

An Investigation of Teachers' Needs on Using ICT in Teaching and Learning

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Abstract. Using information and communication technology (ICT) is becoming an essential skill for teachers to enhance teaching and learning. Teacher training on ICT utilization in higher education institutions in China has emerged as an important issue. However, limited research has been done on a needs analysis for teachers using ICT in university teaching. The purpose of this study was to investigate the need to use ICT in teaching at Capital Normal University (CNU) from the teachers' perspective. Four topics—skills in using traditional and ICT media in teaching, needs for learning new ICT in teaching, attitudes toward the use of ICT in teaching, and difficulties in using ICT in teaching—were investigated. The questionnaire survey was employed. One hundred and twenty-eight valid questionnaires were received (a 94% return rate). The survey showed that the majority of respondents were required to learn computing skills on web design software, Learning Management System, and electronic resources for teaching—only a few needed to learn basic computing skills such as e-mail and Internet. A more important issue was that respondents wanted to learn how to integrate ICT in classroom teaching effectively and efficiently. Therefore, the pedagogy for integrating classroom teaching and online learning should be a high priority in teacher training in ICT. It is expected that the results of this study could be valuable for teacher trainers at higher educational institutions when planning training programs in ICT utilization.

Keywords: Investigation, Information Technology, Skill, Training.

1. Introduction

With the implement of informatization in higher education in Mainland China, teacher training on ICT utilization has emerged as an important issue. Teachers' skill in ICT, especially the capability of using ICT in instruction, has been concerned by more and more supervisors and research fellow both in K-12 and higher education. In K-12, one National Standard for teachers' skill in ICT has been published and generalized in whole country by MOE (Huang,2007);in higher education, according to the report by China Education Technology Association, which is the nonprofit organization aiming at improve ICT utilization in higher education in Mainland China, 217 training centers have been built and over 30 thousand teachers have been trained all around the country up to Nov 2004, nearly 40 percent of participants have got corresponding grade certificate (Zhang, 2003; Xu,2006).

However, the performance of ICT utilization in high education is not expressly evident. Although most of teachers might have considerable skills in ICT, they can not integrate ICT into regular teaching effectively. This phenomenon has been concerned by some research fellows and they have put forward worthy outcome and consideration to solve this problem. In conclusion, there are two options on improving the performance of ICT utilization for teachers in higher education, Training Content and Training Model. In the view of Training Content, Xu(2006) pointed out that the existing curriculum structure and contents are not fit for continuously expanding environment and we must ameliorate the existing curriculum of training for ICT to fulfill the teachers' needs on ICT in instruction. It has been performed for 5 years that the existing curriculum structure and contents built by China Education Technology Association. In Xu's opinion, a new training curriculum structure must be designed for enhancing teachers' literacy in ICT. Xu pointed out that

only in this way, teacher can have the capability of integrating ICT into teaching process and tutoring students to using ICT as an efficient tool for creative learning.

In the view of Training Model, Zhang analyzes the Education Technology competence of higher education faculty and looks into the modes and approaches of professional development for higher education faculty' ET competence in an information age. Zhang considers teacher training as effective means of enhancing teachers' ET competence. The research suggests improving teachers' ET competencies in all possible aspects including the design, development, utilization, management and evaluation of teaching resources and the optimization of the teaching process. Zhang's research represents an obvious relationship with the definition of Education Technology purposed by AECT in 1994. Similar with Zhang's research, Qiao put forward the three basic definitions and formed the four parts of training model for teachers' ICT in teaching. (Qiao, 2005)

From literature review, we discovered that limited research has been done on needs analysis for teachers using ICT in university teaching. According to this need, we implement this research to investigate the needs of using ICT in teaching at higher school (Beijing Normal University) in China from the teachers' perspective.

2. Methodology

The method of questionnaire was employed in this study.

2.1. Instrument

A 4-part 28-item questionnaire was published and distributed. The questionnaire was translated and localized based on the questionnaire of the Next Generation Teachers Project of UNESCO. The goal of the Next Generation of Teachers Project is to assist Teacher Education Institutes (TEIs) to prepare teachers for ICT classrooms which provide a learning environment for students to acquire new skills required by the knowledge societies. The term, Information and Communication Technologies (ICT), refers to forms of technology that are used to transmit, store, create, share or exchange information. Examples of ICT include: radio, television, video, DVD, telephone, satellite systems, computer and network hardware and software, as well as the services associated with them, such as the Internet, videoconferencing and electronic mail.

