Differences in the ICT Skills and the Extent of Technology Integration in the Teaching and Learning Process among Nursing Faculty

Mae Joy B. Penaflor-Espinosa

Woosong University, Daejeon, Republic of Korea
maejoyespinosa426@yahoo.com

Abstract

This research study, conducted in 2015, examined the differences in ICT Skills and the extent of technology integration in the teaching-learning process among the 167 nursing faculty in Western Visayas, Philippines. The ICT skills of nursing faculty and the extent of technology integration in the teaching and learning process are at moderate extent. Young teachers, being male, and those who are assigned both in the classroom and clinical area are more likely to have better ICT skills. The extent of technology integration is highly valued by the nursing faculty who are assigned in the classroom setting. The findings strongly suggest that there is still a need for professional growth and development opportunities among nursing faculty. ICT posed a great challenge to nursing faculty, therefore, it is important to enhance their ICT skills through continuous hands-on training to facilitate appropriate integration within teaching and learning. Recommendations focused on enhancement capability-building programs in ICT, improving school resources and facilities, and adaptation to technological use in nursing education.

Keywords: Technology Integration, ICT, Nursing Education

1. Introduction

Information and communication technology (ICT) has become, within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy (Division of Higher Education, UNESCO, 2002).

There has been a significant increase in the use of technology in higher education. In nursing education, information and communication technologies (ICTs) are emerging in new study plans of the nursing career in recent years (Fernández-Alemán, García, Montesinos, Marqués-Sánchez, Darkistade, & Rivera, 2014) and have opened the door to many new teaching approaches for nurse educators (Axley, 2008).They must be able to design, develop, and evaluate learning experiences based on new technologies (Fernández-Alemán *et al.*, 2014).

Information and communication technology skills are understood as the capacity to know and understand, and know how to apply in practice this knowledge of ICT use in their diverse functions and application contexts (Prendes & Gutiérrez, 2013 cited by Fernández-Alemán *et al.*, 2014). According to Axley (2008), teaching with technology is a learned skill and it involves considerably more knowledge and skill. In order to benefit from these technological developments, a cadre of professionals has to be educated with sound ICT backgrounds, independent of specific computer platforms or software environments (Division of Higher Education, UNESCO, 2002). Integrating technology into nursing education requires an educator who is prepared to facilitate an effective learning experience.

However, the challenges facing faculty who did not "grow up" in the same technological savvy computer age continue to be a focus of concern (Axley, 2008 & Merrill, 2015). Moreover, barriers to the use of information technology also include lack of computer skills and discomfort with technology (Cheeseman, 2011 cited by Gonen, Sharon, & Lev-Ari, 2016), limited funding and high costs of informatics education (Fetter, 2009b cited by Gonen, Sharon, & Lev-Ari, 2016), and limited knowledge about its appropriate integration into curriculum (Gonen, Sharon, & Lev-Ari, 2016).

Nursing students of today may be referred to as "Net Generation" or the "Millennial Generation" will welcome technology in the classroom to complete their learning. So it is important for nursing faculty to devise learning activities that align with these learnedly learning styles, that they must also assess and better understand Net learners, their expectations, and learning needs, then change teaching commonalities to meet the needs of such learners. Furthermore, if the nurse educators do not provide that technology, these future nurses may be left behind and may find that they are unprepared for the technological work environment (Merrill, 2015). Thus there is a need to bridge the gap between the generational cohort of many nursing educators and that of today's learners (Axley, 2008).

The utilization of ICT within educational framework may bring substantial benefits that will assist nursing students with their need to develop stronger critical thinking, communication, and clinical reasoning skills (Costello, *et al.*, 2010). Thus, some of the nursing schools abroad have implemented policies that demand nursing faculty use of electronic technologies in the teaching learning environment (Merrill, 2015). In the clinical practice, it may bring substantial benefits through supplementing traditional nursing practice relating to assessment, health promotion, clinical interventions, and service organization (While & Dewsbury, 2011).

Despite the importance of preparing nursing students using ICT tools, still nursing educational curricula appear to lack sufficient attention to many basic competencies that promote knowledge and skill development in this area (Atthill, 2015). In the Philippines, there is limited evidence regarding the integration of technology in nursing education. There are no known studies examining the ICT skills of nursing faculty and how these technologies have used in both classroom and clinical settings.

The dearth of studies validate therefore the need to investigate how extensively ICT have been integrated in nursing education and also it is interesting to know the ICT skills of nursing faculty in Western Visayas, Philippines.

2. Objective of the Study

This study examined the differences in ICT Skills and the extent of technology integration in the teaching-learning process among nursing faculty in Western Visayas, Philippines.

3. Methodology

This study is a descriptive research, one-shot survey design, conducted in 2015 among the 167 nursing faculty in six nursing schools in Western Visayas, Philippines, specifically, in the Provinces of Iloilo and Negros, Occidental. The six nursing schools were the top performing schools in the Philippine Licensure Examinations in 2013 and 2014.

