Mobile Self-Efficacy in Canadian Nursing Education Programs

Abstract

The purpose of this study was to assess the self-efficacy of nursing faculty and students related to their potential use of mobile technology and to ask what are the implications for their teaching and learning in practice education contexts. We used a cross-sectional survey design involving students and faculty in two nursing education programs in a Western Canadian college. 121 faculty members and students completed the survey in January, 2011. Results showed a high level of ownership and use of mobile devices among our respondents. Their median mobile self-efficacy score was 75 on a scale of 100, indicating that they are highly confident in their use of mobile technologies and prepared to engage in mobile learning.

Keywords

Self-efficacy, motivation, mobile learning, nursing education, practice education

Previously, we (Authors, 2009a, 2009b) have argued that new approaches and tools are needed to support the teaching and learning of nursing students at a distance and that mobile learning (m-learning) could be effective since it supports learning that is more situated, experiential and contextualized within the specific instructional domain (Kukulska-Hulme & Traxler, 2005). In nursing practice education, m-learning has the potential to bring the instructor, peers and resources together virtually at the point-of-care to support the students' safety and evidence-informed practice (Authors, 2010).

This study explores the level of motivation of faculty and students to apply this new technology in their teaching and learning. Previously (Authors, 2009a), we found nursing students reported mobile devices to be easy to use and useful in their practice education, but nonetheless used them sparingly. Their confidence in their ability to learn to use mobile devices was based on previous experience with desktop computing.

Therefore, we turned to the literature on motivation - specifically the concept of self-efficacy (Bandura, 1997) - to delve more deeply into whether nursing students and faculty were prepared to engage in m-learning. Self-efficacy refers to the personal beliefs of individuals that they are capable of learning and performing particular behaviors, for instance, Nursing instructors and students using mobile devices in their teaching and learning. As such, it is a domain specific trait (Bandura, 1997; Schunk, 2008). Individuals' perceptions of self-efficacy influence their decisions about which activity to engage in, their anxiety when performing the activity, and their persistence (Bandura, 1997; Compeau & Higgins, 1995; Schunk, 2008). While a significant body of research exists on learners' feelings of self-efficacy concerning computer technology, online learning, and even podcasting (e.g., Compeau & Higgins, 1995; Hodges, Stackpole-Hodges, & Cox, 2008; Johnson, 2005; Kao & Tsai, 2009; Koh & Frick, 2009; Liang and Wu, 2010; Loftus, 2009), this concept does not appear to have been examined in a mobile learning context.

Methodology

The purpose of this study was to assess the self-efficacy of nursing faculty and students concerning their use of mobile technology and the implications for their teaching and learning in practice education contexts. We used a cross-sectional survey design involving students and faculty in two separate nursing education programs at a community college in Western Canada: a one-year Practical Nurse (PN) program and a four-year Bachelor of Science in Nursing (BSN) program. At the time of the survey, there were 55 students and 9 faculty members in the PN program and 134 students and 18 faculty members in the BSN Program, for a total of 216 potential participants.

We developed an online survey to gather demographic information and mobile use data and to administer a mobile use self-efficacy questionnaire. Bandura (1997, 2006) stresses that self-efficacy should measure judgments of capability that may vary across specific realms of activity. Our mobile self-efficacy questionnaire was based on a computer self-efficacy instrument (Compeau and Higgins, 1995) modified for a mobile learning context. This consisted of changing the question stem from "I could complete the job using the software package..." to (for students), "If I had a mobile device such as a smart phone or 3G phone (e.g., iPhone), I could use it in my Nursing program…" (See Appendix A). Respondents rated their confidence about each question from 0 - 10. If their answer was "No", they selected "0". If their answer was "Yes", they chose between 1 and 10, with "1" indicating only slight confidence and "10" showing total confidence. Bandura (2006) also stresses the need for item homogeneity within a domain-relevant scale. Cronbach's alpha was 0.941 indicating that the mobile version of the scale could be considered strongly internally consistent.

Results

Demographic information

121 faculty members and students completed the survey in January, 2011, for an overall response rate of 56%. Table 1 provides the breakdown of respondents by program type, status as faculty or student, and gender.

Table 1.

Demographic Information

Factor	Grouping	N	%
Program	PN	38	31.4
	BSN	83	68.6
Status	Faculty	17	14.0
	Students	104	86.0
Gender	Male	12	9.9
	Female	109	90.1

The BSN program was much larger than the PN program and provided over two thirds of the respondents in this study. Ninety percent were female, while slightly fewer than 10% were male. PN students were substantially older than the BSN students on average and more uniform in age. The mean ages of the BSN students varied from an average of about 25 in the Year 2 group to nearly 33 in the Year 4 group (Table 2). Overall, our student respondents tended to be mature adults.

Table 2.