In questionnaire, four topics — skills in using traditional and ICT media in teaching, needs for learning new ICT in teaching, attitudes toward the use of ICT in teaching, and difficulties in using ICT in teaching — were investigated.

2.2. Sample

The total number of completed and valid questionnaires was 128, representing a response rate of 94.0 percent. Among them, 67 percent were male while 33.0 percent were female. If we look into the subjects they teach, 51 percent were science, 17 percent were social science, 32 percent were Maths and other subjects like computer science.

Most of respondents represent a high educational level, and 76 percent were awarded Doctor of Philosophy. In addition, 28 percent have teaching experience more than 15 years and 68 percent were professor or associate professor. The table1 describes the distribution of teaching experience.

Table 1 Teaching Experience of Respondents

1-5	38%
6-10	24%
11-15	9%
16-20	14%
21-25	12%
26-30	2%
More than 30 years	1%

3. Result

3.1. Skills in Using Traditional and ICT Media in Teaching

Respondents were asked to select the prior need according their own ICT skills and training needs in the given hardware and software. Obviously, most of respondents have held basic skills of hardware as computers, scanners and certain software as word processing, spreadsheet operations. The majority of respondents were expecting training on web design tools, graphics software and Learning Management System. The table 2 &3 indicates this situation clearly.

Although most of respondents have expressed a willing to attend training course on ICT,, it's found that the training program is not the major method for teacher to obtain corresponding skills in ICT. In one item, by which form respondents update their own skills and knowledge on ICT, only 30 percent select “attending training courses and / or conferences”, and nearly 70 percent respondents select learning from colleagues or taking part in discussion forums to obtain corresponding skills in ICT.

Table 2 The need of training on hardware

I need additional training to use the following hardware	Mean	Sd.	Degree of appreciation
Over head projectors	2.4336	1.29474	A little
Televisions	1.9027	.94458	None
Radio/ cassette players	1.9292	.97024	None
Video tape cassette players	2.4248	1.28038	A little
Video compact disk players	2.2124	1.19112	A little
Computers	2.5133	1.37656	A little
Scanners	2.4336	1.27389	A little
CD-ROM drives	2.1504	1.16666	A little
DVD players	2.2478	1.19172	A little
LCD projectors	2.8673	1.39197	A little
Printers	2.1770	1.14354	A little
Digital cameras	2.4336	1.23835	A little
Digital video cameras	2.9115	1.35987	A little

1. None. 2. A little. 3. Some 4. Quite a lot. 5. A lot

Table 3 The need of training on software

I need additional training to use the following software packages	Mean	Sd.	Degree of Appreciation
Computer operating system	2.3009	1.20182	A little
Word processing	2.2389	1.16707	A little
Spreadsheet operation	2.6283	1.31063	A little
Graphics software	3.2389	1.39049	Quite a lot
Presentation programs	3.1947	1.40063	Quite a lot
Databases	3.3982	1.30617	Quite a lot
Web enabled computer-based training programs	3.7434	1.19357	Quite a lot
Web design tools	3.6106	1.24236	Quite a lot
Animation tools	3.8053	1.12487	Quite a lot
Internet browsers	2.7168	1.31250	A little
E-mail	2.1416	1.17919	A little
Learning Management System	3.6903	1.09446	Quite a lot

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3.2. Needs for Learning New ICT in Teaching

ICT competency is the focus of this part. The respondents were asked to rate their own ICT competency using the given level: Competent, Capable, Developing and Beginner. Each level was noted corresponding explanation, for example Competent means that the respondent can display a high level of the expected

knowledge and skill, and Developing means that the respondent can display a minimally adequate level of the expected knowledge and skills.