The study has used a researcher-made questionnaire-checklist. The first part includes the demographic profile of the respondents such as age, sex, area of teaching assignment, and years of teaching experience in the present institution. To determine the extent of information and communication technology (ICT) skills of the nursing faculty, a 14-item checklist was made, answerable by a 4-point Likert scale with following equivalents: 4 (I am confident in this skill area and need no additional support or training), 3 (I have a

workable knowledge of the skill, but need more practice to ensure I am fully confident), 2 (I have a small amount of knowledge, but would not feel confident in using this in my work), and 1 (I have no knowledge at all). Furthermore, the average of total scores from the statements was categorized as highly skilled if the average scores ranged from 3.50-4.00, moderately skilled if the average scores ranged from 2.50-3.49, poorly skilled if the average scores ranged from 1.50-2.49, and not skilled if the average scores ranged from 1.00-1.49.

The extent of technology integration of the nursing faculty in the teaching-learning process was composed of instructional preparation, delivery, and evaluation. This was determined using, a 13-item questionnaire answerable by a 4-point Likert scale with the following equivalents: Always (4), Oftentimes (3), Sometimes (2), and Never (1). This was further categorized as highly integrated if the average scores ranged from 3.50-4.00, moderately integrated if the average scores ranged from 2.50-3.49, poorly integrated if the average scores ranged from 1.50-2.49, and not integrated if the average scores ranged from 1.00-1.49.

Content validation by four research experts in the field of nursing education and information technology provided comments and suggestions that were integrated in the final draft of the questionnaire. Since the instrument was researcher-made, these were pre-tested in order to determine the reliability. The researcher administered the questionnaire to 16 nursing faculty from another nursing school which was not included in the study. The results of Cronbach's alpha indicated a reliability coefficient of 0.797 for the extent of information communication technology (ICT) skills of the nursing faculty and 0.889 for the extent of technology integration in the teaching and learning process. This means that the instrument used in the study was reliable.

Before the conduct of the study, permission from the president or administrator of the schools was asked through a formal letter. A consent letter was included as part of the questionnaire. It stated the purpose and objectives of the study and a statement that the respondents can freely decide whether to participate in the study or not. To gain the respondents' cooperation, the respondents were assured that the information provided would be treated highly confidential and would be used solely for research.

Data gathered were processed and analyzed using the Statistical Package for Social Sciences (SPSS) version 17. Frequency distribution and means were used to describe the demographic profile of the respondents, the ICT skills, and the extent of technology integration among nursing faculty. Mann-Whitney, Kruskal-Wallis, and Scheffe Tests were used to determine the significant differences in the ICT skills and the extent of technology integration among nursing faculty grouped according to age, sex, area of teaching assignment, and years of teaching experience in the present institution. Level of significance was set at 0.05.

4. Results and Discussions

4.1. The Profile of Nursing Faculty

The data on age reveal that less than two-fifths (38.9 %) of the respondents aged 41-50 years old. There were more than one-fourths of them who belonged to 31-40 and above 51 years old group (28.1 % and 25.7 %, respectively). Only 7.3 percent of them belonged 26-30 age group. In was also noted that females (85.0%) were more than five times higher proportion than that of the males (15.0). In terms of area of assignment and years of teaching, 71.9 percent were assigned both in the classroom and clinical area, while only few of them were assigned solely in the clinical area and classroom (21.6 percent and 6.5 percent, respectively). The figures further show that more than two-fifths (43.1 %) of them had 6-10 years of teaching while less than one-third (32.3 %) had 11-15 years of teaching experience. There were only 1 to 2 respondents in every ten who had 16 years and above (14.4 %) and less than 5 years of teaching experience (10.2 %).

The data in Table 1 has shown that majority of the respondents belonged to middle-aged group, female, both assigned in the classroom and clinical area, and had 6-10 years of teaching experience.

4.2. Information and Communication Technology (ICT) Skills of the Nursing Faculty

The data reveal that the respondents were highly skilled in starting, setting-up, and closing of digital data (M=3.53). They were also moderately skilled in exploring, receiving, storing, utilizing, applying, and sharing of digital data (M=3.39 and M=3.15, respectively). In all, the ICT skills of the respondents were moderate.

The result of the study is consistent with the findings of Alazam, Bakar, Hamzah, and Asmiran (2012) that the level of ICT skills among teachers was moderate. The ICT skills consisted of seven group skills in this study, AutoCAD software, followed by skills of World Wide Web, skills of computer-aided design and drafting, skills of Microsoft excel, skills of digital video and animation, skills of programming languages, and skills of simulation.

