Information and Communications Technology (ICT) Integration in Teacher Education Institutions

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Abstract

This study investigated the expressed attitudes, the perceived skill levels, and the level of the Information and Communications Technology ICT integration to instruction of teacher educators in state universities, autonomous and deregulated teacher education institutions. It explored the relationship between expressed attitudes and perceived skill levels towards the actual level of ICT integration. It also determined if a significant relationship exists between the level of ICT integration and the following factors: gender, age, number of years as teacher educators, and employment status. It further sought the teacher educators' opinions on what teacher education subjects and by what manner can the integration of ICTs to instruction be best implemented.

This study was conducted on nine teacher education institutions in the National Capital Region involving 72 teacher educators. Multi – stage sampling was used to determine the samples.

The questionnaires used to gather data were composed of five parts: descriptive statistics, regression analysis, correlation, and case summary. The level of significance was set at 0.05.

Results of the survey revealed the following: generally, teacher educators have positive attitudes towards ICT integration and consider themselves "Good" in the integration of ICTs to instruction. However, there is a "Low" level of integration in all schools; teacher educators from autonomous institutions have the highest positive perception on their skills in ICT integration as well as the level of ICT integration to instruction; perceived skill level is a significant predictor of ICT integration; positive attitude towards ICT integration which does not assure the integration of ICTs to instruction; for every school type, a different attitude subscale

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predicts the integration of ICTs to instruction; positive correlation between the level of ICT integration and age i.e., the lower the age, the higher the level of integration; ICT integration can be implemented not only in Educational Technology subjects but also in other areas; and, training teachers on ICT integration is the most effective way to implement the integration of ICTs to instruction.

The findings of the study revealed that the significant predictor of ICT integration is the perceived skill level. This supports the recommendation of this study to strengthen pre–service and in–service trainings on ICT integration.

Keywords: Information and Communications Technology, ICT Integration, Instruction, Teacher Educators, Teacher Education Institutions, Expressed Attitudes, Perceived Skill Level

Introduction

Information and communications technologies (ICTs) and globalization have brought about profound changes in the world's economy. A new global economy was created – "powered by technology, fueled by information and driven by knowledge" (U.S. Department of Labor, 1999, as cited in Tinio, 2002, p.3). ICTs have changed the way people communicate and do business. It has brought about highly important transformations in agriculture, medicine, engineering, and other fields (UNESCO, 2002). Industries and corporations have retooled the workplace to become more efficient (Bitter & Pierson, 2005). Online job postings, newspapers and other printed ads will show that companies or institutions prefer to hire individuals who are computer literate or highly proficient in the use of new technologies such as the computer. As stated by Bitter and Pierson (2005), "technology literacy is a given order in our society" (p.29).

We have come to an age where the ability to read, write, and count is not enough, for the developments in technology has become widely adopted in the society. Because of this, skills in ICTs are becoming a necessity that individuals have to acquire. This in turn straps educational institutions with the responsibility to provide new facilities that will help prepare students for the pivotal roles they are going to play in the knowledge and digital economy (Zindi and Aucoin, 2005). This shows that

the education sector has to do its share in developing technologically literate individuals to help them maintain a standard of living and create a balanced lifestyle (Bitter & Pierson, 2005). This greatly shows that the educational system plays a very important role for it is considered as "the force that, when functioning properly, promotes literacy or, when failing, allows illiteracy" (Bitter & Pierson, 2005, p. 3). Countries like the US, Europe, Australia, Japan, Singapore, Malaysia, and Philippines have ongoing initiatives on ICTs in education. Some have even created competency standards for technology use. The table that follows will show several countries' ICT infrastructure and ongoing ICT initiatives in education:

Table 1

COUNTRIES	PROGRAMS/STRATEGIES	INFRASTRUCTURE / HARDWARE/ CONNECTIVITY	COMPETENCY STANDARDS FOR TECHNOLOGY USE
1. USA	Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge (US Department of Education, 2002 as cited in Twinning, 2002), No Child Left Behind (NCLB) Educational Legislation (Bitter & Pierson, 2005)	In 2001: 99 % of US public schools have Internet access and of the 99 %, 87 % have Internet access in all instructional rooms (Wheeler, 2000)	ISTE-NETS (Scheffler & Logan, 1999)
2. Europe	National Grid for Learning (NGfL), setting up of Centers of Excellence in IT (Department of Education and Service, 2001 as cited in Twinning, 2002)	In 2000: 62% of primary schools and 93 % of secondary schools have Internet connection (Department of Education and Employment, 2000 as cited in Wheeler, 2000)	ISTE–NETS (UNESCO, n.d.)

