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Are Teachers Technophobic? Measuring Information and Communication Technology Competency among Teacher Educators in Central Visayas, Philippines

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Abstract

This paper presents an empirical investigation of the level of competency in information and communication technology (ICT) operations and concepts as perceived by teacher educators in the four provinces of Central Visayas, Philippines. All respondents of the study were full-time faculty of teacher education programs in the provinces of Bohol, Cebu, Negros Oriental and Siquijor. A total of 383 responses from the faculty of 76 private and public higher education institutions were included in the analysis. A survey questionnaire was used based on the National ICT Competency Standard for Teachers. The study reveals that the level of competency in ICT operations and concepts is "good." The result implies that the teacher educators can interpret and discuss basic computer operation and other information devices, including basic troubleshooting and maintenance, but have not experienced the actual demonstration of it. The level of competency in ICT operations and concepts is affected by the respondent's age, marital status and number of years in teaching. Desktop, tablet and laptop ownership, and Internet access, also affect the level of competency in ICT operations. It can be concluded that the teacher educators are using and applying basic ICT tools with the desire to achieve innovative teaching and learning. There is an urgent need to increase the level of ICT competency among teacher educators, especially in the concepts and operations of technology.

Keywords: ICT in teacher education, ICT in education, ICT competency, ICT operations and concepts

Introduction

Due to the development, growth and opportunities that have resulted from information and communication technology (ICT), ICT has become a fundamental necessity in educational institutions, government and businesses. Using ICT is a crucial step towards economic competitiveness. ICT is a key driver of putting innovation into action. The foreword of the UNESCO ICT-Competency Standards for Teachers (ICT-CST) states that

"Traditional educational practices no longer provide prospective teachers with all the necessary skills for teaching students to survive economically in today's workplace." The UNESCO ICT-CST is a comprehensive guideline for equipping teacher educators with ICT competency necessary in this digital economy. The term "teacher educators" refers to faculty members in degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in public and private HEIs. Hence, ICT in education provides various opportunities for accessing information, sharing information and learning. ICT has assisted in preparing students for later achievement in universities and the workforce, and ICT has helped students attain higher levels of achievement and motivation in schools (Apple Computer Inc., 2002).

Within the context of a knowledge society, teachers and schools try to make use of ICT to improve students' twenty-first-century skills. ICT skills are essential for individuals in every area of life (Yilmaz, 2011). In this context, ICT is a tool to help students master the skills required for ICT systems (Anderson, 2002). ICT is a tool to encourage self-regulated learning strategies (Karabenick, 2011). It is a tool to change the interaction within the classroom and to involve people outside the classroom with students' learning activities (Harris in Anderson, 2002). Baylor and Ritchie (2002) state that many researchers operationalise ICT use in terms of a fundamental dichotomy in which ICT is either used as the subject of study or as an instructional tool to teach other content. ICT competency, as defined in the National ICT Standards of the Philippines, refers to the knowledge, skill, ability or characteristic associated with high performance on a job.

Given the wide range of ICT skills among students, the study of Irfan Naufal and Noor Afidah (2012) aimed to ascertain and determine students' basic ICT skills, advanced ICT skills, ability to apply the Internet for information access and for communication purposes. According to their study, basic ICT skills involve storage and data transfer as well as the use of word processing and electronic spreadsheet applications. Advanced ICT skills involve graphics, animation, video and multimedia design and development using particular software and authoring tools. The application of the Internet for information access involves the students' skills in accessing the Internet, including the use of search engines and recording and downloading/uploading materials. Another type of ICT skill

is application of the Internet for communication purposes such as the use of social networking, chat rooms, and emails to communicate with others, either for learning or socializing activities. Use of the Internet improves students' research skills (Yilmaz, 2011). In addition, with Web 2.0 technology, which introduces many types of social networking sites, students can communicate, interact and socialize with others without much difficulty (Irfan Naufal and Noor Afidah, 2012). Currently, researchers do not consider ICT use to be a monolithic process but rather emphasise that ICT can be integrated into classrooms in many different ways (Vanderlinde, Aesaert and Braak, 2014). For instance, Tondeur, Van Braak and Valcke (2007) make a distinction between three types of computer use in teaching and learning: (1) the use of ICT as an information tool, (2) the use of ICT as a learning tool, and (3) learning basic computer skills.