4.3. Extent of Technology Integration of Nursing Faculty in the Teaching and Learning Process

In terms of instructional preparation, delivery, and evaluation, the respondents had moderate extent of integration (M=3.31, M=3.42, & M=3.26, respectively). Earlier studies of Ratsogi and Malhotra (2013) and Redmann, Kotrlik, and Douglas (2008) have supported the findings of the study. Ratsogi and Malhotra's (2013) findings resulted to an average level of ICT integration among teachers. Furthermore, Redmann, Kotrlik, and Douglas (2008) revealed that the exploration and adoption of technology for regular use in instruction were found to be fair. Teachers did not integrate technology into their instructions because they have no access to these technologies for students' learning.

Table 1. The Profile of Nursing Faculty

Profile of the Faculty	f	%
Age		
26-30	12	7.3
31-40	43	25.7
41-50	65	38.9
51 and above	47	28.1
Total	**167**	**100**
Mean Age: 44.87		
Sex		
Male	25	15.0
Female	142	85.0
Total	167	100
Areas of Teaching Assignment		
Classroom	11	6.5
Clinical Area	36	21.6
Classroom and Clinical Area	120	71.9
Total	167	100
Years of Teaching in the Present Institution		
Less than 5	17	10.2
6-10	72	43.1
11-15	54	32.3
16 and above	24	14.4
Total	167	100

Table 2. Information and Communication Technology (ICT) Skills of the Nursing Faculty

Information and Communication Technology (ICT) Skills	Mean	Description
1. Start, set-up, close of digital data	3.53	Highly Skilled
2. Explore, receive, and store digital data	3.39	Moderately Skilled
3. Utilize, apply, and share digital data	3.15	Moderately Skilled
Over-all	**3.35**	Moderately Skilled

Mean Range	Description
3.50-4.00	Highly Skilled
2.50-3.49	Moderately Skilled
1.50-2.49	Poorly Skilled
1.00-1.49	Not Skilled

Table 3. The Extent of Technology Integration of the Nursing Faculty in the Teaching and Learning Process

Extent of Technology Integration	Mean	Description
Instructional Preparation	3.31	Moderately Integrated
Instructional Delivery	3.42	Moderately Integrated
Instructional Evaluation	3.26	Moderately Integrated
Over-all	**3.33**	**Moderately Integrated**

Mean Range	Description
3.50-4.00	Highly integrated
2.50-3.49	Moderately integrated
1.50-2.49	Poorly integrated
1.00-1.49	Not integrated

4.4. Difference in the Information and Communication Technology (ICT) Skills of Nursing Faculty When Grouped According to their Profile

The result for the test of difference in *ICT skills of nursing faculty when grouped according to age* reveal that younger faculty had higher mean rank than the older ones. Highest mean rank was noted among those 26-30 years old (M=11.817), followed by those who were 31-40 (M=92.38), and the 41-50 years old (M=85.62). The lowest mean rank score was noted to those who aged 51 years old and above (M=65.37).

There was a statistically significant difference in the extent of ICT skills of the nursing faculty members, as evidenced by Kruskal-Wallis value of 14.383, with a p-value of 0.002. The null hypothesis which states that there is no significant difference in the extent of ICT skills when grouped according to age is therefore rejected. This implies that young nursing faculty had higher ICT skills than the old ones. The result of the Scheffe test for level of difference between those who were young and those who were older (51years old and above) was significant (p=0.026).

These findings are congruent with the results of Alazam *et al.* (2012), Lau and Sim (2008), and Robinson (2003) wherein younger teachers had higher ICT skills than the older ones. In the study of Yu, Wang, and Lin (2013), the lower age groups (20-25 years old) differed significantly from the higher age groups, with the lower age groups indicating that they felt more competent in using software in teaching. A similar finding was reported by Afshari, Abu Bakar, Su Luan, Abu Samah, and Fooi, (2009) that the ability in ICT of young teachers was influenced by using new technology. The finding of the study adds to the literature that found a significant difference in the in the ICT skills of

the nursing faculty based on age, with younger teachers expressing more competence than the older teachers.

Table 4. Difference in the Information and Communication Technology (ICT) Skills of Nursing Faculty When Grouped According to Age

Variable	Mean Rank	KW	*p* Value	Decision Rule
Age				
26-30 years old	118.17	14.383	0.002	Significant
31-40 years old	92.38			Reject Null
41-50 years old	85.62			Hypothesis
51 years old and above	65.37			

Post Hoc Analysis (Scheffe Test)		Mean Difference	*p* Value	Decision Rule
26-30 years old	31-40 years old	0.23754	0.607	Not Significant
	41-50 years old	0.33736	0.264	Not Significant
	51 years old and above	0.53354	0.026	Significant
31-40 years old	26-30 years old	- 0.23754	0.607	Not Significant
	41-50 years old	0.09982	0.826	Not Significant
	51 years old and above	0.29589	0.081	Not Significant
41-50 years old	26-30 years old	-0.33736	0.264	Not Significant
	31-40 years old	-0.09982	0.826	Not Significant
	51 years old and above	0.19607	0.306	Not Significant
51 years old and above	26-30 years old	-0.53354	0.026	Significant
	31-40 years old	-0.29589	0.081	Not Significant
	41-50 years old	-0.19607	0.306	Not Significant