Age Data by Program

Status-Year	N	Mean	Minimum	Maximum	Skewness
BSN Students Year 1	23	27.17	19	43	.800
BSN Students Year 2	21	24.90	20	50	2.841
BSN Students Year 3	16	28.69	21	52	1.293
BSN Students Year 4	11	32.64	22	49	.779
PN Students	33	34.39	19	53	.092
Regular Faculty	14	50.50	43	61	.331
Sessional Faculty	3	41.00	31	50	-.467
Totals	121	32.49	19	61	.599

Mobile Ownership and Use

The familiarity of ownership should impact users' assessment of their capability to use a mobile device and, therefore, mobile self-efficacy scores. Only 10 of our respondents (8%) - two faculty members and eight students - indicated that they did not own a mobile device. Table 3 shows which mobiles our respondents owned. About 15% owned a classic (phone only) mobile, while 27% had a phone with a camera or MP3 player. Twenty-two percent possessed a smart phone (e.g., a Blackberry), while 24% had a 3G phone (e.g., an Apple iPhone). Just under 12% had "other" devices such as an Apple iPod Touch), which provided them with email and internet access and nursing applications.

Among students, the types of devices owned were relatively uniform across program groups. Twenty-eight percent of BSN students and 30% of PN students owned a mobile with camera, while 24% of BSN students and 27% of PN students had a 3G phone. Faculty had a lower level of ownership with 11% owning a camera phone and 15 percent possessing a 3G phone.

Table 3.

Type of Mobile Owned

	Mobile Type					
	Classic Cell	Classic Cell / Camera	Smart Phone	3G Phone	Other	Total
BSN Students Year 1	7	4	4	7	1	23
BSN Students Year 2	2	8	8	3	0	21
BSN Students Year 3	2	6	3	4	1	16
BSN Students Year 4	0	2	5	3	1	11
PN Students	3	10	3	9	8	33
Regular Faculty	3	3	4	2	2	14
Sessional Faculty	1	0	0	1	1	3
Total	18	33	27	29	14	121

To explain their mobile self-efficacy, it was also important to detail how faculty and students used their devices in their daily lives as well as in teaching and learning in order. Table 4 shows what mobile features our respondents used weekly. Not surprisingly, the majority (83%) of respondents used their mobile telephones most.

Table 4.

Mobile device features used at least once a week

Program	Faculty- Student	Telephone	Camera	Email	Browser	SMS	Audio MSG	Word pro	Health apps	Games	Other
BSN	Faculty	8	2	6	6	7	0	1	1	1	3
	Student	65	31	28	34	56	4	6	9	20	12
PN	Faculty	4	1	1	1	2	0	0	1	0	1
	Student	24	11	9	13	22	5	4	4	4	2
Totals		101	45	44	54	87	9	11	15	25	18

While 100% might be expected, some respondents indicated buying their mobiles for emergency purposes only. Other respondents may have instead tended to text more than telephone since, text messaging (SMS) was the second most widely used feature at72%. Just under half (45%) of our respondents used their mobiles weekly to browse the Internet, while over one third used them for photography (37 %) or to do email (36%) and 21% to play games. Other uses included recording videos in the lab, listening to music, using the address book, alarm clock and calendar features, and keeping memos and lists.

We also asked which features respondents used at least once weekly to support their learning or teaching (Table 5). Surprisingly, since this use would have been part of their overall weekly use, they reported it to be about 65%. Fifty-four percent used the telephone for educational purposes, while 39% used their devices for browsing and texting, and 30% for email. It was also surprising that only 17% reported using their mobiles for health applications since, in our previous research (Authors, 2009a), nursing students rated drug reference programs as the most useful mobile feature.

Table 5.

Mobile Features used in nursing education by program

Program	Faculty-Student	Telephone	Camera	Email	Browser	SMS	Audio MSG	Word pro	Health apps	Games	Other
BSN	Faculty	4	0	3	4	4	0	1	1	0	2
	Student	44	12	24	28	32	1	8	11	0	8
PN	Faculty	3	0	1	1	0	0	0	1	0	0
	Student	14	7	8	14	11	3	5	7	2	4
Totals		65	19	36	47	47	4	14	20	2	14

Self-Efficacy

Most of our respondents reported owning a mobile device and most used it weekly at least to make telephone calls. How did such familiarity with mobile use translate into feelings of self-efficacy? The average mobile self-efficacy score (Table 6) was 68 out of total possible score of 100. However, these scores were negatively skewed indicating a tendency to higher scores with individual lower scores affecting the average. Therefore, the median score of 75 is likely more reflective of the group as a whole.

Table 6

Self-Efficacy Scores – Program Comparison (Faculty – Student combined)

Program	Mean	N	Std. Deviation	Median	Minimum	Maximum	Skewness
BSN	72.16	83	24.523	79.00	5	100	-1.014
PN	58.92	38	29.357	64.50	0	100	-.624
Total	68.00	121	26.734	75.00	0	100	-.898

There was also a substantive difference between programs. BSN students and faculty had a mean score of over 13 points higher than PN program members (72.16 as opposed to 58.92). An analysis of variance (Table 7) showed the mean self–efficacy scores between programs to be statistically significant at the $\alpha \leq .01$ level.

Table 7.