3. New Zealand	ICT Schools Cluster Program, School Support Services, The Online Learning Center, Principals' LeadSpace, E-learning for Maori Students, Project Rorohiko, Wharekura Expert Teacher Initiative (Prebble, 2003)	End of 2002: handful of schools have Internet access and there is at least 1 computer for student use in 81% of the classrooms (Prebble, 2003)	None
4. Australia	Northern Territory Department of Education and Training's Indigenous Education Strategic Plan, Basic IT Enabling Skills (BITES) for older workers, Education Queensland's Girls and ICT Initiative, Victorian Government's Women's Web Project, Victorian Department of Education and Training's Bridging the Digital Divide 2000 – 2002, Notebooks for Teachers Program, ICT Skills for Teachers Training Course, WebCT Training, and LearnScope (Naidu & Jasen, 2003)	In 2002: Student–computer ratio is 5:1 (secondary schools generally have lower student–computer ratios than primary school), 91% of all teachers and principals had a computer notebook	Curriculum Standards Framework, Western Australia has Competency Framework for Teachers and in Queensland these competencies are identified in Minimum Standards for Teachers' Learning Technology
5. Japan	Created Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society, Japan Association for Promotion of Educational Technology, Computer Education Practical Idea Award, MEXT Internet Utilization, E-square (e2) Project, KidsWeb Japan and Japan Educational Gateway	1999–2000: Average of 10 students per educational computer over all schools, except for the disabled where ratio is lower, 60 % of teachers use ICT one or more times per week	None
6. Korea	Comprehensive Plan for Developing ICT Use in Education (Hahn, 2003)	2004: 99.6 % of students use	ICT Skills Standards for Teachers

		ICT, 86% of teachers use ICT for class, number of computers per student: elementary level it is 7.2 students per computer (down from 14.1 in 1999); at middle school level it is 6.1 (down from 11.3 in 1999); and at high school it is 5.6 (down from 14.5 in 1999), and 98% of schools have fiber–optic Ethernet connection	(ISST)
7. China	Coca-cola E-Learning Initiatives, Popularization of ICT Education in Primary and Secondary Schools in the Countryside, China – US E-Learning Project, School Connection Project and Modern Distance Education Project (Li, 2003)	Number of computers per student: Elementary – 7.2 students/ computer Middle School – 6.1 students/ computer High School – 5.6 students/ computer (Zhao, 2003)	None
8. Singapore	Creation of National Science and Technology Board, Master Plan 1 and 2 (Krueger, 2006)	2002 – 2003: Widespread deployment of broadband infrastructure, students to computer ratio is 5:1, teacher to notebook computer ratio	Baseline ICT Pupil Standards is now available while Teachers' ICT Standards and HOD's standards will be translated into guidelines in the Professional

		is 2:1, availability of school – wide networking (Ping, 2003)	Development Framework for Teachers and HODs.
9. Malaysia	Virtual Access, E-Learning in Islamic School, Kakaktua.com, Cyber Plant Conservation Project, Smart Schools, Malaysia's Mobile Internet Unit, Penang E-Learning Community Project, E- Learning for Life, and E-nvironment Malaysia (UNESCO, n.d.)	In 2001: Computer Facilities: Primary school – 31% Secondary School – 54% Internet Access: Primary School – 10% Secondary School – 34% (Belawati, 2003)	None
10. Indonesia	5–year action plan which specifically sets out an ICT plan for education, E- dukasi, Education Radio Broadcast for Primary School Students, WANToka (Wide Area Network – CITY), ICT block grants for secondary schools, School 2000, and ICT block grants for secondary schools (Belawati, 2003)	In 2002: About 2500 educational institutions are Internet users: 80% are secondary schools and 20% are higher education institutions; data on the actual use of ICT in schools have never been comprehensively surveyed; application of ICT to teaching – learning activities	None

