

ORIGINAL RESEARCH

# The effects of technology on stress and coping strategies in nurse educators

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## ABSTRACT

The purpose of this study was to investigate the relationships among the independent variables of age, gender, years of experience as a nurse educator, and previous technology training, and the dependent variables of feeling compelled to respond to students after hours, level of stress experienced by nurse educators with technology (in general), and level of stress experienced by nurse educators with technology in the classroom/clinical setting. The researcher also investigated the coping strategies demonstrated by these nurse educators. The target population was defined as master's prepared nurse educators in a nursing program who utilize technology while teaching a nursing theory or clinical course. Of the thirty-six inquiries sent, twenty-two subjects participated in the voluntary survey, resulting in a 61% response rate. Overall, the independent variables were found to not be significantly associated with the measure of the dependent variable of overwhelming feelings of stress or anxiety related to technology. For the measure of the dependent variable of "feeling compelled to answer emails/texts after hours", age was the only significant predictor. It is now ever more important for nursing faculty to engage in life-long learning in informatics. Deans need to support IT initiatives, and ensure that all faculty members have competency in computer literacy during the interview process.

**Key Words:** Technology, Nurse educator, Stress

## 1. INTRODUCTION

The need to prepare technologically competent nurses in the workforce is forcing nursing curricula to incorporate IT into the nursing programs. The literature supports this curricula change due to the fact that "findings from technology-based intervention research have indicated that IT can enhance student learning in academic programs".<sup>[1]</sup>

Current literature examines the stress on nurses produced by the integration of technology in the healthcare settings rather than in the academic setting with nurse educators. According to the NLN,<sup>[2]</sup> more than 80% of nursing faculty indicated they were self-taught regarding computer and information literacy and informatics. There are studies regarding the negative implications of technological change in the healthcare

environment, leading to frustration and dissatisfaction for the already busy bedside nurses, and being time consuming for nurse educators in the clinical setting.<sup>[3]</sup> These findings support the need for coping strategies for nurse educators related to stress from technology. This researcher has often experienced an overwhelming feeling of stress while teaching in the clinical setting.

The purpose of this study was to investigate the relationships among the independent variables of age, gender, years of experience as a nurse educator, and previous technology training by the dependent variables of feeling compelled to respond to students after hours, level of stress experienced by nurse educators with technology (in general), and level of stress experienced by nurse educators with technology in the

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classroom/clinical setting. The researcher also investigated the coping strategies demonstrated by these nurse educators. This study was based on the following two research questions: Is there any significant difference in the stress level of nurse educators utilizing technology in theory or clinical courses depending on age, gender, previous technology training, or years of experience as a nurse educator? What are the coping strategies utilized by baccalaureate nurse educators experiencing stress as a result of technology in theory or clinical courses?

**2. METHOD**

This study was conducted in one school of nursing located in the southeastern region of the U.S. The setting varied from nursing theory classrooms, clinical sites, or both. The technology utilized in the nursing theory classroom varies depending on the teaching strategy used by the educator, but has the capabilities of internet, Smartboard, clickers, and teleconferencing. The technology utilized in the clinical site varies depending on the off-campus location, but consisted of computer documentation, bar-code medication, and electronic supply cart.

The target population was defined as master’s prepared nurse educators in a nursing program who utilize technology while teaching a nursing theory or clinical course. Both theory and clinical faculty were invited to participate in the study. The selection consisted of those individuals who responded to the inquiry for participants. A list of faculty teaching in the nursing program from the southeastern region of the U.S. was obtained from the school’s online faculty directory. The sampling was one of convenience using an informed consent as part of Survey Monkey. The data collection process took over a period of three weeks. Of the thirty-six inquiries sent, twenty-two subjects participated in the voluntary sur-

vey, resulting in a 61% response rate. All surveys were used, however, some questions were left blank, which resulted in missing data. Participants’ ages ranged from 33 to 66 years, with an average of approximately 49 years of age.

A priori power analysis was conducted using G\*Power version 3.1.7 to determine the minimum sample size required to find significance with a desired level of power set at .80, an  $\alpha$ -level at .05, and a moderate effect size of .30 (f2). Based on the analysis, it was determined that a minimum of 88 participants are required to ensure adequate power for the cross tabulation Chi square test. The preliminary analysis can also be addressed adequately with the minimum sample size of 88 participants.