The findings for the test of difference in the extent of *ICT skills when grouped according to area of teaching assignment* show higher mean score among those assigned in both classroom and clinical area (M=91.79), as compared to those assigned in the classroom only (M=85.77) and those assigned in clinical area only (M=57.50). The Kruskal-Wallis test result of 13.990, yielded a p-value of 0.00, which is lower than .05, thus, the difference is significant. The null hypothesis, therefore that there is no significant difference in the ICT skills when grouped to area of assignment is rejected. This implies that the nursing faculty assigned in both classroom and clinical areas were more likely to have better ICT skills than those who were assigned in the classroom only or clinical only. Furthermore, the result of the Scheffe test for difference show that those respondents who were assigned in the classroom only, or in clinical area only, and those assigned in both classroom and clinical areas differ significantly (p=0.050, 0.050, 0.000, and 0.000, respectively).

Table 5. Difference in the Information and Communication Technology (ICT) Skills of Nursing Faculty When Grouped According to Area of Teaching Assignment

Variable		Mean Rank	KW	*p* Value	Decision Rule
Area of Teaching Assignment					
Classroom		85.77	13.990	0.001	Significant
Clinical		57.50			Reject Null
Both Classroom and Clinical		91.79			Hypothesis

Post Hoc Analysis (Scheffe Test)		Mean Difference	*p* Value	Decision Rule
Classroom	Clinical	0.43669	0.050	Significant
	Both Clinical and Classroom	-0.01569	0.995	Not Significant
Clinical	Classroom	-0.43669	0.050	Significant
	Both Clinical and Classroom	-0.45238	0.000	Significant
Both Clinical and Classroom	Classroom	0.01569	0.995	Not Significant
	Clinical	0.45238	0.000	Significant

In comparing the mean scores in the *ICT skills of the nursing faculty when grouped according to sex,* the data reveal that male nursing faculty (M=111.72) registered a higher mean rank than the female nursing faculty (M=79.12). The Mann-Whitney U test result of 1082.000, with a p-value of 0.002 reveal significant difference between the two groups. The hypothesis therefore that there is no significant difference in ICT skills of the nursing faculty when grouped according to sex is rejected. This means that the extent of ICT skills of the nursing faculty is sex differentiated. Males are more competent in starting, setting-up, manipulating, exploring, and applying of digital data than the female respondents. Theories from psychology and sociology suggest that disparity in computer competence and use exists due to sex role typing (Aremu, 2008). The gender schema theory suggests that sex typing occurs in children as a means of encoding and organizing information about their environments. Supporters of this theory believe that society has created an association between computers and "maleness", wherein men will continue to be more attracted to computer use than women, thus creating a gap between their experience and knowledge. If the latter is so, then, the gender issue becomes very important in ICT skills acquisition and use among teachers, since their number is quite high.

These results are in agreement with those of a few studies, such as those by Alazam *et al.* (2012), Summak and Samancıoğlu (2011), and Jimoyiannis and Komis (2007), which all noted a significant difference in the teacher's extent of ICT skills in the classroom. Male teachers had higher mean scores in almost all of the items on basic competence, however, Aremu and Fasan (2011) found that females possessed higher computer self-efficacy than their male counterparts. On the other hand, Yusuf and Balogun (2011) reported that males had higher mean scores for almost all of the items on basic competence, however, the difference in their ICT competence were not significant.

Table 6. Difference in the Information and Communication Technology (ICT) Skills of Nursing Faculty When Grouped According to Sex and Years of Teaching Experience

Variable	Mean Rank	MW-U	*p* Value	Decision Rule
Sex				
Male	111.72	1082.000	0.002	Significant
Female	79.12			Reject Null Hypothesis

Variable	Mean Rank	KW	*p* Value	Decision Rule
Years of Teaching in the Present Institution				
Less than 5 years	114.29	7.537	0.055	Not Significant
6-10 years	79.42			Accept Null
11-15 years	81.82			Hypothesis
16 years and above	81.19			

The mean scores for the *ICT skills of the nursing faculty when grouped according to number of years of teaching in the present institution* reveal a higher mean rank among nursing faculty with less than 5 years of experience (M=114.29). It was also noted that nursing faculty with 6-10 years (M=79.42), 11-15 years (M=81.82), or 16 years and above (M=81.19) had almost the same mean ranks in terms of their ICT skills.

