การศึกษาสภาพและความต้องการพัฒนาความสามารถการบูรณาการไอซีที
ในการสอนของครูระดับประถมศึกษา สังกัดคณะกรรมการส่งเสริมการศึกษาเอกชน

Needs Assessment of ICT Integrated Teaching Ability Development for Primary School Teachers under the Office of the Private Education Committee (Private School)

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บทคัดย่อ

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาสภาพและความต้องการพัฒนาความสามารถการบูรณาการไอซีทีในการสอนของครูระดับประถมศึกษา สังกัดคณะกรรมการส่งเสริมการศึกษาเอกชน เป็นการวิจัยเชิงสำรวจโดยใช้แบบสอบถาม กลุ่มตัวอย่างมีจำนวน 387 คน ใช้วิธีการสุ่มตัวอย่างแบบหลายขั้นตอน ผลการศึกษา พบว่า ครูส่วนใหญ่มีการนำเครื่องมือไอซีทีมาใช้ในการสอนต่ำกว่า 6 ชั่วโมงต่อสัปดาห์ (38.5%) และส่วนใหญ่มีสัดส่วนการนำเครื่องมือไอซีทีมาใช้ในการสอนต่อชั่วโมงสอนต่อสัปดาห์ 21-40% (24.3%) เมื่อวิเคราะห์ความต้องการจำเป็นด้านการบูรณาการไอซีทีในการสอน รายการความต้องการจำเป็นที่พบว่า มีค่า PNI$_{modified}$ สูงที่สุดมีความสำคัญเป็นลำดับที่หนึ่ง คือ การใช้ไอซีทีในการประเมินผู้เรียนก่อนเรียน รองลงมาคือ การใช้ไอซีทีในการประเมินผู้เรียนหลังเรียน และการใช้ไอซีทีในการตรวจสอบความเข้าใจของผู้เรียนระหว่างเรียน และเมื่อวิเคราะห์ความต้องการจำเป็นด้านการพัฒนาความสามารถการบูรณาการไอซีทีในการสอน ความต้องการจำเป็นที่มีความสำคัญเป็นลำดับที่หนึ่ง คือ ครูต้องการให้มีผู้เชี่ยวชาญภายนอกที่มีประสบการณ์ด้านการบูรณาการไอซีทีในการสอนช่วยให้คำแนะนำในการเลือกใช้ไอซีทีในการสอน รองลงมา คือ การร่วมมือกันในการผลิตสื่อไอซีทีและเตรียมอุปกรณ์ และการร่วมมือกันออกแบบการสอนโดยใช้ไอซีทีแก้ปัญหาผู้เรียน

คำสำคัญ: การบูรณาการไอซีทีในการสอน / การพัฒนาความสามารถด้านการบูรณาการไอซีทีในการสอน / ครูประถมศึกษา

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Abstract

The purpose of this study was to assess the needs required to develop ICT integrated teaching ability for primary school teachers under the Office of the Private Education Committee (Private school). The survey was conducted using questionnaires. The sample was 387 teachers, using a multi-stage sampling technique. The study indicated that most of the teachers have a number of ICT used hours of less than 6 hours per week (38.5%) and most of them have a percentage of ICT used hours per total teaching hours per week between 21-40% (24.3%). Analyzing the needs for ICT integrated teaching, the highest $PNI_{modified}$ value were the use of ICT in Pre-testing, followed by the use of ICT in Post-testing and the use of ICT in checking students' understanding during classes. When analyzing the needs for ICT integrated teaching ability development, the first priority was to have external experts with ICT integrated experience to guide how to choose ICT in teaching, followed by collaboratively working together with peers to produce ICT media and prepare related tools, and a collaborative effort in designing ICT-based classroom to solve student problems.