Despite the many pedagogical benefits of ICT in teaching and learning, technophobic teachers still exist in this digital knowledge revolution. Teachers who have a fear of computers are generally technophobic. Webster defines technophobia as a "fear or dislike of advanced technology or complex devices and especially computers". Ali Asghar and Yalda (2012) summarised the factors that contribute to technophobia among teachers. These factors are "lack of knowledge about teaching the topic with computers, lack of access to computers, lack of confidence in computer skills, inadequacy for students' needs and the attitude of computer introducer".

This study is part of a larger investigation of ICT competency among those in the teacher education program in Central Visayas, Philippines. Specifically, this paper aimed to answer the following research questions:

1. What is the level of ICT competency, in terms of technology operations and concepts, in the four provinces (Bohol, Cebu, Negros Oriental and Siquijor) of Central Visayas, Philippines?
2. What is the relationship between the respondents' demographic characteristics, including sex, age, marital status, type of institution, number of years in teaching, highest education degree, and the level of ICT competency in operations and concepts?

3. What is the relationship between the respondents' ownership of a desktop, smartphone, tablet, or laptop and the ICT competency level in operations and concepts?

Review of Related Literature

It is noted that UNESCO (2008) explains three approaches to achieving competency in terms of the concepts and operation of ICT. These are the use of basic tools, complex tools, and pervasive technologies. UNESCO ICT-CST describe these tools as follows. *Basic tools* include the use of computers, productivity software, drill and practice programs, tutorials, and web content as well as the use of networks for management purposes. *Complex tools* include visualisations in science, data analysis tools in mathematics and role-play simulations in social studies. These technologies are referred to as open-ended technologies for knowledge deepening. *Pervasive technologies* include a variety of networked devices, digital resources, and electronic environments that are used to create and support the community in its production of knowledge and anytime, anywhere collaborative learning.

Technology operations and concepts are one of the skill domains described in the Philippine's National ICT Competency Standards (NICS) for Teachers, which is adapted and used in this study. This domain includes competency related to technical operations and concepts and productivity using various ICT tools including computers, communication devices and applications available on-line or off-line. This domain has 4 competency standards: (1) demonstrating knowledge and skills in basic computer operation and other information devices, including basic troubleshooting and maintenance, (2) using appropriate office and teaching productivity tools, (3) understanding and effectively using the Internet and network applications and resources, (4) demonstrating knowledge and skills in information and data management.

Efforts have been made to prepare teachers with ICT skills and to train them to be creative and innovative. The government, through its ministry of education, has introduced several ICT-related initiatives. For example, Soon, Pei and Fei (2013) revealed that knowledge in ICT operations is one of the many indicators that is rated to be important among science and

mathematics teachers. The ICT skills enhancement framework is necessary for all levels of the education system.

However, most educational institutions face many constraints to achieving high competency in ICT; one of the crucial factors for overcoming these constraints is to be equipped with adequate ICT resources and infrastructure, and this is most likely an expensive investment. Mohd Isa, Amirah and Mohamed Amin (2009) have reported that students in Malaysia have limited ICT facilities and equipment, Internet access problems, time constraints and high study loads. In recognition of similar problems, the Ministry of National Education in Turkey has expended considerable effort to improve the conditions of state schools in terms of technology and other arrangements. It is reported that approximately 90% of state schools in Turkey had an Internet connection by the end of 2009. Over 600,000 computers were distributed to schools across the country. In the Philippines, 65.6% of the school respondents revealed that their school has only 1–5 Mbps Internet connectivity (Marcial, 2012). Aside from infrastructure and organizational constraints, ICT integration in teaching and learning activities depends on teachers' attitudes and beliefs (Altun and Bektaş, 2010; Alev, 2003; Tezci, 2010). To integrate ICT investments into ICT curricula, teachers' knowledge, level of use and attitudes towards ICT should be identified and guided (Tezci, 2010). According to Zhao and Cziko (2001), teachers should meet three requirements before they start using technology in the classroom:

