Pre-service Teachers' Perceived Information and Communication Technology Skills and Use in Teaching and Learning at a Rajabhat University in Northeastern Thailand

Brendan McKell[1] and Satha Phongsatha[2]

ABSTRACT

The purpose of this research was to identify pre-service teachers' ICT ownership, self-perceived ICT skills, and the use of ICT in teaching and learning in realtion to university support, training and infrastructure. This research used a quantitative and qualitative approach. The samples were 470 pre-service teachers at Sakon Nakhon Rajabhat University in northeastern Thailand. The research instruments for data collection included an online survey and semi-structured interviews. Statistics used in data analysis were quantity (N), the sum (∑X), percentage, and frequency.

The findings revealed that the pre-service teachers reported a high level of ownership and abilities in regard to mobile technologies, particularly mobiles and social media. Laptops and personal printers were also utilized by many of pre-service teachers, as well as the use of slideshows, word processing software and spreadsheets. The use of online learning was low. Most pre-service teachers identified a need for better infrastructure being provided by the university and for better training in the use of technologies.

Keywords : Pre-service Teacher, Information and Communication Technology Skills and Use

[1]Postgraduate Student for a Degree of Master of Education Program in Teaching and Technology, Assumption University of Thailand

[2]Ph.D., Advisor of Master of Education Program in Teaching and Technology, Graduate School of eLearning, Assumption University of Thailand

*Corresponding author: ajarnb@live.com

Received 15 March 2019 Accepted 20 April 2019 Published 30 April 2019

Background of the study

The concept of globalisation dominates the various influences driving changes in knowledge and information transfer through technology, telecommunications, international social and economic movement and transport. Thailand, like other countries is trying to keep up with these changes which are mostly related to increasing market competition. Consequestly, the Ministry of Education (2009) presented its proposal for the second decade of education reform in Thailand (2009–2018), thus indicating the value of human resources development in relation to technologies (pp. 11–12). This attempt was constrained by the limited provision of facilities, materials, accessibility, and inadequately trained and equipped human resources regarding technologies for education (p. 8). In addition, the existing content and instructional methods incorporating technology are on a rather small scale (p. 8). Within Thailand, the volumn of research and studies into technologies for education is increasing. Many studies in the Thai context found that pre-service teachers encounter difficulties in using technology resulting from limited basic knowledge in using information technology for study purposes (Gulatee, Pagram & Combes, 2018; Gulatee & Combes, 2017). The students' ICT skills were identified as needing training in creating an appropriate electronic medium for learning, e-learning, e-books; use of internet and networking; and computer use for academic purposes (Deerajvise, 2014). There is also an apparent link between ownership, professional development, attitudes and technology support and implementation (Gulatee, Vonganusith, Pagram, & Cooper, 2016; Chantarvisoot, 2017). Numerous studies also found that the integration of technology in instruction helps the students' learning achievement improve (Mesprasat, Ridhikerd, & Viriyavejakul, 2017; Suebsom, & Meeplad, 2017). Consequently, if pre-service teachers do not acquire and improve their technology skills, it is possible that they will feel less confident to use technology campared to future students. Current staff in Rajabhat Universities have undergone voluntarily training in computer literacy; computer literacy in this situation is, therefore, unlikely to be an official component of instruction, but is of a general and individual usage.

The government funded Rajabhat Universities, whcih are located throughout the country, cater for educational requirements of a wide section of the Thai population. The underlying philosophy of Rajabhat Universities is not only to promote the academic and professional status of teacher-educators and educational personnel, but also to apply advanced technologies to enhance instruction and improve efficiency. In addition, there is a need for effective guidance, support and training for pre-service teachers in integrating technology resources into learning through more hands-on and practical experience. Understanding the pre-service teachers' attitudes about the value of technology integration into practice and reasons for using or not using technology should be emphasized (Anuyahong, & Torut, 2017). There are also studies that have attempted to identify how higher education students, including pre-service teachers are using ICT in their university life. The context of this current study aims to gain insight into pre-servie teachers in technology use in university life cocerning ownership, self-perceived ICT skills, ICT-related pedagogical skills, attitudes, and institutional support for ICT use, which are rarely addressed. A quantitative

survey and qualitative, semi-structured interviews will be conducted for data collection.