KEYWORDS: ICT INTEGRATED TEACHING / ICT INTEGRATED TEACHING ABILITY DEVELOPMENT / PRIMARY SCHOOL TEACHER

Introduction

Information and Communication Technology (ICT) plays a very important role at present, as it is considered to be an effective tool for increasing the performance of education, expanding learning opportunities to reduce inequalities and enhancing students' potentials. Because ICT provides teachers with more opportunities in adapting their learning and teaching methods to meet individual students' needs, acquiring ICT competency for teachers has become a major component of education today. There are many organizations that develop ICT frameworks and standards for teachers, students and schools. Specifically, for private schools to certify to international standards, 80% of their teachers are required to use ICT in teaching and

develop innovative teaching media (Office of Private Education Committee, 2015).

For the abovementioned significance, there are various government-initiated programs and public-private institutes that try to organize a professional development program for teachers in the integration of ICT. However, it has been found that these professional development programs normally consist of only a day or a one-week workshop with the focus on the technical functions of ICT tools. Even though most of the training results have been rated as good, a report has shown that Thai teachers lack confidence in their own ability to use ICT in the classroom (OECD /UNESCO, 2016). Due to the huge size of the training classes, limited time, and non-contextualized content, the current training does not adequately support teachers in applying their knowledge into actual classroom settings (Akarawang, Kidraran & Nuangchalerm, 2015; Cabero & Barroso, 2016; Sánchez-García, Marcos, GuanLin & Escribano, 2013).

For ICT to become an integral tool for learning, teachers must develop a conception of their subject matter with respect to technology and how to use that technology to teach in constructive ways (Koehler & Misha, 2008). Training that focuses on instrumental aspects is simply not enough. A number of studies related to ICT skills enhancement have shown that teachers need professional development that allows ongoing collaboration with peers to learn about new technology and to plan lessons together (Jang, 2010; Jang & Chen, 2010). They also need to be able to observe ICT-mediated classes and reflect on the observation results to develop a deeper knowledge of teaching with technology in an actual classroom context (Lu, 2013).

The purpose of this study aims to identify the existing situation and the desired state of ICT integrated instruction, as well as the collaborative effort within schools to see the possibilities of enhancing ICT integrated instruction ability through collaborative work with peers. Identifying needs is to be discussed throughout this paper.

Objectives

1. To study the needs for ICT integrated teaching
2. To study the needs for ICT integrated teaching ability development

Methodology

The procedure and the development of the reseach tool were as following;

1. This research commenced with a literature review to identify relevant theories, concepts and research related to ICT integrated instruction abilities and enhancement. This research was a survey research by questionnaires, the populations were primary school teachers under the Office of Private Education Committee; a sample group was chosen by multi-stage sampling based on the Cochran (2007) sample size formula. The data was collected from 480 randomly selected primary school teachers from 60 schools in 5 regions of Thailand; North, Northeast, Central, East, and South.

2. A questionnaire employed to collect data from teachers in which questions were on ICT use in teaching and learning, and the process they expect to receive as support to enhance their ICT skills. The questionnaire comprised of a checklist, rating scales, and a dual-response format to determine the actual and desired state. It has been validated with an Index

of Item-Objective Congruence (IOC) with only questions with an IOC rating of more than 0.6 included.

3. Data was collected through post services during August–September 2017, 387 completed questionnaires were used for analysis (80%). Findings were present in frequency, percentage, mean, and Priority Needs Index (PNI). The PNI calculation is based on this formula: $PNI_{Modified} = (I-D)/D$ (Wongwanich, 2007), "I" refers to the average of existing state and "D" refers to the average of desired state. Both variables vary from 1 (the lowest) to 5 (the highest).

Findings

The research findings can be presented into 3 parts; 1) number and percentage of respondents' general information, 2) needs for ICT integrated instruction and 3) needs for ICT integrated instruction ability enhancement as below:

Part 1: Number and percentage of respondents' general information

Most of the respondents were female (83.2%), in the age group of 30–39 years old (37.2%) and 91% had their own notebook or personal computer in order to work at home. Most of the teachers indicated that their schools have ICT infrastructure set up ready to use ICT in teaching and learning. Only 9.6% indicated that the ICT infrastructure is not ready.