1. The teacher must believe that using technology will meet a higher-level goal than before.
2. The teacher must believe that using technology will not cause disturbances to other higher-level goals that he or she thinks are more important than the one being pursued.
3. The teacher must believe that he or she has or will have sufficient ability and resources to use the technology.

Methodology

Design and Research Site

The study implemented a descriptive-correlative study and utilised a survey method. The study was conducted in all recognised higher

education institutions (HEIs) offering any teacher education programs in Region 7 of the Philippines. Region 7 is composed of the four provinces of Central Visayas, Philippines, namely, Bohol, Cebu, Negros Oriental and Siquijor. The teacher education programs were degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in public and private HEIs. All private and public HEIs, including community colleges, were included. The respondents of the study were all full-time faculty teaching any professional or specialisation courses in the teacher education program.

Respondents

All HEIs offering teacher education programs in Region 7 were considered. A total enumeration of respondents was employed. The identification of HEIs was based on the list provided by the Commission on Higher Education (CHED) Region 7 office, dated 31 January 2013. Table 1 shows the summary of the number of HEIs offering teacher education programs in the region.

Table 1: Summary of HEIs offering teacher education program in Region 7

Type of HEIs	Bohol		Cebu		Negros Oriental		Siquijor		Total	
	N	%	N	%	N	%	N	%	N	%
Public	7	35.00	17	27.42	9	42.86	1	25	34	31.78
Private	13	65.00	45	72.58	12	57.14	3	75	73	68.22
Total	20	100.00	62	100.00	21	100.00	4	100	107	100.00

As shown in Table 2, a total of 76 out of 107 HEIs participated in the survey study. All schools in Bohol and Siquijor participated in the study. In Negros Oriental, 12 out of 21 schools participated and were included in the study analysis. Five HEIs in Negros Oriental are no longer offering a teacher education program as listed in CHED's database. Some HEIs in Negros Oriental did not return the questionnaires. In Cebu, 40 out of 62 HEIs were included in the study analysis. The completed questionnaires from two schools were rejected due to the qualifications of the person who answered the survey questionnaire. Some Cebu schools opted not to participate in the study, and some did not return the questionnaires after several days of extension. In total, responses from 23 (30.26%) public and 53 (69.74%) private HEIs were included in the study analysis.

Table 2: Summary of HEIs that participated in the study

Type of HEIs	Bohol		Cebu		Negros Oriental		Siquijor		Total	
	N	%	N	%	N	%	N	%	N	%
Public	7	35.00	12	30.00	3	25.00	1	25.00	23	30.26
Private	13	65.00	28	70.00	9	75.00	3	75.00	53	69.74
Total	20	100.00	40	100.00	12	100.00	4	100.00	76	100.00

Instrument

The instrument used in data gathering to accomplish the specific objectives of the study was a survey questionnaire. Questions related to ICT competency in teacher development are based on the Philippine's National ICT Competency Standards for Teachers. The respondents were asked to evaluate their competency level according to the five-point Likert scale as follows: 1 – poor (completely unfamiliar with the task), 2 – fair (just read about the task in a book/heard it from others), 3 – good (able to explain and discuss the task but has not experienced the actual process), 4 – very good (able to perform and carry out the task but needs help, advice and guidance from an expert), and 5 – excellent (able to perform and carry out the task proficiently without the help of an expert). The questionnaire was drafted based on national and integration competency standards. A test-retest was performed among 23 qualified testers to measure the reliability of the instrument. These testers were full-time faculty at Silliman University College of Education who teach in the high school department. They were chosen because they have similar teaching attributes to the respondents. The testers were randomly selected in coordination with the college dean. Administration of the test-retest was performed over two (2) weeks by distributing the hard copy of the questionnaire. Using statistical software, the test-retest answers were processed. Items that were not significant at either 0.01 or 0.05 levels were removed.