Self-Efficacy Scores by Program ANOVA results

		Sum of Squares	df	Mean Square	F	Sig.
SE Score * Program Between Groups (Combined)		4566.273	1	4566.273	6.692	.011
	Within Groups	81197.727	119	682.334		
	Total	85764.000	120			

Table 8 compares the mean mobile self-efficacy scores by faculty and student. The mean student self-efficacy scores were higher than those of the faculty, but faculty median scores were higher, indicating that the faculty means were likely affected by an outlier. However, an ANOVA showed no statistically significant differences between the self-efficacy scores of these two groups.

Table 8.

Self-Efficacy Scores - Faculty-Student Comparison

Faculty-Student	Mean	N	Std. Deviation	Median	Minimum	Maximum	Skewness
Faculty	62.12	17	35.173	80.00	0	100	-.635
Student	68.96	104	25.176	74.50	0	100	-.913
Total	68.00	121	26.734	75.00	0	100	-.898

Table 9 shows a mobile self-efficacy by age comparison. A Pearson's r correlation between age and self-efficacy was -0.145. While this mild negative association indicated self-efficacy scores tended to be higher on average for the lower age groups, this relationship was not statistically significant.

Table 9.

Self-Efficacy Scores- Age Comparison

Age	N	Mean	Median	Minimum	Maximum
19	6	71.50	88.00	9	94
20	7	50.14	48.00	8	89
21	15	72.20	81.00	20	100
22	6	76.00	76.50	51	98
23	5	82.20	82.00	73	91
24	3	82.67	90.00	63	95
25	4	76.50	76.50	71	82
26	3	68.33	85.00	25	95
27	2	77.00	77.00	72	82
28	5	71.00	75.00	53	88
29	9	68.22	63.00	32	100
30	2	73.00	73.00	46	100
31	2	90.00	90.00	88	92
32	3	76.67	78.00	72	80
34	2	95.00	95.00	94	96
35	2	52.00	52.00	25	79
37	2	42.00	42.00	28	56
38	1	63.00	63.00	63	63
39	5	55.20	62.00	0	100
40	1	100.00	100.00	100	100
41	3	80.33	80.00	67	94
42	5	43.40	49.00	0	100
43	4	82.75	86.50	69	89
44	2	33.50	33.50	18	49
45	3	67.00	80.00	37	84
46	1	64.00	64.00	64	64
47	3	56.33	62.00	7	100
48	1	96.00	96.00	96	96
49	2	69.00	69.00	58	80
50	3	62.67	53.00	45	90
52	2	64.50	64.50	37	92
53	2	52.50	52.50	39	66
55	2	85.00	85.00	70	100
57	1	6.00	6.00	6	6
58	1	38.00	38.00	38	38
61	1	83.00	83.00	83	83
Total	121	68.00	75.00	0	100

Conclusions

M-learning has the potential to bring the instructor, peers and resources together virtually at the point-of-care to support the students' safety and evidence-informed practice. This study assessed the current use of mobile technology by faculty and students in nursing education and investigated their predisposition to use this new technology in their teaching and learning.

The results of the demographics portion of our survey, for instance, revealed that most respondents owned mobile devices and that nearly half (46%) owned smart phones or 3G devices. Furthermore, the ownership of these more sophisticated mobiles was spread fairly evenly across the groups and all ages. While our respondents' used their mobiles weekly predominantly for communications (cell phone, texting and email), they also used them regularly for a range of other activities. More importantly, nearly two thirds (65%) of the time, our respondents used their mobiles in their teaching and learning.

Self-efficacy refers to individuals' personal beliefs that they are capable of learning and performing particular behaviors. The stronger the sense of personal efficacy they possess, the greater will be their perseverance and the higher the likelihood that they will perform the chosen activity successfully (Bandura, 1997; Compeau & Higgins, 1995). The mean self-efficacy score for our respondents was 75, a rating that reflects a high level of confidence in their ability to use mobile technology.

These self-efficacy levels, however, were significantly different between program groups with BSN students and faculty an average difference of 13 points higher. Since, the PN program is a one year certificate, while the BSN is a baccalaureate level program, it is possible that higher levels of education and experience could contribute strongly to an individual's sense of self-efficacy in learning contexts.

No other comparisons resulted in significant differences. There was no discernable difference in mobile self-efficacy between faculty and students. While there was a slight relationship between age and self-efficacy in favor of younger respondents, this correlation was not statistically significant.

It appears then that nursing faculty and students are familiar with the use of mobile technology and a substantial proportion is comfortable using the various functionalities these devices afford. Therefore, it is reasonable to conclude that nursing students and faculty, as represented by our respondents, are well prepared and strongly motivated to engage in mobile learning.

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Appendix A: Mobile Self-Efficacy Scale Questions

	If I had a mobile device such as a smart phone or 3G phone (e.g., iPhone), I could use it in my Nursing instruction…
Q1	...if there was no one around to tell me what to do as I go.
Q2	...even if I had never used a device like it before.
Q3	...if I had only the device manual for reference.
Q4	...if I had seen someone else using it before trying it myself.
Q5	...if I could call someone for help if I got stuck.
Q6	...if someone else had helped me get started.
Q7	...if I had a lot of time to complete the task for which the device was provided.
Q8	...if I had just the built-in help facility for assistance.
Q9	...if someone showed me how to do it first.
Q10	…if I had used similar devices before this one to do the same task.