The Kruskal-Wallis result of 7.537 with a p-value of 0.055 indicates that there is no significant difference in the information and communication technology (ICT) skills of the nursing faculty in terms of years of teaching experience. This means that years of experience has no significant influence on their ICT skills especially of being technologically savvy.

The results are consistent to the finding of Jamieson-Proctor, Burnett, Finger, and Watson (2006) that the years of teaching experience is not a factor on the extent of teacher confidence in using ICT with the students for teaching and learning. Further, the findings of Makhanu (2010) also indicate no statistically significant difference in the years of experience in ICT literacy levels among secondary school principals in Kenya. Contrary to the present study, research conducted in Western Australian Government School Teachers (Department of Education and Training, Government of Western Australia (2005) wherein the ICT skills was found to be significantly associated with teacher's ICT Competence. This also confirms the findings of Alazam *et al.* (2012) in which ICT skills integration differ significantly according to length of teaching experience. Likewise, Mahmud and Ismail (2010) found that ICT literacy in terms of skills was influenced by years of experience.

4.5. Differences in the Extent of Technology Integration by the Nursing Faculty in Teaching and Learning Process when Grouped According to their Profile

The mean ranks for *technology integration according to age* are nearly the same for respondents aging 26-30 years old (M=78.17), 31-40 years old (93.10), and 41-50 years old (86.00). A lower mean rank, however, was noted to respondents aged 51 years old and above (M=74.39). Considering the small differences among means, it is not surprising that the result of the Kruskal-Wallis test for difference among means is not significant at 0.05 level (KW=1.991; *p*=0.574). This means that technology integration of the

respondents does not vary with age. Further, regardless of their age, their technology integration is not remarkably different.

Various studies have shown that technology integration differ in terms of age (Yu, Wang, & Lin, 2013; Alazam *et al.*, 2012; & Inan & Lowther, 2010). Yu, Wang, and Lin (2013) have conducted a study on evaluation of technology integration into the instructional setting among the nursing faculty in Taiwan. The subsequent post hoc test suggested that the younger teachers, aged 20-25, had significantly higher scores than those teachers aged 56 and above. The findings of this study add to the literature on differences in teachers' perceived competence in instructional delivery in terms of teaching software applications according to age, with younger teachers expressing more competence in using software applications in teaching their area of discipline, more than the more matured (older) teachers. The findings also reveal that there were differences among the age groups, the younger age groups believe that they can teach students how to use some software applications to facilitate teaching and learning while the older participants are undecided and unsure of their ability.

Alazam *et al.* (2012) found a significant difference in the integration of technology according to teachers' age. The data further show that young teachers integrate technology more than their older teachers. Previous studies also found similar findings that age have a negative impact on the integration of technology in the classroom. This finding suggests that technology integration decreases with age (Inan & Lowther, 2010). However, this finding is in contradiction with a study by Sharma and Khurad (2012) that age of teachers and the use of computers and e-resources in preparation for the class was found to be insignificant, but were positive. Moreover, the difference in the use of internet and web 2.0 tools were also found to be negative but insignificant. This indicates that the use of internet and web 2.0 tools increases with a decrease in age and vice versa. Similarly, the scores on the use of computers and e-resources increase with age. The finding is consistent with the result of the study of Peeraer and Petegen (2011) and Gorder (2008) where the mean difference in technology integration is not significant.

Furthermore, the data in Table 7, for the comparison of mean ranks in the integration of the technology of the nursing faculty according to the *number of years of teaching in the present institution* reveal high mean scores among those respondents who have 16 years or more teaching experience (M=87.73). It is followed by the means of those with six to ten years experience (M=86.83). Moreover, those with eleven to fifteen years of experience and those with less than five years of experience were nearly of the same proportions (80.31 and 78.47, respectively). The differences among the means of the four groups, however, are minimal and the result of the Kruskal-Wallis test for difference among means yielded a value, which is not significant at .05 level (KW=0.928, p=0.819). The hypothesis therefore stating that there is no significant difference in their integration of technology cannot be rejected. This indicates that years of teaching experience does not influence the teachers' extent of technology integration in their teaching.

The results find support in the study of Gorder (2008) and Ertmer, Ottenbreit-Leftwich, and York (2005) which revealed that teaching experience did not influence extent of technology integration in teaching. Baek *et al.* (2008) claimed that experienced teachers are less ready to integrate ICT into their teaching. On the contrary, Wong and Li (2008), Hernandez-Ramos (2005), and Lau and Sim (2008) found that successful technology integration is influenced by teaching experience. Russell, O'Dwyer, Bebell, and Tao (2007) likewise reported that the quality of extent of technology integration was related to the years of teaching service.

The results of the test of difference in technology integration *according to area of teaching assignment* reveal a higher mean rank among those respondents who were assigned in the classroom only (M=102.50), compared to those were assigned both in the classroom and clinical area (M=91.80) and among those assigned in the clinical area only (52.33). The Kruskal-Wallis value of 20.243 is statistically significant, p-value of 0.000.