Data Gathering and Statistical Treatment

The survey administration process was performed during two distribution periods due to unexpected delays in the project funding. The first administration was performed on 1 to 30 April 2013 by the assigned area coordinators. Field enumerators were identified to assist during the

distribution and collection of the self-administered questionnaire for each province. A briefing was conducted before the survey administration with an emphasis on the ethical standards and protocol. A post-enumeration meeting was also conducted. An endorsement letter from the CHED regional director was attached to all of the survey questionnaires. As part of the protocol, the program or school head was met with first, and this person was the source of information in terms of the total number of qualified respondents. Only those who were present at the time of the visit were given a questionnaire to complete, which was collected before the respondent left the school. Copies of the questionnaire were also left for the school staff to be distributed to all eligible respondents who were not present at the time of the distribution. Retrieval of these questionnaires was performed during the last week of April, 2013.

Some schools in Cebu and one school in Negros Oriental were not visited because of geographical concerns. Instead, printed copies of questionnaires with a return postage stamp were sent via a courier addressed to the school head in reference to the CHED regional's database. Follow-up processes were limited to making a telephone call and sending text messages to the respondents who did not respond by the indicated deadline. A weekly follow-up through email was also conducted to encourage greater participation from HEIs. The first distribution was performed from only 1 to 30 April 2013 to obtain necessary results for the skills enhancement training in May as scheduled. To improve the number of responses from the respondents and participation from other HEIs, a second distribution was performed from July to August 2013 by sending printed copies of the questionnaire to all respondents who were on vacation leave during the April visit. The questionnaires were mailed through a speed mailing service with the inclusion of a prepaid postage stamp. All questionnaires were sent directly to the dean or head of the teacher education program. In total, 383 responses were accepted and included in the analysis and came from 76 private and public HEIs in the four provinces. In this case, 40 survey questionnaires were rejected.

The statistical tools employed in the data processing were the weighted mean for measuring the competency level and the chi-square test for testing the relationships.

Results and Discussion

Level of Competency in ICT Operations and Concepts

The overall mean level of competency in ICT operations and concepts was 3.00, which is described as "good" (see Table 4). The overall result shows that the teacher educators have the ability to explain and discuss the task but have not experienced the actual process.

Specifically, the data show that the respondents are remarkably good at working the essential components of a computer and managing email ($\bar{x} = 3.42$). In contrast, editing video and soundtrack and adding simple enhancements was associated with the lowest level of competency ($\bar{x} = 2.51$), which is described as fair. The ICT competency results for each task according to the province are shown in Table 4. The Bohol respondents were found to be superb in editing video and soundtrack ($\bar{x} = 2.56$) as well as using storage devices for storing and sharing files. However, they had a fair competency in using online and offline support facilities for troubleshooting, maintenance and updates ($\bar{x} = 2.45$). The Cebu respondents were excellent in relation to the main components of the computer ($\bar{x}$ = 3.59), software driver installation ($\bar{x}$ = 3.49), basics of spreadsheet ($\bar{x}$ = 3.54), slide presentation management ($\bar{x}$ = 3.50), LCD projector connectivity ($\bar{x}$ = 3.53) and emails with attachments ($\bar{x}$ = 3.61). The Negros Oriental respondents were excellent in terms of the fundamental components of the computer ($\bar{x}$ = 3.83), storage devices ($\bar{x}$ = 3.74), slide presentation management ($\bar{x}$ = 3.40), LCD projector connectivity ($\bar{x}$ = 3.47), connecting to the Internet via dial-up, LAN or Wi-Fi ($\bar{x}$ = 3.41) and emails with attachments ($\bar{x}$ = 3.59). The Siquijor respondents possessed many skills that are described as fair, such as computer settings configuration ($\bar{x}$ = 2.43), computer protection ($\bar{x}$ = 2.50), online and offline help facilities ($\bar{x}$ = 2.07), spreadsheet sorting ($\bar{x}$ = 2.50), spreadsheets computation and graphs ($\bar{x}$ = 2.50), spreadsheet printing and storing ($\bar{x}$ = 2.43), digital image enhancement ($\bar{x}$ = 2.43), media players ($\bar{x}$ = 2.43), video or sound enhancements ($\bar{x}$ = 2.07), digital photo storage ($\bar{x}$ = 2.43), and web and help applications ($\bar{x}$ = 2.57). Like Cebu and Negros Oriental, the Siquijor respondents were also superb at identifying and defining the functions of the key components of the computer as well as the computer peripherals (i.e., printer, scanner, modem, digital camera,