		is prevalent on international schools (Belawati, 2003)	
11. Philippines	DepEd Modernization Programme, Act of 1998 (R.A. 8525), the Science Education Institute (SEI) Initiatives, The Bridgeit Program, Development of Multimedia packages with ABS – CBN Foundation, Inc., Computer Education for Elementary Schools, TV – Assisted Instructional Project, Eskwela ng Bayan Project, A Project to Integrate ICT into the 2002 Basic Education, IT Centers, ProjectLINK, Continuing studies via Television (CONSTEL), PCs for Public Schools, ICT in Education Master Plan, Philippine Strategic Roadmap (2006 – 2010)	In 2004: 14% of private and public, primary and secondary schools have computer, 69% of public secondary school have at least one computer and 2% of schools have Internet access, 44.5% of public secondary schools that use the Internet for instructional purposes only have one computer that can access the Internet - about half of these schools access the Internet for an average of less than an hour per day	National ICT Competency Standards (NICS) – Basic, Advanced, Teachers (CICT, 2006)

It is virtually known in all countries that the key predictor of student learning is the quality of teachers (Ololube, 2005 as cited in Ololube, 2006). Therefore, an effective teacher education program is a prerequisite for a reliant education (Lawal, 2003). As Jones (2003) stated, teacher education providers are responsible for the future of teaching. Teacher training is indeed crucial, and that teacher education institutions

will continually face the challenge of preparing teachers who can thrive in a dynamic environment of fast-paced technological change and knowledge production (UNESCO, 2002). As Jager and Lokman (n.d.) said, teacher training institutions hold an important role in the process of educational motivation and implementation of ICTs for they have to anticipate new developments and prepare prospective teachers for their future role.

Teacher educators have great influence on their students. "Educational reformers have long noted that teachers teach as they were taught" (Barron & Goldman, 1994 as cited in International Society for Technology in Education, 1999). "If we want to encourage the use of technology as a tool for learning and problem solving, it makes sense that we would want teachers to model this activity for students at all levels and in all appropriate contexts" (ISTE, 1999, p. 23). It wouldn't be possible to produce new generation teachers who effectively use new tools for learning unless teacher educators model effective use of technology in their own classes (UNESCO, 2002). Classroom practice is unlikely to be significantly influenced by the possibilities of technology enhanced teaching and learning unless there is effective instruction and modeling of technology integration during the teacher education experience (Nolan, 2004, p.1). Therefore, for sustained application of ICT in schools, teacher education students must be exposed to effective use of ICTs in their training. By integrating ICTs during regular classes, teachers are demonstrating to students innovative ways of learning (Steketee, 2006). With these, it can be said that the recurring solution in the integration of technology in the classroom is teacher education (Burkholder, 1995; Kearsley & Lynch, 1994; Shermis, 1990; Stoddart & Niederhauser, 1993, as cited in Java, 2004).

Teacher education institutions and programs have a critical role to provide the necessary leadership in adapting pre–service and in–service teacher education to deal with the current demands of society and economy (Bevernage, et al., 2005). Teacher educators should be trained on ICTs (Burkholder, 1995 as cited in Java, 2004 & Chapman & Mählck, 2004) to be able to model to teacher candidates its effective use for teaching and learning (UNESCO, 2002 & Bevernage, et al., 2005). Furthermore, it is important for teacher candidates to be exposed to the effective use of ICTs because they have a significant role to play the sustained application of ICT in schools (Steketee, 2006). As Arinto (2005)

said, competencies in teaching with ICT should be pursued at the pre – service and in – service levels. Training on teaching with ICTs should be constant and built into the system of professional development. Teacher professional development on ICT integration should make use of ICTs, embody and model appropriate pedagogy that teachers can adopt in their classrooms.