Research Objectives

The purposes of this research were to examine the pre-service teachers' perception of their ICT ownership, self-perceived ICT skills and use in teaching and learning corresponding with the support and objectives provided by their institution.

Conceptual Framework

This section outlines details of a conceptual framework concerning the topic of this study. It is believed that the combination of ICT ownership, positive self-perceived skills, tecnology-integration, attitudes and the provision of ICT facilities and support could explain the use of ICT of pre-service teachers.

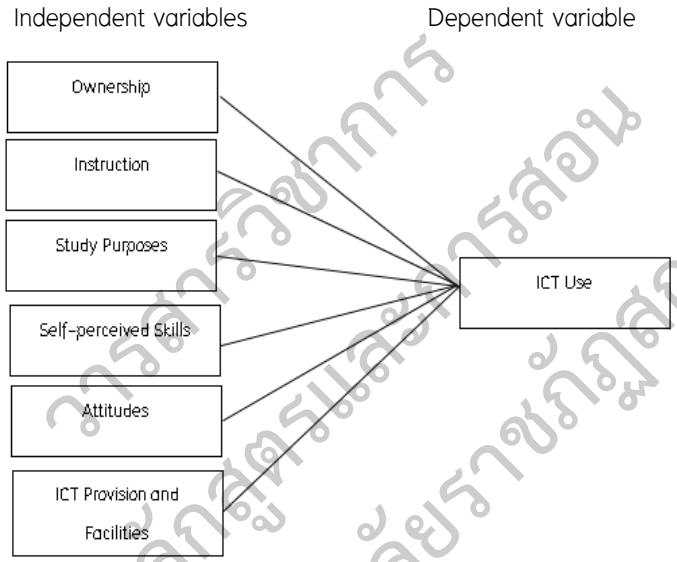

Figure 1 Conceptual framework

Reseach methodology

The methodology used in this study employed a quantitative and qualitative approach. The online survey questionnaire was distributed to 470 pre-service teachers. The semi-structured interviews were then carried out with 25 pre-service teachers who took the survey volunteered to participate in the interviews.

The subjects were 470 pre-service teachers enrolling in the 12 out of 14 Education programs in the second semester in the academic year 2018 at Sakon Nakhon Rajabhat University (SNRU). The pre-service teachers were randomly sampled to determine the sample population. The data were collected from the subjects studying from the first year through the fifth year, comprising 107 seniors (fifth year), 104 seniors (fourth year), 94 juniors, 82 sophomores, and 83 freshmen, yielding a total of 470 pre-service teachers.

The questionnaire used in this study is adapted from Pagram, & Cooper (2011). The questionnaire was proposed to the research advisor for approval and then submitted to experts for content validity. The item quality of this research questionnaire was at 1.00 for all items, which was aligned with the set index of the Item Objective Congruence (IOC) Index. In addition,

the reliability of the developed questions achieved 0.82 which was consistent with the scales of Cronbach's alpha ranging from 0.80–1.00.

The online survey was conducted by using 13 close-ended questions and a set of open-ended questions, yielding a total of 14 questions concerning ICT ownership, including ownership length, ICT for teaching and learning, self-perceived skills, attitudes, and institutional support for ICT use.

Semi-structured interviews were employed in the present study to gain deep understanding of the pre-service teachers' perception and values. Open-ended questions used in the interviews allow a respondent to express meaningful answers using own knowledge, understanding and feelings (Blanford, 2013).

The data was analyzed with both quantitative and qualitative research designs by a statistical computer program, for example quantity (N), the sum (∑X), percentage, and frequency.

Investigation Findings and Conclusion

The investigation findings will be described into six items detailing as follows: 1) ICT ownership, including ownership lenght; 2) ICT use in teaching; 3) ICT use for study purposes; 4) self-perceived ICT skills; 5) attitudes toward ICT and Internet system access; and 6) Institutional policies and support.