speaker, others) ($\bar{x}$ = 3.64). In addition, they were superb in using storage devices for storing and sharing files ($\bar{x}$ = 3.71).

The results signify that the competency level of the faculty in teacher education programs is in the technology literacy level. The results show that the faculty members in teacher education are competently using the necessary ICT tools. In terms of their level of technology literacy, teachers know only the necessary hardware and software operations, as well as productivity applications software, web browsers, communications software, presentation software, and management applications. UNESCO (2008) defines three approaches to achieving competency in terms of the operation of ICT tools. These are basic tools, complex tools, and pervasive technologies. The results show that the competency level in relation to a teacher's work aspect is consistent with to the competency level in relation to the ICT operations and concepts of the teacher's skill domain. As discussed, the skills include the competency related to technical operations and concepts of various ICT tools such as computers and communication devices as well as online and offline applications.

The results imply that the teacher educators in Region 7 can interpret and discuss basic computer operation but have not experienced the actual demonstration of computer operation. The results also suggest that the teacher educators do not integrate productivity tools in their classrooms. Likewise, the teacher educators have never implemented the efficient use of the Internet and network applications, including resources, in the classroom. On a positive note, the results show that the teachers can work the essential components of a computer and can manage email; however, they need help and guidance from an expert. However, the results indicate that the teacher educators in the area are not familiar with video and soundtrack editing activities from having read the operation and theory from a book or having heard it from others.

According to Shyamal Majumdar, Director General of the Colombo Plan Staff College for Technician Education (cited in Oliva, 2008), ICT in education has at least four stages: the emerging stage, which involves awareness of ICT; the applying stage, which involves learning ICT; the infusing stage, which involves the use and integration of ICT into the curriculum; and the transforming stage, which involves innovative learning by developing new ways of teaching-learning using ICT. The

results of this study might indicate that the ICT competency of the teacher educators is still in the applying stage. The respondents have the ability to explain and discuss the task but have not experienced the actual process.

Test of Relationships

Table 3 shows the results of chi-square testing for determining whether significant relationships exist between the ICT competencies and demographic characteristics of the respondents. There is much evidence showing the relationship between age and level of ICT competency in operations and concepts. The respondents' ages in this study were categorised according to Erikson's stages of development as young adulthood (19–40), middle adulthood (41–65), and maturity (66–death). The data show that the young adult respondents had the highest level of competency and that the mature respondents had the lowest level of competency. Likewise, marital status is correlated with the level of ICT competency. The data show that the single respondents had the highest level of competency. Moreover, the number of years in teaching affects the level of competency in technology operations and concepts. In contrast, sex, type of institution and highest educational degree were not significantly related to the level of ICT competency in terms of operations and concepts as perceived by the respondents.