For the ICT infrastructure ready schools, most teachers indicated that their regular classrooms have an internet connection (66.4%), a notebook/PC (65.6%) and a Projector/TV (58.1%). For shared rooms and resources, the numbers of available internet connection, a notebook / PC and a Projector/ TV were increased (73.1%, 84.8%, 59.4%, respectively). Most schools did not

provide Smartphone/Tablet (only 15%) but more were provided as sharable devices (32.8%), as shown in Table1.

Table 1 ICT infrastructure in School (n=387)

ICT Infrastructure	Shared Room/Resources		Regular classrooms	
	Frequency	Percentage	Frequency	Percentage
Notebook/PC	328	84.8	254	65.6
Printer/Scanner	194	50.1	87	22.5
Smartphone/Tablet	127	32.8	58	15.0
Internet	283	73.1	257	66.4
Interactive Board	35	9.0	35	9.0
Projector/TV	230	59.4	225	58.1

Based on the data in Table 2, most teachers had 16-20 teaching hours per week (35.1%) and used ICT for classroom instruction for less than 6 hours per week (38.5%). 7% of teachers indicated that they were not currently using ICT in the classroom at all. For the ratio of ICT usage hours per teaching hours, most teachers were between 21–40% (24.3%).

Table 2 Number and percentage of teaching hours information (n=387)

Data	Categories	Number	Percentage
Teaching hours per week	Less than 6 hours	11	2.8
	6-10 hours	17	4.4
	11-15 hours	41	10.6
	16-20 hours	136	35.1
	21-25 hours	135	34.9
	More than 25 hours	47	12.1

Table 2 (Cont.) Number and percentage of teaching hours information (n=387)

Data	Categories	Number	Percentage
ICT usage hours per week in class-room instruction	Not used	27	7.0
	Less than 6 hours	149	38.5
	6-10 hours	88	22.7
	11-15 hours	47	12.1
	16-20 hours	59	15.2
	21-25 hours	12	3.1
	More than 25 hours	5	1.3
The percentage of ICT usage hours per teaching hours	Do not use ICT tools	27	7.0
	1-20 %	75	19.4
	21-40 %	94	24.3
	41-60 %	67	17.3
	61-80 %	46	11.9
	81-100 %	78	20.2

Part 2: Needs for ICT integrated teaching of the primary school teachers under the Office of Private Education Committee

The first 5 popular ICT tools were: 1) Online media tools such as YouTube (75.7%), 2) Presentation tools (58.1%), 3) Computer Assisted Instruction-CAI (35.7%), 4) Online social media tools (34.6%), and 5) Online learning resources (28.2%) and Online assessment tools were the least used ICT, as shown in Figure 1.
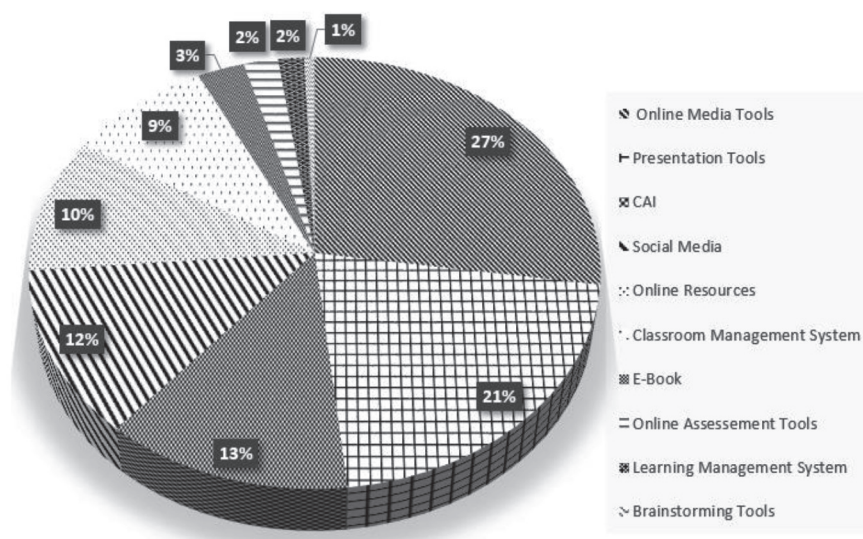
Figure 1 The used ICT tools in teaching

