<td>I had trouble falling asleep or staying asleep</td>
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<td>I did not have strong feelings about PDA usage</td>
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**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).
Qualitative Data

Two qualitative interviews were conducted with two participants within the sample population. The results of their answers to questions on PDA use and “The Stress of Educational PDA Technology” follow:

Participant One

1. What was the Experience like when you first learned to use the PDA? “For the most part I had a trouble free experience.”

2. Will you help me understand your reaction to the questions on the survey? “Yes.”

3. As I review the survey items please respond (read each item). Question One- “Good question, PDA use can obviously affect people.” Two- “Bad question, I would like the word frustrated instead of upset, upset is too heavy.” Three- “Too weighty in terms of description.” Four- “The same as #3, too heavy in word usage.” Five- “Seems like a double negative- these double negative questions are always confusing.” Six- “I can’t imagine someone getting this stressed.” Seven-“Too heavy.” Eight- “This is a good question, worded well and applicable.” Nine- “Valid question as well.” Ten-“Too heavy again in terms of wording.” Eleven- “Makes no sense to me in wording.” Twelve- “I like this question, it applies well to the process of using PDAs.” Thirteen- “Same as twelve, good question.” Fourteen-“I can imagine some people having stress, so again this is a good question.”

4. Is there anything else you want me to know about your PDA experience? “No, for me it went pretty well.”

Participant Two

1. What was the Experience like when you first learned to use the PDA? “I am an advanced user and it did not have much impact.”

2. Will you help me understand your reaction to the questions on the survey? “Sure.”
3. As I review the questions on the scale please respond (read each item). Question one- "Good question based on the fact that some users may have stress." Two- "O.K question." Three- "Again O.K. question." Four- "Too strong of language, I can't imagine someone having such a response." Five- "O.K question." Six- "Needs wording." Seven- "O.K." Eight- "O.K." Nine- "This is not a bad question." Ten- "This is a strangely worded question." Eleven- "O.K." Twelve- "This is understandable that you would ask this question." Thirteen- "Good question." Fourteen- "Strangely worded." 

4. Is there anything else you want me to know about your PDA experience? "It is hard for me to understand that someone would have such a stressful time with PDA's but after thinking about your question as asked to this type of person, I guess it could be. But these are my thoughts on the questions from an advanced user."

The summary of these interviews indicates that these users may be of the non-stressed population and it would have been helpful to interview a sample of the stressed group. The individuals did not elaborate much when posed with questions. The two participants seemed to feel that the wording could be changed to reflect less of an impact. However, these two participants as stated are apparently of the non-stressed population in response to technology so this may not be the opinion of the stressed population. The summary of these interviews supports Roy's model in that these participants may have had an optimal level of adaptation due to the strength of their coping subsystems given their indication of being intermediate or advanced users.
Chapter IV

Discussion and Implications

A review of the existing literature, both on computer anxiety and the increased importance of PDA’s in clinical care, highlights the importance of this investigation. Stress negatively impacts learning and there is good support that computers produce anxiety for a portion of the population (Gos, 1996; McEwen, 2000; McEwen 2003; Orr, n.d.). It is important to identify the stress associated with micro-computers, like PDA’s, which have become increasingly common in educational settings.

The results of this study indicate that approximately 50 percent of the subjects experience a significant amount of stress when beginning to use PDA’s for educational purposes. These results were generated from a sample group that could be considered technologically savvy given the environmental emphasis on technology in the nursing college. The findings on the level of stress in this investigation exceed the rate of stress reported by Orr (n.d.). Yet findings in a technologically sophisticated environment may hold even more significance in technologically naïve populations.

The “Stress of Educational Technology Scale” results indicate two distinct populations in the study. One group is not stressed by the use of technology, and one group affected by stress response. The scale presents the ability to identify these groups very clearly. The implementation of this scale prior to introducing PDA technology may be effective in identifying those with stress so that interventions may be put in place to lessen the stress response.

Prior to this study, no investigations reported on the level of stress caused by using PDA technology in the nursing graduate educational process. This pilot study identified the stress associated with the implementation of a new educational technology in the PMHNP students. Results suggest the need for a larger study. Future research could also focus on interventions
that may lessen the stressful impact observed in approximately 50% of the sample. Interventions can impact the educational process of all students using sophisticated technology.

**Limitations**

When analyzing the limitations of the study one key limitation was the fact that study design did not connect the demographic information with the scale data. As a result, correlations between stress responses and demographic characteristics were prevented. Also due to the nature of the study, the sample utilized only thirteen subjects. While this is an adequate size for a pilot study, the sample is not large enough to generalize to many populations.