Table 3: Relationship between ICT operations competency level and the respondents' demographic characteristics

ICT Operations and Concepts	χ^2 Value	*p* value	df	Remarks
Sex	7.85	0.097	4	Not Significant
Age	66.90	0.000	8	Significant
Marital status	20.00	0.010	8	Significant
Type of institution	2.18	0.702	4	Not Significant
No. of years in teaching	60.90	0.000	15	Significant
Highest educational degree	6.84	0.554	8	Not Significant

The lack of a correlation between sex and ICT competency accords with the results of existing studies such as those of Hew and Leong (2011), Irfan Naufal and Noor Afidah (2012), among others. Hew and Leong (2011) showed that there are no significant gender differences in the use of word processing, presentation, spreadsheet, web, database, social

networking or utility programs. However, Hew and Leong reported that male students demonstrated a significantly superior skill to that of their female counterparts in computer maintenance. Similarly, in the study conducted by Irfan Naufal and Noor Afidah (2012), in terms of the four ICT skills (basic ICT skills, advanced ICT skills, Internet use for information access, and Internet application for communication purposes), there were no significant differences between male and female students.

The results of chi-square testing to determine whether significant relationships exist between ICT competency and the respondents' technology ownership are shown in Table 5. The results show that there is evidence of a significant relationship between the ICT level of competency in technology operations and concepts and the respondents' ownership of a desktop computer (χ^2 (4, N = 383) = 22.60, $p < .01$). The competency level was also influenced by tablet ownership (χ^2 (4, N = 383) = 12.20, $p < .01$), laptop ownership is correlated with the competency level (χ^2 (4, N = 383) = 29.60, $p < .01$) and web accessibility in the school (χ^2 (4, N = 383) = 21.90, $p < .01$). Understandably, respondents who owned a desktop, tablet or laptop and had access to the Internet had a higher level of competency than those who did not. Surprisingly, there was inadequate evidence that smartphone ownership has a significant correlation with the level of competency in technology operations and concepts.

Table 4: Competency level of ICT in operations and concepts

Operations Skills	Bohol		Cebu		Negros Oriental		Siquijor		Total	
	$(\bar{x})$	Description	$(\bar{x})$	Description	$(\bar{x})$	Description	$(\bar{x})$	Description	$(\bar{x})$	Description
a. Identifying & defining the functions of the main components	3.35	Good	3.59	Very Good	3.83	Very Good	3.64	Very Good	3.60	Very Good
b. Properly connecting main components& installing drivers	2.82	Good	3.49	Very Good	3.21	Good	2.71	Good	3.06	Good
c. Configuring computer settings of various software & hardware	2.50	Good	3.25	Good	2.67	Good	2.43	Fair	2.71	Good
d. Understanding the basic functions of the operating system	3.01	Good	3.15	Good	3.10	Good	2.71	Good	2.99	Good
e. Organizing & managing computer files, folders & directories	3.22	Good	3.24	Good	3.39	Good	3.00	Good	3.21	Good
f. Using storage devices (USB, flash memory, etc.) for storing & sharing files	3.50	Very Good	3.02	Good	3.74	Very Good	3.71	Very Good	3.49	Good
g. Protecting the computer from virus, spyware, adware, malware, hackers etc.	2.67	Good	3.15	Good	2.96	Good	2.50	Fair	2.82	Good
h. Using online & offline help facilities for troubleshooting, maintenance & update of applications	2.45	Fair	3.26	Good	2.83	Good	2.07	Fair	2.65	Good
i. Using a spreadsheet to enter & sort data, and formatting cells into tables	2.78	Good	3.02	Good	2.99	Good	2.50	Fair	2.82	Good
j. Using spreadsheets to compute & create graphs	2.78	Good	3.54	Very Good	2.99	Good	2.50	Fair	2.95	Good
k. Printing & storing data tables using a spreadsheet application	2.88	Good	3.07	Good	3.03	Good	2.43	Fair	2.85	Good
l. Enhancing slide presentations by adding sound, animation & images	2.92	Good	2.92	Good	3.35	Good	2.93	Good	3.03	Good
m. Printing presentation handouts & storing slide presentations	3.11	Good	3.50	Very Good	3.40	Very Good	2.93	Good	3.24	Good
n. Making effective class presentations using the slides & LCD projector	3.01	Good	3.53	Very Good	3.47	Very Good	3.36	Good	3.34	Good
o. Acquiring digital images & other media from web sites, CD & flash drives	2.91	Good	3.31	Good	3.27	Good	2.93	Good	3.11	Good