In this study, ICT competency is structured by two main parts, one is the skill in ICT and the other is the capability to using ICT in teaching, such as planning, teaching, assessing and evaluating through ICT. For the first part, the questionnaire listed 8 definite skills in ICT and each skill was described in detail. For example when talking about word processing, the description was: explain how a word processor can be used, use simple editing, import text and images into word processing documents and etc. The second part, the capability to using ICT in teaching, was declaration by four portion, which is planning, teaching, assessing and evaluating, professional using of ICT. Additionally, the mention was given for respondents judging their own level. The table 4 describes this part and the results obviously show that the capability to using ICT in teaching are dropped behind of the skills in ICT.

Table 4 Teachers' skills in ICT

Skills in ICT	Mean	Sd	Degree of appreciation
Computer Operation	3.2920	.72803	Competent
Word processing	3.4513	.61224	Competent
Database	2.3451	1.05872	Capable
Spreadsheet	2.8938	.89005	Capable
Graphics	2.4867	.93651	Capable
Using devices	2.8319	.90537	Capable
Using the internet	3.2301	.69448	Competent
E-mail	3.4956	.59946	Competent

3.3. Attitudes toward the Use of ICT in Teaching

When asked whether interested in learning about and using Learning Management Systems, 81 percent of respondents showed inclination of learning and using LMS, and 80 percent were interested in learning more about learner-centered instruction and using ICT in teaching. These two items indicate that most of respondents showed positive attitudes toward the utilization of ICT in teaching obviously. Meanwhile, almost 20 percent teachers representing a neutral or negative attitude.

Following, respondents were asked to rate 9 Attitudes toward the utilization of ICT in Teaching according to five levels: Strongly agree, Agree, Neither agree nor disagree, Disagree, Strongly disagree. The result validated that the former opinion on the positive attitude toward the utilization of ICT in teaching.

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3.5. Difficulties in Using ICT in Teaching

In order to indicate the main constraints in integrating ICT into the curriculum in higher education, the respondents were asked to select as many as required in given mentions. From the research result, only near 30 percent respondents choosing the item related with equipment and construction, such as lack of infrastructure, equipment and computers. In contrast, 66 percent respondents choose "lack of material support" and nearly 50 percent respondents consider "lack of management support" and "pressure of curriculum coverage" as the baffle for integrating ICT into instruction.

This research shows that "lack of material support" has become the major restriction for higher school teacher to utilize ICT into classroom in mainland china.

4. Discussion and Conclusion

With reference to the above survey findings and other literature, we are going to analyse the data and provide some policy implications.

4.1. Teacher training through LMS

Recent research indicates that emphases of national informatization in higher education in Mainland China are helping teacher integrate ICT into instruction and performing instruction through LMS (Zhao, 2004). Correspondingly, training for teachers' capability on ICT should adapt the trend of informatization and the training program should be implemented through LMS. According to this survey, most of respondents represent a strong consciousness and desirability, and prefer to learn more ICT skills and technical methods to integrate ICT into instruction through training program and other form. Especially, most of higher institutes have adequate equipments to support ICT utilization in teaching. All these make it possible to implement teacher training through using LMS in higher education.

Different from regular training program focused on training contents, teacher training through LMS should pay more attention to training model. Blended training model is coincident with the characters of continuing education for higher school teacher. Training teacher in higher school should blend traditional face-to-face training with training through LMS. In higher education, each subject presents particular characteristic and different instruction methods. A blended training model takes these differences into consideration and provides a variety of mediums from which teachers are more likely to find something that suits their teaching and learning style.

4.2. Performing formative evaluation in training

The utilization of ICT in instruction is the core of training teacher on ICT. In contrast with skills in ICT, enhancing the capability of using ICT into instruction is the goal for efficient utilization in higher education. Now in Mainland China, the major evaluation for training teacher on ICT in higher education is summative evaluation which could not reflect whole the situation of training precisely. Active evaluation system has baffled the shaping of teachers' capability of using ICT in instruction.

The capability of using ICT in teaching is made up of by three main aspects. One is the skills in using traditional media, computer and web as base for ICT utilization. Another, as the key part, is the capability of using ICT in teaching. The last one is the attitudes toward the utilization of ICT in teaching and it directly decides whether teachers utilize ICT in instruction. Evaluation system must cover these three aspects. Formative evaluation will help teachers greatly in shaping these three aspects.

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