School classroom practice is likely to be significantly influenced by the possibilities of technology –enhanced teaching and learning if there is effective instruction and modeling of technology integration during the teacher education experience (Courus, 2002; Maeers, Brown & Cooper, 1999 as cited in Nolan, 2004). Modeling is also important in order to expand pre – service teachers' view on effective integration of ICT into teaching and learning (Nolan, 2004).

Integrating ICTs in teacher training has been the topic of much debate (Larose, et al., 1999) because increased pressure is placed upon educational systems to utilize it (Ololube, 2006). Aside from this, it is also "surprisingly difficult to locate a direct and consistently applied definition of ICT integration" (Lloyd, 2005, p. 4) Similar with the term ICT, definitions of ICT integration are abounding. However, in this study, the following definitions are used: ICTs are various resources and tools presented on the computer (Wang & Woo, 2007).; ICT integration is making use of ICTs during instruction to aid the teaching – learning process.

There are several reasons why ICTs should be integrated to instruction in teacher training. Based on literature, the following are: 1) to prepare teachers for their roles in a society of fast – paced technological change and knowledge production; 2) teacher educators need to model effective ICT integration to influence and encourage teacher candidates to use ICTs in their future work; 3) for sustained application of ICTs; 4) for education to reap the full benefits of ICTs; and 5) to expand pre – service teachers' view on effective ICT integration.

On the other hand, there are several factors that influence teachers' integration of ICTs to instruction. Based on literature, these factors are: 1) teachers' pedagogical and subject knowledge; 2) technologies available / provided; 3) teachers' attitudes and confidence on the use of ICTs; 4) knowledge and skills in ICT; 5) conceptions on the use and benefits of ICTs; 6) type of training received; 7) cooperation with colleagues; 8) ability to integrate ICTs; 9) curriculum; 10) school /

administrative leadership and support; 11) technical support and maintenance; 12) funds for operations; 13) prevalent pedagogical or school culture / context; 14) incentives; and 15) time.

Statement of the Problem

This study attempted to determine the level of ICT integration to instruction in teacher education institutions. Specifically, this study aimed to answer the following questions:

1. What are the expressed attitudes of teacher educators in state universities, autonomous and deregulated teacher education institutions in the National Capital Region towards the integration of ICTs to instruction?
2. What is the perceived skill level in the integration if ICT to instruction of teacher educators in state universities, autonomous and deregulated teacher education institutions in the National Capital Region?
3. What is the level of ICT integration to instruction of teacher educators in state universities, autonomous and deregulated teacher education institutions in the National Capital Region?
4. What is the relationship between expressed attitudes and perceived skill level of teacher educators in state universities and colleges, autonomous and deregulated teacher education institutions in the National Capital Region towards their level of ICT integration to instruction?
5. Is there a significant relationship between the level of ICT integration to instruction and the following factors:
    a. gender
    b. age
    c. number of years as a teacher educator
    d. employment status
6. To which teacher education courses and by what manner can the integration of ICTs to instruction be best implemented?

Participants of the Study

The study was conducted on teacher education institutions in the NCR. In NCR, there are about 82 TEIs, seven of which are SUCs, nine granted with autonomy, and eight with deregulated status. Multi – stage sampling was used to determine the sample. Stratified random sampling was employed to determine which TEIs will be included in the sample. It consisted of three state universities, three with autonomous status, and three with deregulated status. Stratified random sampling was also used to determine the teacher educators who will be included in the sample; that is, those who have at least a year of experience as teacher educator. Lastly, simple random sampling was employed to determine the respondents.

Research Instruments

The research instruments used to gather data from the teacher educators were survey questionnaires. The questionnaires determined their attitudes towards ICT integration to instruction, perceived skill level in the integration of ICTs to instruction, and level of ICT integration to instruction. It also sought their opinions on what teacher education courses and by what manner can the integration of ICTs to instruction be best implemented.

Part I was the 30-item questionnaire on attitudes toward ICT integration to instruction. It was based on the Technology Attitude Questionnaire (Knezek & Christensen, 2000), Attitudes Toward Computers (Java, 2004), and Faculty Attitudes Toward Information Technology (Gilmore, 1998). Similar to Java's questionnaires, the questionnaire in this study is divided into four subscales: interest / enthusiasm, comfort / ease, utility, and relevance. The questionnaire employed a Likert scale in which the respondents were made to choose among the following: Strongly Agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD).