When considering the primary objectives of using ICT tools in teaching, the survey results showed that most teachers had a reason to adopt ICT tools in order to stimulate the student's learning (86.6%), to enrich the content (84.8%), whereas the least was to extend the learning beyond the classroom (11.4%), as shown in Figure 2.
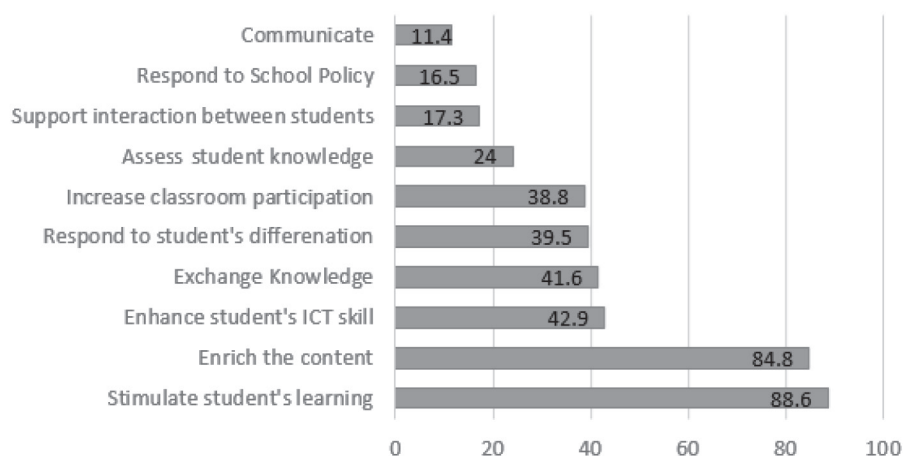

Figure 2 The objectives of ICT tools in teaching

Figure 3 displays the results of the needs assessment for ICT integrated teaching. Based on the priority need index (PNI), the first priority was to use ICT to support student pre-testing (PNI =0.220), followed by to use ICT to support student post-testing (PNI =0.198), and the third was to use ICT to support learning assessment during class (PNI =0.187). The mean scores of expectation for each item were similarly at high levels (M = 4.04, 4.10, 4.16, respectively).
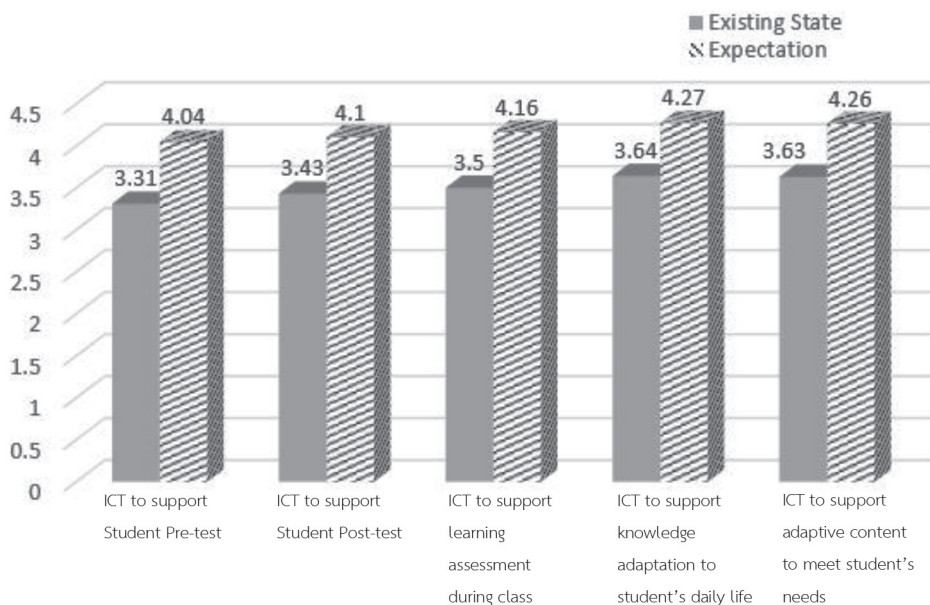
Figure 3 Needs on ICT integrated teaching