All procedures were carried out according to the guidelines established by the Institutional Review Board (IRB) at South-eastern Louisiana University for human subject protection. There was no risk posed to the participants in the study. All participants were over the age of 18, and there were no invasive procedures utilized. There was no direct benefit to the participant.

The survey did not ask participants to provide any information that linked their identity to the provided information, such as name, address, birth date, etc., ensuring anonymity was maintained. Access to data is limited to the principle researcher ensuring subject confidentiality.

The data from the survey was tabulated, and analyzed using statistical software (SPSS) version 19. Descriptive statistics was used for age, gender, previous computer training, and years of teaching experience. Responses from the open-ended question related to coping strategies will be qualitatively reviewed and categorized according to the strategies utilized (see Table 1).

**Table 1.** Analysis table

Research Question	Descriptive Analysis	Rationale
Is there any significant difference in the stress level of baccalaureate nurse educators utilizing technology in theory or clinical courses depending on the following: age, gender, years of experience as a nurse educator, previous computer training, and utilizing technology in the classroom or clinical setting?	Pearson’s chi-square Cramer’s V test	To determine whether two sets of data are significantly different from one another [8]
What are the coping strategies utilized by baccalaureate nurse educators experiencing stress as a result of technology in theory or clinical courses?	Reviewing and identifying coping strategies with an open-ended question	To categorize the most often used coping strategy

**3. RESULTS**

The frequencies and percentages for the categorical dependent variables are displayed in Table 2. Most participants

reported that they sometimes (36.4%) or often (36.4%) felt compelled to answer emails or texts from students after school hours. The majority of participants reported that

they sometimes (63.6%) experienced overwhelming feelings of stress or anxiety related to technology in general, while a small percentage of participants reported they felt overwhelmed often (4.5%) or always (4.5%). When asked how frequently they felt overwhelmed with stress or anxiety related to technology specifically in a classroom or clinical setting, most participants responded that they felt overwhelmed sometimes (61.9%).

**Table 2.** Frequencies and percentages for categorical dependent variables

	<i>n</i>	%
<b>Compelled to Answer Emails/Texts from Students After School</b>		
Rarely	3	13.6
Sometimes	8	36.4
Often	8	36.4
Always	3	13.6
<b>Overwhelming Feeling of Stress/Anxiety Related to Technology</b>		
Never	2	9.1
Rarely	4	18.2
Sometimes	14	63.6
Often	1	4.5
Always	1	4.5
<b>Overwhelming Feeling of Stress/Anxiety Related to Technology in Class or Clinical Setting</b>		
Never	2	9.5
Rarely	4	19.0
Sometimes	13	61.9
Often	2	9.5

Note. Frequencies not summing to *N* = 22 reflect missing data.

The frequencies and percentages for the categorical independent variables and demographics are displayed in Table 3. Only one participant reported not utilizing computers and/or technology in the classroom (4.5%) and only two participants were male (9.5%) (Due to the extremely imbalanced frequencies of these two variables they were not used for further analysis). Most of the participants in the study

incorporated technology in a clinical setting (68.2%). Participants were also asked whether they had taken a formal course to learn about utilizing technology in the classroom and whether they had taken a formal course to learn about utilizing technology in a clinical setting. Participants were relatively evenly split in their responses to these questions, with most participants reporting they had not taken a course on the utilization of technology in the classroom (59.1%) and a slight majority reporting they had taken a course on the utilization of technology in a clinical setting (52.4%).

**Table 3.** Frequencies and percentages for categorical independent variables and demographic variable

	<i>n</i>	%
<b>Incorporate Technology in the Classroom</b>		
No	1	4.8
Yes	20	95.2
<b>Incorporate Technology in Clinical Settings</b>		
No	7	31.8
Yes	15	68.2
<b>Classroom Technology Course</b>		
No	13	59.1
Yes	9	40.9
<b>Clinical Setting Technology Course</b>		
No	10	47.6
Yes	11	52.4
<b>Gender</b>		
Female	19	90.5
Male	2	9.5

Note. Frequencies not summing to *N* = 22 reflect missing data. Due to a low frequency of male participants and educators not incorporating technology in the classroom, these variables were excluded from further analyses.