Part II was the 13-item questionnaire that was used to determine the teacher educators perceived skill level in the integration of ICTs to instruction. The items of the questionnaires were based on SchoolNet's Teacher Competencies for ICT Integration (2003), UNESCO's Survey on

ICT Indicators (2004), Jones' ICT Competencies Checklist (2005), and CICT's National ICT Competency Standards for Teachers (2006). ICTs were limited to those commonly used in the educational context and taking into consideration of the teacher as a user of technology. Teacher educators were made to rate themselves based on their self – perceived skill in the integration of ICTs to instruction. The following scale was used: 5 - excellent, 4 – very good, 3 – good, 2 – fair and 1 – no capability. The same items were used on the third part of the questionnaire which determined the level of ICT integration to instruction. Teacher educators were made to provide self-reported information on the number of times they had integrated ICTs to instruction during the first half of the semester. The scale used was: high for 4 - 5 or more times, moderate for 3 to 4 times, low for 1 – 2 times, and no integration of ICT for 0 times.

Part IV collected the teacher educators' opinions on what courses and by what manner can the integration of ICTs to instruction best implemented. On the other hand, the demographic profiles of the respondents were collected with the use of a one-page questionnaire.

The questionnaires were pilot – tested and was found to have an internal consistency of .734. Based on the respondents' comments and suggestions during the pilot testing, some changes were made to the questionnaires. After the data gathering, internal consistency was again tested and it was .952.

Data Collection

A list of teacher education institutions in the NCR was acquired from CHED. Stratified random sampling was then employed to determine the schools where the questionnaires will be distributed. A letter of intent was sent to the deans of the selected schools. The letter explained the importance of the study and the possible respondents. It also assured the confidentiality of the survey's responses. Eight of the deans asked the questionnaires to be left to their personnel in – charge and simple random sampling was used to determine the respondents. Each school was given 15 questionnaires: a total of 135 questionnaires were distributed and 72 were returned which gives a 54.54% return rate. Of the returned questionnaires, 26 were from state universities, 23 from institutions

granted with autonomy, and 23 from deregulated institutions. The data was collected at the middle of the 1st semester of school year 2007 – 2008.

Data Analysis

The data was analyzed using Statistical Product and Service Solutions or SPSS (formerly Statistical Package for the Social Sciences) version 15.

Descriptive statistics using means and medians were used for the data on attitude towards ICT integration, perceived skill level on the integration of ICTs to instruction, and level of ICT integration to instruction. Regression analysis was used to determine if a significant relationship exists between expressed attitude and perceived skill level towards the level of ICT integration to instruction. Correlation was used to determine if a significant relationship exists between level of ICT integration to instruction and the following factors: gender, age, number of years as teacher educator, and employment status. For the data on the courses which teacher educators think that ICT integration to instruction is best implemented, frequencies for multiple response was used. Lastly, case summary was used to determine the ranking of the data on the teacher educators' opinions on what manner can the integration of ICTs to instruction be best implemented.

Results

The study came out with the following significant findings:

1. Profile of the Respondents

    a. Findings revealed that 31.94% of the respondents are between ages 20 – 29 and the mean age of the teacher educators irregardless of school type is 38.11.
    b. Majority or 62.5% of the teacher educators are females. Similar with the results of Project WITTY, majority of the teacher educators are females. Results of both studies indeed show that males are not attracted to the teaching

profession compared to the females. Teaching is indeed a highly gendered profession, both historically and currently that the social attitudes towards teachers have been shaped by the ideology of the male breadwinner (Riddell, et al., 2005). Being breadwinners, the males are forced to look for higher-paying jobs (Project WITTY, 2004). Aside from the salary, status of teachers in the community and career opportunities are reasons for the apparent disinclination of males to become teachers (House of Representatives, 2002 as cited in Lyons, Quinn, and Sumsion, 2005).

c. In terms of employment status, 73.6% are working full – time.