Comparing the average of the existing state of ICT usage between ICT infrastructure ready schools and those that were not ready, results indicated a significant difference at the .05 level (F = 2.249; sig = .025). Teachers in ICT infrastructure ready schools seem to use ICT in teaching more than teachers in schools where ICT infrastructure was not ready ($\overline{X}$ = 3.65, 3.41; SD = 0.63, 0.65 respectively).

Part 3: Needs for ICT integrated teaching ability development

The mean score of each item in Table 3 was divided into 2 sections; the existing and desired support expected from experts and the existing and desired support expected from peers. For the support from the experts, the average of expectation was all at a high level, where teachers prefer to have computer teachers or an ICT specialist in the school to help at the highest level (4.37), followed next by having ICT integrated instruction experienced teachers in the school to help advise when selecting ICT tools. While internal experts were more favorable, support from outside experts is at a high level (4.16) and ranked as 1st in the priority need index (0.217). For the support from peers, the average of expectations is also at a high level, however, to share ICT knowledge with peers to support student learning is the process with the highest average score (4.24). It is worth noting that for teachers who do not normally help each other prepare ICT tools, the average score of the existing state is the lowest (3.47).

Based on the priority need index (PNI), the first priority is to have external experts with ICT integrated instruction experience to help advise on selecting ICT tools (PNI = .217), followed by the collaboration of teachers to prepare ICT tools and related equipment (PNI = .200), and third is designing ICT-based lesson plans (PNI = .187).

Comparing the average by a school's infrastructure readiness, results indicated a significant difference at .05 level (F = 2.241; sig = .026) which is for teachers in schools where the ICT infrastructure is ready, they expect collaborative support in ICT more than teachers in schools where the ICT infrastructure is not ready.

Table 3 Results of needs for ICT integrated teaching ability development

Category	Existing State (D)	Meaning	Desired state (I)	Meaning	PNI	Rank
Support from Experts						
External experts with ICT integrated instruction experience	3.42	Medium	4.16	High	0.217	1
ICT integrated instruction experienced teachers in the school	3.73	High	4.31	High	0.155	7
Computer teachers or ICT specialists in the school	3.88	High	4.37	High	0.127	8
Collaborative support from peers						
Collaboratively preparing ICT tools and related equipment	3.47	Medium	4.16	High	0.200	2
Collaboratively designing ICT-based lesson plan	3.51	High	4.16	High	0.187	3
Observation and reflection on ICT problems in class	3.55	High	4.19	High	0.181	4
Collaboratively learning ICT tools to share affordances and constraints	3.58	High	4.21	High	0.177	5
ICT knowledge sharing with peers to support student learning	3.65	High	4.24	High	0.161	6

Conclusions and Discussion

The results of this study can be concluded according to the reseach objectives as follows:

1. A study of needs for ICT integrated teaching of primary school teachers under the Office of Private Education Committee, the first priority is to use ICT to support Student Pre-testing (PNI =0.220), followed by the use of ICT to support Student Post-testing (PNI =0.198), and third is to use ICT to support learning assessment during class (PNI =0.187). Even though only 5.9% of teachers who use online assessment tools such as Kahoot, Plicker, Socrative, the result of this study confirmed that teachers realize how essential it is and the advantages of using ICT to assess student learning. The mean scores of expectation for ICT in student assessment were similarly at a high level (M = 4.04, 4.10, 4.16, respectively). In fact, with the current functionally of online assessment tools nowadays, teachers can track student performances individually or in groups easily and the results allow teachers to adjust instruction accordingly.