Means and standard deviations for the continuous demographic variables are shown in Table 4. Participants' ages ranged from 33 to 66 years, with an average of approximately 49 years of age (*M* = 48.73, *SD* = 9.56). Participants' years of experience as a nurse educator ranged from 2 to 34 years, with an average of roughly 12 years (*M* = 11.93, *SD* = 8.70).

**Table 4.** Means and standard deviations for continuous demographic variables age and years of experience

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Age	22	48.73	9.56	33	66
Years of Nurse Educator Experience	21	11.93	8.70	2	34

Note. Frequency not summing to *N* = 22 reflects missing data.

### 3.1 Research Question 1

Is there any significant difference in the stress level of nurse educators utilizing technology in theory or clinical courses depending on age, gender, previous technology training, or years of experience as a nurse educator? Cross tabulation

analyses using Pearson's chi-square and Cramer's V tests were conducted to examine the relationships between the dependent variable of feeling compelled to answer emails/texts after hours and the independent and demographic variables, as shown in Table 5 (Due to the small sample size it was not

possible to analyze the dependent variable using the original 5-point scale, therefore it was recoded into a dichotomous variable: infrequently [never, rarely, sometimes] and frequently [often and always]). The independent variables and demographic variables included incorporation of technology in clinical settings, having taken a classroom technology course, having taken a clinical setting technology course, age, and years of experience as a nurse educator (Due to the small sample size it was not possible to maintain the variables for age and years of nurse educator experience in their original continuous and ordinal forms, respectively, for analyses. Therefore, age was recoded as a dichotomous variable

into participants who were 50 or younger and participants who were older than 50. Years of nurse educator experience was dichotomized into participants with less than 10 years of experience and participants who had 10 or more years of experience). The results indicate that the relationship between age and a feeling of compulsion to answer emails and or texts from students after hours was statistically significant,  $\chi^2(1) = 6.60, p = .010$ , Cramer's  $V = .55$  (However, these results should be interpreted with caution because half of the cells contain fewer than 5 observations. These results should be considered preliminary.). No other relationships were found to be statistically significant (all  $ps > .1$ ).

**Table 5.** Frequencies and percentages for technology in clinical settings, technology course for classroom use, technology course for clinical, age, and years of experience by feeling compelled to respond to students after hours

	Feeling Compelled to Respond to Students After Hours				$\chi^2$	<i>p</i>
	Infrequently		Frequently			
	<i>n</i>	%	<i>n</i>	%		
<b>Incorporate Technology in Clinical Settings</b>					.21	.647
No	3	50.0	4	25.0		
Yes	3	50.0	12	75.0		
<b>Classroom Technology Course</b>					.19	.665
No	4	66.7	9	56.3		
Yes	2	33.3	7	43.8		
<b>Clinical Setting Technology Course</b>					.44	.505
No	4	66.7	6	40.0		
Yes	2	33.3	9	60.0		
<b>Age</b>					6.60	.010
50 years or less	3	27.2	9	81.8		
51 years or more	8	72.7	2	18.2		
<b>Years of Nurse Educator Experience</b>					2.38	.123
Less than 10	3	50.0	7	46.7		
10 or more	3	50.0	8	53.3		

Cross tabulation analyses using Pearson's chi-square and Cramer's  $V$  tests were conducted to examine the relationships between the dependent variable of an overwhelming feeling of stress or anxiety related to technology (overall) and the independent and demographic variables, as shown in Table 6 (Due to the small sample size it was not possible to analyze the dependent variable using the original 5-point scale, therefore it was recoded into a dichotomous variable: infrequently [never and rarely] and frequently [sometimes, often, and always]). The independent variables and demographic variables included incorporation of technology in clinical settings, having taken a classroom technology course, having taken a clinical setting technology course, age, and years of experience as a nurse educator. The results revealed

that there were no statistically significant relationships between any of the independent or demographic variables and the dependent variable (all  $ps > .2$ ).