1) ICT ownership

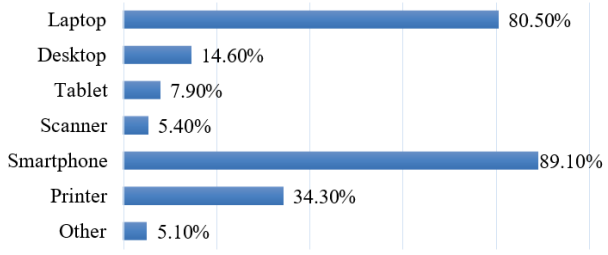

Figure 2 ICT ownership

The data analysis showed that all pre-service teachers owned a variety of ICT devices. All pre-service teachers had at least either a laptop computer or a smartphone. Smartphone ownership was reported by the highest percentage of the respondents at 89.1%, followed by 80.5% of students owning laptop computers. They also reported their ownership on the printer while the number of pre-service teachers owning desktop computers, tablets, scanner, and other devices was considerably small proportion.

As an addition of ownership, the respondents rated the length of ICT device ownership in terms of laptop computers (41%) and modern technologies such as smartphones (40%) for longer periods. Desktop computers (60%), tablets (68%), scanners (78%) appear not being owned by most pre-service teachers. Almost 60% of pre-service teachers owned printers.

2) Use of ICT in teaching

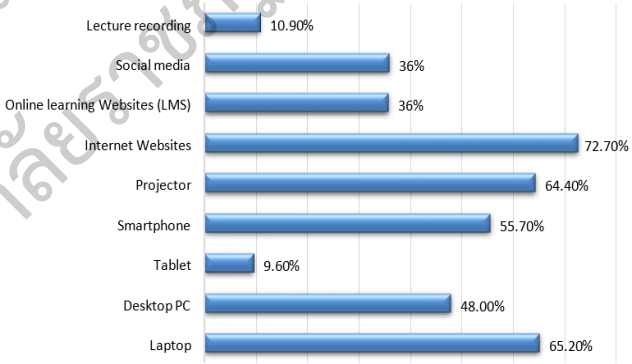

Figure 3 Use of ICT in Teaching

The graph demonstrated that the most used devices were Internet websites (72.7%), laptops (65.2%), projectors (64.4%), followed by smartphones (55.7%). Desktop computers (supplied by the university) were also rated at a high level (48%). Online learning websites (LMS) and social media were rated at equal percentage (36%). Tablet and lecturer recording were at a small rate.

3) ICT use for study purposes

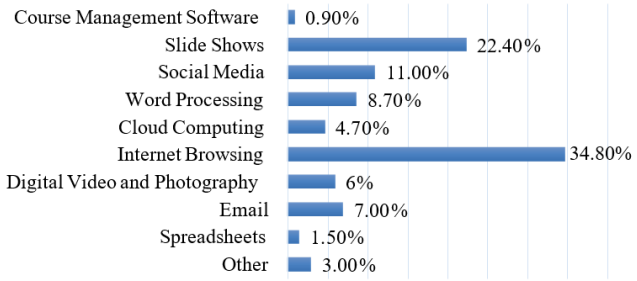

Figure 4 ICT use for study purposes

The pre-service teachers reported using Internet Browsers to support their studies (34.8%), followed by slideshows (22.4%). Social media (11%) and word processing (8.7%) appeared to be devices that the pre-service teachers employed to support their learning. Using spreadsheets, digital video and photography, email, course management software, and cloud computing can be seen but fewer application for learning purposes.

4) Self-perceived ICT skills

The invetagation examined the level of skills of pre-service teachers possessed on computers. The eight categories were rated in accordance with individual skills on technology devices, including word processing, slideshows, spreadsheets, Internet Browsing, social media, video and digital photograph, email, course management software, and cloud computing. The results revealed that the pre-service teachers perceived their competence to advanced skills of using word processing, slideshows, Internet Browsers, email, and social media. However, the pre-service teachers perceived their limited skills in using spreadsheets, digital video and photography, course management software, and cloud computing.

The mentioned results are similar to the best description of the self-perceived skills in technologies of pre-service teachers below. The data revealed that most pre-service teachers (81.9%) accepted technology integration into their life.