The null hypothesis therefore that there is no significant difference in the integration of technology grouped to area of assignment is rejected. This implies that teachers who have been assigned in the classroom only are more likely to integrate technology in teaching activities than those assigned in the clinical area. The trend of responses differ between those assigned in the clinical area only, those assigned in the classroom only, and those with both classroom and clinical area assignments (p=0.000, 0.005, 0.000, and 0.000, respectively). Furthermore, the results of the study demonstrated easy access of teachers to technology and resources necessary for the use in teaching-learning process.

The findings of this study is supported by the findings of Yildrim (2007) which revealed that access to technological resources is one of the effective ways to teacher's pedagogical use of ICT integration in teaching. This is also in agreement with the findings of Singh and Chan (2014) that positive attitude towards using ICT can change the way students learn in classrooms. The overall findings on the integration of ICT in the classroom revealed a positive relationship among teachers (Department of Education and Training, Government of Western Australia, 2005).

The statistical data for the test of difference in integration of technology according to sex show that the male nurse faculty was more likely to integrate technology in teaching than their female counterparts (90.12 and 82.92, respectively). However, the Mann-Whitney U-test value for the test of difference between means is not significant at 5 percent (MW=1622.000; p=0.492). This indicates no significant sex difference in extent of technology integration among the teachers. It can be deduced that extent of technology integration in the teaching and learning process does not vary according to sex.

Contrary to the findings on differences in terms of sex and the extent of technology integration vary in the studies reviewed. Male nursing faculty are more likely to integrate technology in instruction into teaching and learning processes than that of the female faculty. This finding find support in the studies of Sharma and Khurad (2012), Summak and Samancıoğlu (2011), and Markauskaite (2006) who found that males had better technical ICT capabilities, and situational and longitudinal sustainability than females. Jamieson-Proctor *et al.* (2006) likewise found that the proportions of female teachers who had integrated technology into their teaching is less than the proportion of male teachers. According to Jimoyiannis and Komis (2007), the implementation of ICT in school has produced new social stereotypes and inequalities in innovation and activities related to ICT have been viewed as a male domain. However, the gaps between male and female teachers have been reduced over the past years. Wozney, Venkatesh, and Abrami (2006) found that females had higher mean scores in instruction, however, no significant differences in their extent of integration. This study confirms earlier findings of Summak and Samancıoğlu (2011), Yusef and Balugon (2011), Gorder (2008), and Kay (2006) that gender was not a predictor of integration of technology into teaching.

Table 7. Differences in the Extent of Technology Integration by the Nursing Faculty in Teaching and Learning Process when Grouped According to their Profile

Variable	Mean Rank	KW	p Value	Decision Rule
Age				
26-30 years old	78.17			Not Significant
31-40 years old	93.10	1.991	0.574	Accept Null
41-50 years old	86.00			Hypothesis
51 years old and above	74.39			
Years of Teaching in the Present Institution				
Less than 5 years	78.47	0.928	0.819	Not Significant
6-10 years	86.83			Accept Null
11-15 years	80.31			Hypothesis
16 years and above	87.73			
Area of Teaching Assignment				
Classroom	102.50	20.243	0.000	Significant
Clinical	52.33			Reject Null
Both Clinical and Classroom	91.80			Hypothesis

Post Hoc Analysis for Area of Teaching Assignment (Scheffe Test)		Mean Difference	p Value	Decision Rule
Classroom	Clinical	0.52700	0.005	Significant
	Both Clinical and Classroom	0.10221	0.778	Not Significant
Clinical	Classroom	-0.52700	0.005	Significant
	Both Clinical and Classroom	-0.42479	0.000	Significant
Both Clinical and Classroom	Classroom	-0.10221	0.778	Not Significant
	Clinical	0.42479	0.000	Significant

Variable	Mean Rank	MW-U	p Value	Decision Rule
Sex				Not Significant
Male	90.12	1622.000	0.492	Accept Null
Female	82.92			Hypothesis

5. Summary of Findings

1. Majority of the respondents belonged to middle-aged group (41-50 years old), female, have been assigned in both classroom and clinical area, and had 6-10 years of teaching experience in the present institution.
2. The over-all ICT skills of the nursing faculty were moderate.
3. In terms of instructional preparation, delivery, and evaluation, the respondents had moderate extent of integration.
4. The Information Communication and Technology (ICT) skills of nursing faculty in teaching and learning process differ significantly when grouped according to age, area of teaching assignment, and sex. The result differed between the categories of those respondents who were young and those who were old, those who were assigned in the classroom only, clinical area only, and both assigned in the

classroom and clinical area. No statistically significant difference in the ICT skills according to years of teaching experience.