Cross tabulation analyses using Pearson's chi-square and Cramer's  $V$  tests were conducted to examine the relationships between the dependent variable of an overwhelming feeling of stress or anxiety related to technology in a classroom or clinical setting and the independent and the demographic variables, as shown in Table 7 (Due to the small sample size it was not possible to analyze the dependent variable using the original 5-point scale, therefore it was recoded into a dichotomous variable: infrequently [never and rarely] and frequently [sometimes, often, and always]). The independent variables and demographic variables included incorporation

of technology in clinical settings, having taken a classroom technology course, having taken a clinical setting technology course, age, and years of experience as a nurse educator. The results indicate that the relationship between having taken a classroom technology course and overwhelming feelings of stress or anxiety related to technology in a classroom or clinical setting was statistically significant,  $\chi^2(1) = 5.17, p$

$= .023$ , Cramer’s  $V = .50$ . No other relationships between the dependent variable of an overwhelming feeling of stress or anxiety related to technology in a classroom or clinical setting and the remaining independent and the demographic variables were found to be statistically significant (all  $ps > .05$ ).

**Table 6.** Frequencies and percentages for technology in clinical settings, technology course for classroom use, technology course for clinical, age, and years of experience by stress related to technology

	Overwhelming Feeling of Stress/Anxiety Related to Technology					
	Infrequently		Frequently		$\chi^2$	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
<b>Incorporate Technology in Clinical Settings</b>					1.26	.262
No	3	50.0	4	25.0		
Yes	3	50.0	12	75.0		
<b>Classroom Technology Course</b>					.20	.658
No	4	66.7	9	56.3		
Yes	2	33.3	7	43.8		
<b>Clinical Setting Technology Course</b>					1.22	.269
No	4	66.7	6	40.0		
Yes	2	33.3	9	60.0		
<b>Age</b>					.07	.793
50 years or less	3	50.0	9	56.3		
51 years or more	3	50.0	7	43.8		
<b>Years of Nurse Educator Experience</b>					.02	.890
Less than 10	3	50.0	7	46.7		
10 or more	3	50.0	8	53.3		

**3.2 Research Question 2**

What are the coping strategies utilized by baccalaureate nurse educators experiencing stress as a result of technology in theory or clinical courses? Of the 22 participants, 14 participants provided descriptions of their coping strategies used to combat stress and anxiety. Just less than one quarter of the participants responded with some variation of setting limits on their availability and communicating these limits to their students. These participants explained that they only made themselves available to students within “business hours” during the workweek. The second most frequently cited coping strategy was some form of outreach. Of these participants, two explained that they often reach out to colleagues and another two reached out to their IT departments for support. Other strategies cited by participants included preparation and forms of meditation or escape.

To address the first research question, three different measures of stress levels of nurse educators were used to test for associations with age, gender, previous technology training,

years of experience as a nurse educator, and utilization of technology in classroom or clinical settings. For the measure of the dependent variable of “feeling compelled to answer emails/texts after hours”, age was the only significant predictor. Older participants were less likely to frequently feel compelled to respond to students after school hours than younger participants. This is supported by findings from this study in that a greater proportion of participants who reported infrequent compulsion to answer emails and texts after school hours were older than 50 (72.7%) compared to participants who reported frequent compulsion to answer emails and texts after school hours (18.2%). One aspect of this finding was not supported by literature in that Axley,<sup>[4]</sup> stated that those who did not “grow up” in the computer age may face more challenges with technological competencies. Axley,<sup>[4]</sup> stated that today’s expectation is for faculty to use electronic technologies; however this can be particularly stressful for the older faculty who may have little or no computer knowledge.