When considering the existing state of ICT usage, results reveal that most teachers use ICT for less than 6 hours a week (38.5%) which is similar to the research of ICT indicators in education from the Office of the Permanent Secretary, Ministry of Education (2013), in which there were only 4.10 – 4.86 hours a week of ICT usage in teaching and learning for teachers in private schools. The results of this study imply that ICT usage has not increased by much in 4 - 5 years, despite that teachers' ICT competency has been the key focus in the ICT Master plan - ICT2020 (Ministry of Information and Communication Technology, 2011).

When comparing the average of the existing state of ICT usage between ICT infrastructure ready schools and those not ready, results indicated a significant difference at the .05 level (F = 2.249; sig =.025). Teachers in ICT infrastructure ready schools seemed to use ICT in teaching

more than teachers in schools where the ICT infrastructure was not ready ($\overline{X}$ = 3.65, 3.41; SD = 0.63, 0.65, respectively). This result complies with the research on factors affecting teachers' use of information and communications technology (Buabeng-Andoh, 2012; Mumtaz, 2006). Access to ICT resources in schools is a necessary condition for the integration of ICT in education. The absence of ICT infrastructure or poorly maintained hardware may discourage the use of ICT by teachers. Support from school leaders and administrators are therefore crucial in order to create a conducive ICT-mediated environment (Buabeng-Andoh, 2012; Lim & Khine, 2006). In addition, when studying the primary objective to use ICT in classrooms, the research results showed that most teachers reasoned with the idea of using ICT to stimulate students' learning (86.6%). Although most teachers reasoned with the idea of using technology to make the learning process more attractive for students, it could be implied that attractiveness contributes to its effectiveness for student learning (Heitink, Voogt, Verplanken, Braak & Fisser, 2016).

2. In a study of the needs for ICT integrated ability development, the first priority was to have external ICT experts who have experience in ICT mediate instruction to advise ICT tools selection (PNI = .217). The result of this study confirmed that the support from external experts is necessary. From the literature review, support by experienced experts would help connect the ICT workshop activities to classroom practice and help with the blending of new ICT functionalities into content, pedagogy and classroom context (Plair, 2008; Sánchez-García et al., 2013). Observing ICT experienced teachers and receiving advice is a technique to support the fast ICT integrated teaching improvement (Haydn, 2014; Jang & Chen, 2010). Moreover, having external resources would help to bring in new knowledge, new teaching techniques and more creative ways to solve student problems (Sánchez-García et al.,

2013; Takahashi, 2014).

For the collaborative support from peers, the results of the needs assessment confirmed that all processes were necessary at a high level. The first priority was the collaboration of teachers to build ICT tools and prepare the classroom (PNI = .200), followed by designing ICT based lesson plans together (PNI = .187) and observing and reflecting on ICT problems in the classroom. Thus, a future ICT integrated teaching ability development process should consider a step for teachers to work together to build ICT tools and design ICT based lesson plan, as well as observation and reflection on ICT problems in the classroom to see the effectiveness of that design lesson. Through ongoing collaboration, teachers can learn from each other to adapt lessons to use technology and explore more areas where technology could be used to help students better understand a particular topic, and finally to advance the depth of the lesson through the use of technology.

Recommendations

The findings of this study suggested that to improve teacher development in ICT integrated teaching ability, the process should include training on ICT assessment tools to support teachers to use ICT in Pre-testing, Post-testing and in checking students' understanding during classes. Besides, the development process should consider a step for teachers to work together to build ICT tools and design ICT based lesson plans. Advice from external ICT experts is also important for consideration as part of the process. However, there remains a lack for research that produces, validates and proposes the model or framework to support the development of ICT integrated teaching ability. An assessment on ICT integrated teaching ability is also important for future research.

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