d. It was found out that the lowest educational attainment is having an MA / MS units. It was also seen that 26.9% of teacher educators in state universities are doctorate degree holders; the highest among the school types. Similar with the results of Project WITTY, it shows that although teacher educators are relatively busy, they consider professional and self – advancement very important (2004).

e. 45.2% of the respondents are handling Professional Education subjects. Data also shows that some are handling more than one area such as Reading, Language, and English.

f. Teachers from state universities have the highest percentage at 92.3. However, when it came to Internet access at home, they are the lowest among the schools. On E-mail address ownership, all teacher educators from autonomous institutions have e-mail address. This is consistent with the data on Internet access that also shows the highest percentage among the schools. However, although teacher educators from deregulated institutions also have the highest percentage of internet access, they also have the lowest percentage in terms of having an e-mail address. Their use of the Internet might be more on browsing than for communication like e-mail, chat, or online conferences,

g. It was found out that the teachers learned about computers through a variety of ways. However, it is worth noting that

84.1 % learned through self – practice. Moreover, 60.6% of the teachers from autonomous institutions learned about computers through the in – service training conducted by their schools. The reason might be, autonomous institutions consider computer training for their teachers a priority.

2. Expressed Attitudes Towards ICT Integration to Instruction

Teachers from state universities have the highest overall attitude mean. Among the subscales, "Utility" got the lowest mean of 3.84 and that the "Interest / enthusiasm" subscale have the highest mean of 4.38. "Comfort / ease" and "relevance" got 3.96 and 4.27, respectively. Generally, teacher educators have positive attitudes towards ICT integration.

3. Perceived Skill Level in the Integration of ICTs to Instruction

Teachers consider themselves most skillful in integrating to instruction the use of Internet browser and consider their skill to be "Very Good" meaning they possess ample skills on the use of the technology. This is followed by word processing and use of email / chat / online conferences. On the other hand, teachers consider themselves least skillful in integrating video / web conferencing to instruction.

With the highest mean, teachers from autonomous institutions have the highest positive perception of their skills and generally, notwithstanding of school type, teachers consider their skills to be "Good" or possessing just enough skill on the integration of ICT to instruction. Having a "Good" skill level shows that the teachers' overall performance on the integration of ICTs to instruction falls right in the middle of the scale. This might be because ICT integration is a new movement that there are teachers who attended college when computers were not really used in the classrooms (Sheingold, et al, 1990, as cited in Liu, Theodore & Lavelle, 2004), and the least attended training

is on ICTs (Project WITTY, 2004). However, the measurement of skill level was based on the teacher educators' own perception of their skills. As the International Society for Technology in Education study (1999) acknowledged that there are limitations of self–report surveys because the responses are subjective. Therefore, to validate these self–ratings, the conclusions of such works have to be confirmed through class observations, interviews, or case studies (ISTE, 1999).

4. Level of ICT Integration to Instruction

In a "Moderate" level or having integrated ICT for about 3 – 4 times during the first half of the semester, word processing and Internet browsers are the most commonly integrated and followed by the use of text and graphics on a presentation tool. Considering the means, video or web conferencing is the least integrated with a mean of 1.94, which is described as "Low" or integrated for only 1-2 times. It was found out that majority of the ICTs are integrated either on a "Moderate" or "Low" level. Integration per school type shows that ICTs are most commonly integrated in autonomous institutions and least in deregulated institutions. However, to clearly describe their levels, there is a "Low" level integration in all the TEIs or ICT integration to instruction is rarely done by the teachers.

Considering the results of the expressed attitudes on ICT integration, "Utility" has the lowest mean among the subscales. This might have been a contributing factor to the "Low" level of ICT integration. On the other hand, a generally positive attitude towards ICT integration and a "Good" skill level on the integration of ICTs to instruction brought in a "Low" level of ICT integration to instruction.

Teachers from autonomous institutions who have the highest positive perception on their skills in ICT integration also have the highest mean on the integration of ICTs to instruction. Other reasons for such levels might be attributed to factors like available infrastructure

(Macchiusi, 2001), technical support (Milton, 2003), time (De Sieno, 1995; Baldwin, 1998; and Pinheiro, 1998 as cited in Macchiusi, 2001), school culture (Biggs, 1996 & Milton, 2003), leadership (Gaynor, 2004), and trainings (Ololube, 2006).