**Table 7.** Frequencies and percentages for technology in clinical settings, technology course for classroom use, technology course for clinical, age, and years of experience by stress related to technology in class or clinical settings

	Overwhelming feeling of stress/anxiety related to technology in class or clinical setting				$\chi^2$	p
	Infrequently		Frequently			
	n	%	n	%		
<b>Incorporate Technology in Clinical Settings</b>						
No	3	50.0	3	20.0	1.89	.169
Yes	3	50.0	12	80.0		
<b>Classroom Technology Course</b>						
No	6	100.0	7	46.7	5.17	.023
Yes	0	.0	8	53.3		
<b>Clinical Setting Technology Course</b>						
No	5	83.3	5	35.7	3.81	.051
Yes	1	16.7	9	64.3		
<b>Age</b>						
50 years or less	4	66.7	8	53.3	.31	.577
51 years or more	2	33.3	7	46.7		
<b>Years of Nurse Educator Experience</b>						
Less than 10	3	50.0	7	50.0	.00	1.000
10 or more	3	50.0	7	50.0		

For the measure of the dependent variable of an “overwhelming feeling of stress or anxiety related to technology in a classroom or clinical setting”, having taken a classroom technology course was the only significant predictor. Participants who had previously taken a course focused on the use of technology in the classroom were more likely to “frequently have overwhelming feelings of stress or anxiety related to technology in a classroom or clinical setting”. This is supported by findings from this study that 53.3% of participants who reported frequently feeling overwhelmed with stress or anxiety related to technology in a classroom or clinical setting had taken a course on the use of technology in the classroom. This finding is supported by Skiba,<sup>[5]</sup> in that with the greater demand for interaction with technology, educators are still struggling with emerging technology tools in their nursing courses. Overall, the independent variables were found to not be significantly associated with the measure of the dependent variable of overwhelming feelings of stress or anxiety related to technology.

To address the second research question, participants were asked to answer an open-ended question relating to any coping strategies utilized if they had ever experienced stress from computer and/or technology issues or 24/7 accessibility. This is supported by findings from this study in that the two most dominant themes were setting limits on availability and reaching out to peers or IT departments. No research was

located during literature review supporting these findings.

#### 4. DISCUSSION AND CONCLUSION

With the federal mandate that health care institutions having to adopt the electronic health record by the end of last year, nursing programs must continue to incorporate IT into the academic setting. It is now ever more important for nursing faculty to engage in life-long learning in informatics. Deans need to support IT initiatives, and ensure that all faculty members have competency in computer literacy during the interview process. Nurse educators should be encouraged to participate in faculty development programs to achieve IT competency. Mentoring programs are utilized in nursing programs to assist faculty with developing skills in IT through face-to-face instruction, online tutorials, and practice forums.<sup>[4]</sup> These programs should be offered by the nursing programs' institution, as well as the clinical agencies. The AACN<sup>[6]</sup> has developed a web-based program, “The Education Scholar Program”, to assist faculty with delivering content using technological resources.

The researcher has participated in “round” table discussions (face-to-face) offered bi-yearly for faculty teaching clinical courses. In the practice setting, this allows faculty assigned to this particular clinical agency to be informed on technology implementations and changes prior to the semester starting. Some institutions designate a “champion” to assist faculty

in using instructional technologies to teach. Partnerships between clinical agencies and academic institutions enable practicing nurses and nursing students to engage and become proactive with the digital electronic environment in health care.<sup>[7]</sup>

Having eight clinical students administering medications when instructor log in is not detectable, barcodes on arm-bands are scratched or even non-existent on patients' arms, and medication blister packs not detected by scanner are just a few of IT issues that has led to stress and frustrations for the researcher. Gooder<sup>[3]</sup> concluded that implementation of BCMA systems may have a negative impact on nurses' attitudes toward the medication administration process and may make the work processes more difficult. One of the coping strategies identified was for nurse educators to reach out to their IT departments for support.

The majority of the participants in this study were female. Therefore, future research should include subjects of both genders to determine if this variable is a significant predictor

of nurse educators' stress levels due to effects of technology. In this study, data collection was conducted between trimesters. Stress levels of nurse educators may have been lower during this time period since the participants were not actively teaching.

Future studies could consist of including several nursing programs within the southeastern region. A larger sample may help depict more themes regarding the coping strategies utilized by nurse educators in response to the effects of technology on stress levels, and comparing these themes with other regions of the U.S. Additional research could be incorporating the independent variable of adjunct versus full-time faculty in relation to the effects of technology on stress levels. Another thought to consider in a future study is the comparison of stress levels between nurse educators who teach in a baccalaureate versus associate degree nursing program.

### CONFLICTS OF INTEREST DISCLOSURE

The author declares that there is no conflict of interest statement.

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