(*continue on next page*)

Table 4: (*continued*)

Operations Skills	Bohol		Cebu		Negros Oriental		Siquijor		Total	
	$(\bar{x})$	Description	$(\bar{x})$	Description	$(\bar{x})$	Description	$(\bar{x})$	Description	$(\bar{x})$	Description
p. Cropping, scaling, correcting colours & enhancing digital images	2.67	Good	3.13	Good	3.04	Good	2.43	Fair	2.82	Good
q. Playing various media files using appropriate media players	2.88	Good	3.15	Good	3.13	Good	2.43	Fair	2.90	Good
r. Stitching together video footage & sound tracks & adding simple enhancements - transitions, titles, etc.	2.56	Fair	2.77	Good	2.64	Good	2.07	Fair	2.51	Fair
s. Storing digital images using optical media (CD, DVD, USB, flash disk) & online repositories	2.84	Good	3.14	Good	3.21	Good	2.43	Fair	2.91	Good
t. Connecting to the Internet via dial-up LAN or Wi-Fi	2.90	Good	3.33	Good	3.41	Very Good	3.00	Good	3.16	Good
u. Configuring & using web browsers & help applications	2.69	Good	2.97	Good	2.91	Good	2.57	Fair	2.79	Good
v. Sending & receiving emails with attachments	3.13	Good	3.61	Very Good	3.59	Very Good	3.36	Good	3.42	Very Good
w. Effectively using synchronous and asynchronous web-based communication tools such as instant messengers, Skype, voice and teleconferencing	2.72	Good	2.99	Good	2.94	Good	2.64	Good	2.82	Good
x. Downloading & installing relevant applications including freeware, shareware, updates, patches, viewers & support applications	2.80	Good	2.87	Good	2.89	Good	2.64	Good	2.80	Good
Aggregate Mean	**2.88**	**Good**	**3.21**	**Good**	**3.17**	**Good**	**2.75**	**Good**	**3.00**	**Good**

Table 5: Relationship between ICT operations competency level and the respondents' technology ownership

ICT Operations and Concepts	χ^2 Value	*p* value	df	Remarks
Desktop ownership	22.60	0.000	4	Significant
Smartphone ownership	8.30	0.081	4	Not Significant
Tablet ownership	14.20	0.007	4	Significant
Laptop ownership	29.60	0.000	4	Significant
Internet accessibility in the school	21.90	0.000	4	Significant

Conclusions and Recommendation

Teacher educators in Region 7 are technologically challenged with innovative teaching and learning. Not all teacher educators are equipped with the recent tools for mobile and collaborative learning. They use and apply essential ICT tools with the desire to achieve innovative teaching and learning. There is an urgent need to increase the level of ICT competency among the teacher educators. What is interesting to highlight, however, is that it appeared that the teachers have not experienced the actual integration processes. There is a need to make a careful analysis of the many variables that affect ICT integration. There is a high demand for improving ICT integration, especially in its operations and concepts. Teachers must take advantage of existing and available tools offered in their institution or other organisations that emphasise open learning. It is highly recommended that ICT skills enhancement training for teacher educators be regularly conducted. Training providers should refer to any existing competency standards such as UNESCO ICT-CST, ISTE Standards·T, NICS-Teachers, and others. They should carefully customise the standards to make it scalable and adaptable in school.

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