5. The extent of technology integration by the nursing faculty in teaching and learning process differ significantly in the area of teaching assignment. The result of post hoc analysis further revealed that they differed between the categories of those were assigned in the clinical only, classroom only, and both in the classroom and clinical area. No significant differences in their extent of integration of technology in the teaching and learning process in terms of age, years of teaching, and sex of the respondents.

6. Conclusions

The ICT skills of nursing faculty and the extent of technology integration in the teaching and learning process are at moderate extent. Young teachers, being male, and those who are assigned both in the classroom and clinical area are more likely to have better ICT skills. The extent of technology integration is highly valued by the nursing faculty who are assigned in the classroom setting.

The findings strongly suggest that there is still a need for professional growth and development opportunities among nursing faculty. ICT posed a great challenge to nursing faculty, therefore, it is important to enhance their ICT skills through continuous hands-on training to facilitate appropriate integration within teaching and learning. Recommendations focused on enhancement capability-building programs in ICT, improving school resources and facilities, and adaptation to technological use in nursing education.

References

[1] Division of Higher Education, United Nations Educational, Scientific, and Cultural Organization, "Information and communication technology in education: a curriculum for schools and programme of teacher development", **(2002)**.

[2] J. L. F. Alemán, A. B. Sánchez, M. J. López, P. M. Sánchez, E. Darkistade and F. J. Pérez, "Exploring the use of information and communication technologies and social networks among university nursing faculty staff: an opinion survey", Invest Educ Enferm, vol. 32, no. 3, **(2014)**, pp. 438-450.

[3] L. Axley, "The integration of technology into nursing curricula: supporting faculty via the technology fellowship program", OJIN: The Online Journal of Issues in Nursing, vol. 13, no. 3, **(2008)**.

[4] E. Merrill, "Integrating technology into nursing education", ABNF Journal, vol. 26, no. 4, **(2015)**.

[5] A. Gonen, D. Sharon, L. Lev-Ari, W. & Shuyan, "Integrating information technology's competencies into academic nursing education–an action study", Cogent Education 3 (1). doi: http://dx.doi.org/10.1080/2331186X.2016.1193109, **(2016).**

[6] E. Costello, M. Corcoran, J. Barnett, M. Birkmeier, R. Cohn, O. Ekmekci, N. Falk, T. Harrod, D. Herrmann, S. Robinson and B. Walker, "Information and communication technology to facilitate learning for students in the health professions: current uses, gaps and future directions", The Official Journal of OLC, doi: http://dx.doi.org/10.24059/olj.v18i4.512, **(2010)**.

[7] A. While and G. Dewsbury, "Nursing and information and communication technology (ICT): a discussion of trends and future directions", International journal of nursing studies, 48 (10):1302-10, doi: 10.1016/j.ijnurstu.2011.02.020, **(2011)**.

[8] S. Atthill, "An exploration of the influence of nursing education culture on the integration of nursing informatics competencies into a collaborative nursing program curriculum", Electronic Thesis and Dissertation Repository Paper, **(2015)**.

[9] Rastogi and S. Malhotra, "ICT skills and attitude as determinants of ICT pedagogy integration", European Academic Research, vol. 1, no. 2, **(2012)**.

[10] D. Redmann and J. Kotrlik, "A trend study: technology adoption in the teaching-learning process by secondary business teachers- 2002 & 2007", The Delta Pi Epsilon Journal, L, no. 2, **(2008)**, pp. 77-89.

[11] A. Alazam, A.R. Bakar, R. Hamzah, & S. Asmiran, "Teachers ICT skills and ICT integration integration in the classroom: the case of vocational and technical teachers in Malaysia", ScIRP Journal, vol. 3, **(2012)**, pp. 70-76.

[12] B. T. Lau and C. H. Sim, "Exploring the extent of ICT adoption among secondary school teachers in Malaysia", Retrieved December 23, 2014 from http://www. researchgate.net/publication, **(2008)**.

[13] W. Robinson, "External and internal factors which predict teachers' computer usage in K-12 classrooms", Retrieved January 5, 2015 from https://www.questia.com/library/journal/1P3-1647756541/technology-in-ohio-s-school-music-programs-an-exploratory, **(2003)**.

[14] W. Yu, J. Wang, & C. Lin, "Nursing faculty's evaluations of technology integration in to the instructional setting", World Journal of Education. 3 (13), 24-39, **(2013)**.

[15] M. Afshari, K. Abu Bakar, W. Su Luan, B. Abu Samah, & F.S. Fooi, "Factors affecting teachers' use of information and communication technology", International Journal of Instruction, 2 (1), **(2009).**

[16] [M. Sumak & M. Samancioglu, "Assessment of technology integration in vocational education and training schools", International Journal of Education and Development Using Information and Communication Technology, 7(1), 68-85, **(2011)**.

[17] A. Jimoyiannis & V. Komis, "Examining teacher's beliefs about ICT in education", Teachers Development, 11 (2), 149-173, **(2007)**.