Results imply that there is a low exposure of the teacher education students to ICT integration, thus affecting how they would integrate ICTs in their future teaching. As Barron and Goldman (1994 p. 23, as cited in ISTE, 1999) said, "Educational reformers have long noted that teacher teach as they were taught". It is not be possible to prepare new generation of teachers who can effectively use the new tools for learning unless teacher educators model effective use of technology in their own classes (UNESCO, 2003). Moreover, school classroom practice is unlikely to be significantly influenced by the possibilities of technology enhanced teaching and learning unless there is effective instruction and modeling of technology integration during the teacher education experience (Nolan, 2004, p.1). As Steketee (2006) explained there is a need for teacher education students to be exposed to the effective use of ICT in their training and by integrating ICT during regular classes.

However, teachers' skill level on ICT integration or the level of ICT integration to instruction does not affect the institutions' accreditation, granting of status or reapplication of such. The criteria for granting or reapplication of status does not place emphasis on ICT integration. Integration of ICTs to instruction would not be adopted in TEIs unless accrediting organizations or the CHED will place much emphasis on it. While adding specific criteria for evaluation, like teachers' skill on ICT integration would require careful preparation of evaluation instruments and class observations, the benefits that teacher education students will reap is of much importance. This view is supported by UNESCO (2002) stating that, teacher education institutions should be producing graduates who can thrive in a dynamic environment of

fast– paced technological change and knowledge production. Ensuring that teacher educators are prepared for their roles in producing those kind of graduates can make a difference on the adoption of ICT integration.

5. Relationship Between Expressed Attitudes and Perceived Skill Level of ICT Integration to Instruction

Results of the regression analysis indicate that between expressed attitudes and perceived skill level, only the perceived skill level is a significant predictor of integration of ICTs to instruction and this result is valid among different types of institutions. The coefficients table in the regression analysis shows that for every change in the skill level of a teacher educator, the level of integration increases by 0.549. This implies that a teacher educator needs to transcend two levels from their skills assessment in order to transcend to the next level in the frequency by which they integrate ICTs to instruction. For instance, in an institution whose educators rated themselves as incapable in terms of skills and reported that they never integrated ICT when teaching, needs to reach a skills assessment of "Good" to validly claim that they would be able to integrate ICT to instruction 1-2 times. In contrast, analysis indicates that attitude towards ICT integration is not a useful predictor of ICT integration to instruction. This result of the study shows that a positive attitude towards ICT integration does not assure the integration of ICTs to instruction. However, it was determined that for every school type, a different attitude subscale predicts their integration of ICTs to instruction. It was interest / enthusiasm for state universities, comfort / ease for autonomous institutions, utility for deregulated schools, and irregardless of school type, comfort / ease is a significant predictor. Relevance failed to appear as a significant predictor of ICT integration. It can be concluded that one factor by itself does not really ensure integration of

ICTs to instruction. ICT integration to instruction is a result of several factors.

6. **Relationship Between Level of ICT Integration to Instruction and the Following Factors: Gender, Age, Number of Years as Teacher Educator, and Employment Status**

A significant relationship exists only between level of ICT integration and age. The P value at -.281 indicates that the lower the age, the higher the level of ICT integration to instruction. The reason might be older teachers prefer to stick with the pedagogies they were used to. For older teacher educators, learning a new way of teaching might be too cumbersome for them. They have been accustomed to being experts, and since ICT integration to instruction is basically a new movement, it might lead them to anxiety or resistance (De Vry, et al, 1996 in Rogers, 2000).