A second environmental element impacting the study is that the students were not technology "naïve." Since much of the educational program emphasized distance educational technologies, a fair percentage of the students have never been to the main campus (Rice, 2003). This means students experienced a variety of educational technologies such as “Whets” microwave technology, IP based videoconferencing, and internet “Blackboard” courses. The students in the program may have a higher threshold and tolerance for stress associated with using educational technology. Thus, both the positive and negative responses to the stress associated with the PDA’s found in this investigation may not reflect the stress experiences by technologically naïve populations. Even though the nursing college in this study has one of the largest enrollments of any Psych NP program, there are not a great number of students enrolled in the final clinical courses.

A final, and major limitation in the study is the environment in which the students used the PDA’s. Due to the emphasis on distance education, there are two aspects that affect their responses of the students. First, in the clinical practice arenas, 70 of all clinical sites are located in rural and medically underserved areas. This requires that the student be more self reliant, but also results in isolation from technological support. Any problems and issues associated with the use of high end technologies require the students to self manage problems.
Appendix A

Impact of Educational Technology Scale

Instructions: Below is a list of comments made about the use of technology in education and the responses to events surrounding learning the use of technology. Read each item and decide how frequently each item was true for you during the past seven (7) days. If the item did not occur during the past seven days, chose the "Not at all" option. Please complete each item. Please indicate how PDA usage has affected you by answering the following questions.

Question 1  Multiple Choice
The stress of learning the PDA interferes with my learning.

☐ Not at all
☐ Rarely
☐ Sometimes
☐ Often

Question 2  Multiple Choice
I got upset when I thought about using the PDA.

☐ Not at all
☐ Rarely
☐ Sometimes
☐ Often

Question 3  Multiple Choice
I tried to remove thoughts of the PDA from my memory.

☐ Not at all
☐ Rarely
☐ Sometimes
☐ Often

Question 4  Multiple Choice
I had trouble falling asleep or staying asleep, because of thoughts about PDA use.

☐ Not at all
☐ Rarely
☐ Sometimes
☐ Often

Question 5  Multiple Choice
Question 6

I did not have strong feelings about PDA usage.

- Not at all
- Rarely
- Sometimes
- Often

Question 8

I tried to talk about the PDA use to get more comfortable with it.

- Not at all
- Rarely
- Sometimes
- Often

Question 9

Thoughts about PDA use pop into my mind.

- Not at all
- Rarely
- Sometimes
- Often

Question 10

Multiple Choice
Question 10
Other things kept making me think of PDA use.

Not at all
Rarely
Sometimes
Often

Question 11
Multiple Choice
I was not aware that I had feelings about PDA use.

Not at all
Rarely
Sometimes
Often

Question 12
Multiple Choice
I tried not to think about PDA usage.

Not at all
Rarely
Sometimes
Often

Question 13
Multiple Choice
I had thoughts about how to use the PDA in clinical.

Not at all
Rarely
Sometimes
Often

Question 14
Multiple Choice
I was overwhelmed by my feelings about PDA usage.

Not at all
Rarely
Sometimes
Often
MEMORANDUM

TO: Michael Rice
   Intercollegiate College of Nursing, Spokane

FROM: Jamie Murphy (for) Cindy Corbett, Chair, WSU Institutional Review Board (3140)

DATE: 12 September 2003

SUBJECT: Approved Human Subjects Protocol

Your Human Subjects Review Summary Form and additional information provided for the proposal titled "Enhancing Rural Mental Health Education Using PDA's," IRB File Number 5417-b was reviewed for the protection of the subjects participating in the study. Based on the information received from you, the WSU-IRB approved your human subjects protocol on 6 March 2003.

IRB approval indicates that the study protocol as presented in the Human Subjects Form by the investigator, is designed to adequately protect the subjects participating in the study. This approval does not relieve the investigator from the responsibility of providing continuing attention to ethical considerations involved in the utilization of human subjects participating in the study.

This approval expires on 4 March 2004. If any significant changes are made to the study protocol you must notify the IRB before implementation. Request for modification forms are available online at http://www.ogrd.wsu.edu/Forms.asp.

In accordance with federal regulations, this approval letter and a copy of the approved protocol must be kept with any copies of signed consent forms by the principal investigator for THREE years after completion of the project.