[18] A. Aremu & O. Fasan, "Teacher training implications of gender and computer self-efficacy for technology integration in Nigerian schools', The African Symposium. 11(2), 323-342, **(2011)**.

[19] M. Yusuf, & M. Balogun, "Student-teachers' competence and attitude towards information and communication technology: a case study in a Nigerian university", Contemporary Educational Technology. 2(1), 18-36, **(2011)**.

[20] R.M. Jamieson-Proctor, P.C. Burnett, G. Finger, & G. Watson, "ICT integration and teachers' confidence in using ICT for teaching and learning in Queensland state schools, "Australian Journal of Educational Technology, 22 (4), 511-530, **(2006)**.

[21] E.S. Makhanu, "Principals' literacy in information and communication technology (ICT): towards improving secondary school performance in Kenya", Retrieved January   5,   2015 fromhttp://uir.unisa.ac.za/handle/10500/3837, **(2010)**.

[22] Department of Education and Training, Government of Western Australia, Teacher ICT skills: evaluation of the information and communication technology (ICT) knowledge and skills levels of Western Australian Government school teachers", Retrieved January1, 2015 from www.det.wa.edu.au, **(2005)**.

[23] R. Mahmud, & M.A.H, Ismail, "Impact of training and experience in using ICT on in-service teachers' basic ICT literacy. Malaysian Journal of Educational Technology. 10 (2). 1-10, **(2010)**.

[24] F. Inan & D. Lowther, "Factors affecting technology integration in K-12 classrooms: a path model", Educational Technology Research and Development, 58(2), 137-154, **(2010)**.

[25] R. Sharma & A. Khurad, "Awareness and use of ICT among the college teacher: a study during the orientation programme", An International Journal of Education and Applied Social Sciences. 3 (3), 291-296, **(2012)**.

[26] J. Peeraer & P.V. Petegem, "How to address integration of ICT in teaching practice? Research on factors influencing the use of ICT in education", Retrieved January 5, 2015, **(2011)**.

[27] L. M. Gorder, "A study of teacher perceptions of instructional technology integration in the classroom", The Delta Pi Epsilon Journal. Volume L, vol. 2, **(2008)**, pp. 63-76.

[28] P. A. Ertmer, "Teacher pedagogical beliefs: the final frontier in our quest for technology integration?", Educational Technology Research and Development, vol. 53, no. 4, pp. 25-39, **(2005)**.

[29] Y.G. Baek, J. Jong, & B. Kim, "What makes teachers use of technology in the classroom? exploring the factors affecting facilitation of technology with a Korean sample", Computers and Education, vol. 50, no. 8, **(2008)**, pp. 224-234.

[30] E. M. L. Wong and S. C. Li, "Framing ICT implementation in a context of educational change: a multilevel analysis", School effectiveness and school improvement, vol. 19, no. 1, **(2008)**, pp. 99-120.

[31] P. H. Ramos, "If not here, where? understanding teachers' use of technology in Silicon Valley schools. Journal of Research on Technology in Education, vol. 38, no. 1, **(2005)**, pp. 39-64.

[32] M. Russell, L. M. O'Dwyer, D. Bebell and W. Tao, "'How teachers' use of technology vary by tenure and longevity", Journal of Educational Computing Research, vol. 37, no. 4, **(2007)**, pp. 393-41.

[33] S. Yildrim, "Current utilization of ICT in Turkish basic education schools: a review of teachers ICT use and barriers to integration', International Journal of Instructional Media, vol. 34, no. 2, (**2007**), pp. 171-86.

[34] T. K. Singh and S. Chan, "Teachers readiness on ICT integration in teaching-learning: a Malaysian case study. International Journal of Asian Social Science, vol. 4, no. 7, **(2014)**, pp. 874-885.

[35] L. Markauskaite, "Gender issues in pre-service teachers' training: ICT literacy and online learning", Australasian Journal of Educational Technology, vol. 22, no. 1, **(2006)**, pp. 1-20.

[36] L. Wozney, V. Venkatesh, and P. C. Abrami, "Implementing computer technologies: teachers' perceptions and practices", Journal of Technology and Teacher Education, vol. 14, no. 1, **(2006)**, pp. 173-207.

[37] R. Kay, "Addressing gender differences in computer ability, attitudes and use: the laptop effect", Journal of Educational Computing Research, vol. 34, no. 2, **(2006)**, pp. 187-211.

Author

Mae Joy P. Espinosa, PhD, RN is an Assistant Professor in Woosong University, Daejeon, Republic of Korea. She had been a Lecturer in the Department of Adult and Critical Care, College of Nursing, Sultan Qaboos University, Muscat, Oman. She has made significant contributions to patient care through teaching, lectures, leadership activities and professional activities both in graduate and undergraduate nursing.