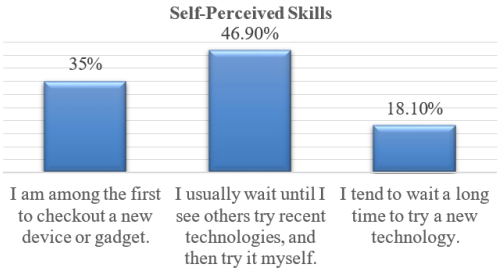

Figure 5 Self-Perceived Skills

5) Attitudes toward technology and Internet system access

According to the results, the pre-service teachers' attitudes toward technology were more positive which tended to reach "Strongly agree" to "Agree" interval scale.

In terms of the university's policies and support, more than 90% of pre-service teachers reported their positive level of attitudes toward institutional support for ICT use in all statements, including making use of internet-based communication, internet for study support, maintaining all equipment, IT support, and providing all the technologies support for learning successfully. Based upon the inteviews, the pre-service teachers also looked for the more training opportunities and various considerations e.g. computer access, technologies competence and experience, and computer education to minimize the failure of technology use in the future classroom.

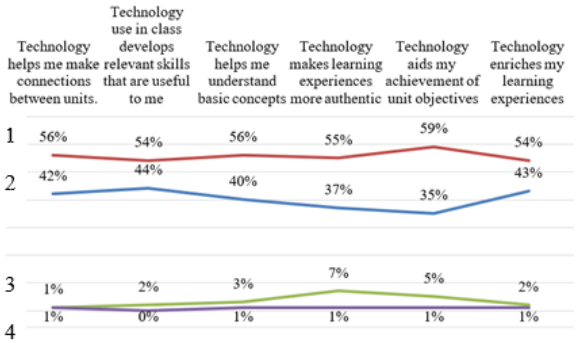

Figure 6 Attitudes toward Technology

Note: 1 = strongly agree; 2 = agree; 3 = disagree; 4 = strongly disagree

In terms of Internet system access, the pre–service teachers reported their Internet access everyday through individual smartphones, Approximately 48% of participants among pre–service teachers used computers routinely at home and dormitories, and Internet mobile phones. 58% of pre–service teachers reported sometimes using the free Wi–Fi at restaurants or shops. More than 55% of participants reported sometimes using the Internet at the university Wi–Fi and university computer lab.

Discussion

This section presents discussions of the findings.

1. ICT ownership

The results of the current study indicated that overall, pre–service teachers' responses concerning ICT ownership represented a move toward mobile devices, which were more affordable and convenient. Many pre–service teachers possessed and had access to devices as a learning tool and a comunication tool. The finding emerged from the current study matched with previous studies, which showed that 90% of pre–service teachers owned mobile phones and nearly two third of 386 respondents owned laptop computers (Raphael, & Mtebe, 2016, p. 202). Other studies in a Thai context found that the students at a higher education level in Thailand considered mobile phones as necessary items to own, resulting in using their mobile phones every day with 85% of users (Gulatee, & Combes, 2017, p. 84).

2. ICT ownership length

The result of the present study revealed that the pre–service teachers' owneship signified a move toward handheld mobile devices. In terms of years of ICT ownership, from the current study revealed that the pre–service teachers (more than 40%) tended to own laptop computers and modern technologies such as mobile phones for longer periods. This also mirrors previous studies where university students spent significantly more time using mobile phones, online chatting, and social networking sites (Bragdon & Dowler, 2016, p. 12). Similarly, a study of Gulatee, Pagram, & Combes (2018, p. 142) also found an increase in smartphones ownership over laptops may due to mobility and the increase use of Google Classroom and the cloud to access staff and learing materials.

3. Use of ICT in teaching

The result of the current study revealed that the devices use in the classroom showed a combination of mobile devices or resources: Internet websites, laptops, smartphones and convention devices like projectors and desktop computers. Online websites (LMS) and social media were not fully employed during the lecture. The data from previous studies showed that all faculty members from 68 departments of the College of Education owned a variety of devices, including iPad. All participants used laptop computers and iPad as part of their classes, including preparing and presenting course materials such as presentations and videos (Islim, & Cirak, 2017, p. 55). Quite a large number of users of mobile phones for teaching at a university due to the handheld property of mobile devices, including protable and convenience (Jawarneh, 2017, p. 164).