This institution has a Human Subjects Assurance Number FWA00002946 which is on file with the Office for Human Research Protections. WSU's Assurance of Compliance with the Department of Health and Human Services Regulations Regarding the Use of Human Subjects can be reviewed on OGRD's homepage (http://www.ogrd.wsu.edu/) under "Electronic Forms," OGRD Memorandum #6.

If you have questions, please contact the Institutional Review Board at OGRD (509) 335-9661. Any revised materials can be mailed to OGRD (Campus Zip 3140), faxed to (509) 335-1676, or in some cases by electronic mail, to ogrd@mail.wsu.edu.

Review Type: MOD OGRD No.: NF
Review Category: XMT Agency: Suffolk Community College-Symbol Technologies
Date Received: 8 September 2003
Appendix C

Enhancing Rural Mental Health Education Using PDAs

INFORMED CONSENT

A. Invitation to participate

You are invited by Michael J. Rice, Associate Professor at the Intercollegiate College of Nursing to take part in a research study about the use of PDAs to enhance Psych NP Education. The goal of the study is to evaluate the use and effectiveness of using PDAs in Psych NP education. Your agreement to take part in this study is voluntary and of your own free will. The ICN and Washington State University Institutional Review Board (IRB) have approved the use of human subjects for this study.

B. Purpose of the study

This study is examining the enhancement of clinical education through the use of PDAs and drug data bases. You are asked to take part in this study because you are a student here at ICN and involved in clinical experiences as part of your training. If you agree to take part and be a subject in this study, you will be given a PDA and asked to use that PDA during your clinical experiences with clients. You also be asked to complete surveys at designated times during the year.

C. Explanation of protocol

After agreeing to take part in this study, you will need to sign this consent form. You will be asked to participate in a MIRA videoconference on the use of the PDAs. You will then be given a pretest and a post test on the use of the PDA at the start and end of the semester. You will also be asked to complete a brief PDA evaluation after each use of the PDA in the clinical setting. The test is a brief Excell spread sheet that takes less that two minutes to complete. During the course of the semester, you will be asked to connect the PDA to a special web page on a weekly basis in order to down load information and to update your drug and health data bases. You will also be asked to complete a 14 item scale entitled the “Impact of Educational Technology Scale” which measures the effects of using PDAs during your education at weeks, 2, 8 and 14. The entire set of instruments will take less than 10 minutes of your time at each survey period.

D. Potential risks and discomforts

There are no known risks to this study. I have made every effort to provide complete confidentiality and privacy so no one will know you have taken part in this study. All of your personal information is protected by giving you with a study number. Your name and study number are kept in separate files, and are available only to myself and the research team as needed. All research information and personal identifying information will be kept in locked files that can be opened only by myself and the research team.

You may choose not to continue at any time during the study. Your choice not to continue will not affect your relationship as a student here at ICN in the Psych NP program.
You may choose to answer as many or as few of the questions as you choose. You may stop or withdraw at any time.

E. **Potential benefits**

You will benefit by receiving free training on the PDA's, free access to data based health programs and learn a time saving skill. This will hopefully teach you skills that can be used after graduation in rural and medically underserved communities.

F. **Assurance of confidentiality**

Information obtained as part of this study will be strictly private and confidential. The information will be used only for research. The number code with your name will be available only to myself and research team. The completed information taken from subjects will be kept in a locked file and destroyed at the end of this study. At no time, will your study number and personal information be available to anyone but the research team. Study results will be reported only as part of a larger group.

G. **Withdrawal from the study**

Your agreement to take part in this study is voluntary. If you agree to take part, you may choose to stop and withdraw your consent at any time.

H. **Informed consent**

1. I, as shown by my signature below, fully understand the study goals, procedures and risks that go along with taking part in this study.
2. I, as shown by my signature below, understand that taking part in this study is of my own free will and that I may stop at any time.
3. I, as shown by my signature below, give permission to Michael Rice to use and get rid of the information and findings from this study. I understand that the investigator and other professionals who work with the investigator agree to protect the privacy and confidentiality of the information gathered during this study within the limits of Washington State Law.

I have read and understand the above conditions. I have had the chance to ask questions about the study and the methods used to collect the study information. These questions have been answered to my satisfaction. I have read and understand the study and have received a copy of this form.

I may contact Michael Rice at the ICNE, 509-324-7256 to get information or ask questions I may have about this study at any time.

Subject's Signature __________________ Date ____________

Investigator's Signature __________________ Date ____________
References


McCannon, M., & O'Neal, P.V. (2003). Results of a national survey indicating information technology skills needed by nurses at time of entry into the work force. *Journal of Nursing Education, 42*(8), 337-340.