7. **Teacher Education Courses and Manner to Best Implement ICT Integration to Instruction**

93.1% believe that ICT integration can be best implemented in the Educational Technology subjects. 79.2% also believe that ICT integration to instruction can be implemented on the major courses of the different areas of specializations. Moreover, 75% consider that it is also best to implement ICT integration on the following subjects: General Education, Principles and Methods of Teaching, Educational Measurement and Evaluation, and Curriculum Development. On the other hand, the following rankings on the manner to best implement ICT integration to instruction were revealed:

1 Train teachers on ICT integration
2 Develop ICT – based teacher education curriculum

3.5	Mainstream ICT into the teacher education curriculum
3.5	Provide policies and guidelines on the integration of ICTs to instruction
5	Provide necessary infrastructure
6	Adopt innovative strategies in the use of ICT in schools from the more advanced countries

Conclusion

The following conclusions were arrived based on the findings and limitations of the study:

1. Autonomous teacher education institutions provide more in – service trainings on computers.
2. Teacher educators have positive attitudes towards ICT integration to instruction.
3. Teacher educators perceive themselves to be most skillful in integrating to instruction the use of an Internet browser, and they are least skillful on video or web conferencing.
4. The overall perceived skill level on the integration of ICTs to instruction of teacher educators is "Good".
5. Considering the means of the perceived skill level on ICT integration, teacher educators from autonomous institutions are the most skillful. However, they would still fall under "Good" just like the other teachers from other institutions.
6. Word processing and Internet browsers are the most commonly integrated ICTs on a "Moderate" level, while video / web conferencing is the least integrated on a "Very low" level.
7. Considering the means of the level of ICT integration to instruction, ICTs are more commonly integrated by the teacher educators in autonomous institutions. However, the frequency of their integration would still fall under the "Low" level just like the teachers from state universities and deregulated institutions.

8. In general, there is a low level of ICT integration to instruction in teacher education institutions.
9. Perceived skill level is a significant predictor of ICT integration to instruction.
10. A teacher educator needs to transcend two levels from their skills assessment in order to transcend to the next level in the frequency by which they integrate ICTs to instruction.
11. Attitude towards ICT integration is not a useful predictor of ICT integration to instruction. However, if attitude subscales are considered individually, a different subscale for every school can predict the integration of ICTs to instruction.
12. A significant relationship exists between the level of ICT integration and age.
13. No significant relationship exists between level of ICT integration and the following factors: gender, number of years as teacher educator, and employment status.
14. ICT integration to instruction can be implemented in all teacher education courses.
15. Training teachers on ICT integration is the best manner to implement ICT integration to instruction.

Recommendations

1. Teacher education institutions should provide in – service training on ICTs and ICT integration in order to improve the teacher educators' skill level and increase the level of ICT integration to instruction. Provision of adequate trainings will also raise the level of equality amongst the knowledge of teachers.
2. Teacher education institutions should provide the necessary infrastructure, technical support, proper leadership, time, and promote access to available facilities to encourage teachers to integrate ICTs to instruction. The creation of an incentive system might also encourage teachers to exert effort in integrating ICTs to instruction.
3. Teacher educators should be encouraged to model and integrate ICTs to instruction to serve as models to the pre – service teachers

who would most probably adopt their pedagogies in their future classrooms – a classroom filled with Digital Natives.

4. Technology integration does not happen overnight. Teacher educators who are Digital Immigrants cannot be expected to change their pedagogies because of technological advancement. Teachers should not be forced to change the way they teach for they may become resistant. These teachers need to feel comfortable first on the use of new technologies and be left to integrate it in their lessons as they feel fit. Only then can meaningful and effective ICT integration takes place.
5. Encourage ICT integration to instruction not only in Educational Technology courses but other teacher education courses as well to be able give pre – service teachers a bigger exposure to ICT integration.
6. Conduct trainings on ICT integration and strategic planning for ICT integration to school administrators. Conducting such will ensure that they can provide proper guidance and support to their teachers.
7. In the accreditation of schools, include these specific areas for evaluation: teachers' skill on ICT integration or level of ICT integration. This will encourage or force TEIs to adopt ICT integration.
8. Similar studies should be done and in addition, classes of the teacher respondents be observed or their students would be made to answer a questionnaire on their teachers' integration of ICTs.
9. In similar studies in the future, the following factors should be tested as a predictor of ICT integration to instruction: area of specialization, type of school where the teacher educators came from, and type of computer training received.

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