4. ICT use for study purposes

The investigation found that many devices such as Internet Browsers, slideshows, social media and word processing appeared to be of medium use among pre–service teachers. Fewer pre–service teachers

employed spreadsheets, digital video and photography, email, course management software, and cloud computing for learning. This could conclude that most respondents used their devices either for getting or tracking different information both for academic or personal purposes. The results of this study demonstrate similar results as previous research–indicating that pre–service teachers felt confidence regarding their abilities to integrate technology, but also felt pressure to be able to teach with technology (Mulder, 2017, p. 7).

5. ICT perceived skills

The pre–service teachers reported their technology skills in a positive way concerning word processing, slideshows, Internet Browsers, email, and social media. The pre–service teachers also considered themselves as beginners in using spreadsheets, digital video and photography, email, course management software, and cloud computing. Similar findings were reported in a survey by Newhouse, Pagram, & Cooper, (2016) that 184 undergraduate pre–service teachers showed they used the basic features of blackboard to manage files and to communicate. Almost all required some use of standard office qualifications, internet search, slideshows, and some digital media production.

Based on the questionnaires conducted in this study, pre–service teachers saw themselves as competent to advanced level of technology skills, such as social media, slideshows, word processing, spreadsheet, Internet Browsers, and email. However, participating pre–service teachers still indicated that there still was a need for developing technology skills.

6. Self–perceived skills and attitudes

In terms of attitudes, pre–service teachers' attitudes showed positive responses, which were in accordance with the analysis of interviews reporting the great appreciation of technologyy benefit, and less fear of technology usage. Similar findings were reported in a study of Mimnoi (2015, p. 199) that the majority of sophomore, junior and senior undergradutes (N=190) engaged in self–learning behaviours and utilized new media at a high level of mean scores. Their attitudes towards new media for self learning aspects were at statistically significant level of .05. In a Thai context, the higher education students had positive attitudes toward the use of Internet in learning subjects, They also perceived themselves as good at basic Internet applications (Chomphuchart, 2017, p. 13).

7. The university's ICT policies and support

Due to the unsupportive physical infrastructure, the technology implementation is challenging, such as the classroom is equipped with technology like desktop and projectors, but a limitation of Internet speed and network instability. The preparation for pre–service teachers can be categorized into three aspects: Professional development, infrastructure provision, and support from experts and peers.

The similar results of the previous studies of Jawarneh (2017, p. 179) and Rana (2016, p. 5) are of interest, given that the university lecturers tend to have sufficient skills for everyday and routine working practices, but many of them still have difficulties with access due to infrastructure issues. In addition, the effective provision of technology infrastructure should be considered because of limitations of home Internet. For example, a study by Chomphuchart (2017, p. 13) reported that most higher education students from eight univeristies in Bangkok and four universities from other regions of Thailand frequently accessed the Internet at home and encountered limitations from too many users on the Internet and limited server capacity.

Also a recommendation from a survey study of Pagram, Jin & Cooper (2017, p. 244) addressed that "the increase in the possession of laptops, smart phones and the way that devices are accessed suggests that more students are using portable devices and it is also the time for the universities to change their ICT policies and practice".

Recommendations

The purpose of this section is to provide implications for practice and to recommend a path for further research.

Implications for practice

The current study also suggests that instructors should improve individual ICT skills to keep up with the modern youth in using social media and other new applications and to integrate ICT use into the classroom to encourage future teachers' confidence and positive attitudes toward ICT use for future career. Therefore, the universities should ensure the effective provision and use of ICT, including basic computer literacy and appropriate use of various forms of ICT in individual practice. In addition, the development of an ICT curriculum integration should be considered for futher improvement of ICT skills for both pre-service teachers and instructors.

Recommendations for future research

The study of instructors of ICT skills and attitudes should be conducted to further address issues identified with the current education system. Additional research will be needed to improve instructors and pre-service teachers' learning opportunities connected to the realities of how instructors and pre-service students spend their time using technologies. Further research is also needed to study the instructors' attitudes toward technologies, and perception of individual ICT skills, including the exploration of development of relationships of instructors and students using ICT. Possible research also relates to instructors' learning opportunities to meet the improvement of professional practices, and the intersection of these needs with future technological changes. The effects of pre-service teachers being left behind in terms of ICT use are also needed to be conducted.

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