Teacher's background and ICT uses at schools in Taiwan

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Abstract: This paper reports a large scale survey of elementary and junior high school teachers on their use of ICT and the differences their background may have made. A survey questionnaire was developed based the six standard areas suggested by International Society of Technology Education (ISTE). A total of 324 schools and 3,729 teachers in Taiwan were surveyed. The results showed that teachers performed better on ICT integration if they were male, received higher education, gained ICT related training, or had ICT administrative duties. No age differences were found on the teacher's proficiency of ICT integration. It suggested that teachers need both technology and teaching experiences to do well on ICT integration.

Introduction

Information and Communication Technology (ICT) has been advancing at a great speed. The impact is herald by many people and institutions (Lim, 2007). To harness the effect of ICT development, many parts of the world have been making efforts to integrate ICT in their schools. Asking teachers to integrate technology into their teaching, however, could be a long and difficult job. There seemed little progress made compared to the money and equipment that has been invested into the process (Bichelmeyer & Molenda, 2006). Yet having teachers to use computers is an important goal for ICT integration.

Taiwan has been advocating ICT integration since the reform of education (Ministry of Education, 1999). The new curriculum asked the teachers to integrate ICT into every subject matter they teach. The government has spent great efforts in providing equipment and training to teachers in the past decades. Many regional and small scale surveys conducted to assess the effects of teacher's integration of ICT found that teachers are in general feeling positive about the computer integration, but teachers' background such as age, subject matters, administrative duties made differences (for example, see Kao, 2005).

Many individual background factors have been documented to have potential impact on teacher's integration of computers (Becker, 2001). In order to confirm the past findings and to present an overall picture of teachers that use computers at schools, this project examined several demographic background, including sex, age, education, administrative duty, and computer related jobs. In general, males were doing betters than females (Lee, 1997). In order to examine the factors that could influence teacher's use of ICT, a study was conducted to survey the elementary and junior high school teachers in Taiwan.

Methods

A survey was conducted from October to December, 2006. A total of 4,911 teachers from 334 schools were surveyed, and a total of 3,729 questionnaires were returned. The return rate was 76%. The survey was distributed by both paper and web.

The standards developed by the International Society for Technology in Education (ISTE) was taken as references. The National Educational Technology Standards for Teachers (NETS-T) developed by ISTE was adopted by states within USA, and it covers the following ICT integration in education aspects. The six NETS-T standard areas are: 1) technology operations and concepts, 2) planning and designing learning environments and experiences, 3) teaching, learning, and the curriculum, 4) assessment and evaluation, 5) productivity and professional practice, and 6) social, ethical, legal, and human issues (ISTE, 2000). Based on the above six standard areas and 23 performance indicators in NETS-T, an expert panel of local teachers was used to develop questionnaire items based on the NETS-T standards. The ICT integration scales were consisted of 45 items. For each item, teachers had to rank their experience during the last semester using four choices: "very often," "sometimes," "once in a while," and "never use." Those four answers were coded as score 4 to 1 in the subsequent analysis.

Results and Discussion

The results of the teacher's mean score and standard deviations on their six ICT integration scales for each of the background items were reported. The scores showed that all the listed background factors produced differences that reach significance at $p<0.05$ level.

The results found that teachers at elementary schools were doing more ICT than teachers at junior high schools. Given the higher academic pressure and the high stake high school entrance exam systems, the

elementary school teachers in general enjoy more freedom and flexibility in their curriculum and lesson planning. On the contrary, the heavy demand on the time for academic achievement could have limited the teachers to explore more teaching alternatives using ICT.

The results confirmed the general assumption that males did better than females on the technology related practice. Similar results also found for the teachers who had computer related administrative duties. Education and professional training in ICT helped too. Teachers with experiences on doing ICT related research performed much better than those who simply have taken credit courses or even those who obtained a degree in ICT related fields. Those who neither took any courses nor did any research performed the poorest.

Table 1: Teacher's background on ICT scales.

Factor		n	Mean	SD
School Level	Elementary	2463	2.61**	.56
	Junior high	1266	2.47	.58
Sex	Male	1323	2.69**	.54
	Female	2406	2.50	.58
Training	Taken credits	990	2.64^{ab}	.54
	Done research	70	3.01^{a}	.46
	With degree	248	2.81^{b}	.48
	none	2421	2.49^{ab}	.58
Edu. level	Normal C.	98	2.63^{ab}	.64
	B.S.	2478	2.54^{b}	.57
	40 credit hours	316	2.56^{ab}	.58
	M.S.	827	2.64^{b}	.58
	Ph.D.	5	2.70^{ab}	.35
Admin. duty	ICT duty	145	2.99^{a}	.43
	Other duty	876	2.66^{b}	.54
	none	645	2.55^{c}	.54

Notes: 1. ** p<.01, * p<.05.

2. The results of Scheffe's post-hoc test were denoted as the same letter if there is no significant differences at p<.05 level.

The age of the teacher, however, was the only background factor that did not show significant differences. It is contrary to the conventional belief that old teachers may not be able to integrate computers in education well because they are too old or too afraid to do so. In other measures, the findings confirm the usual observations. In the age differences, however, it presents another picture. It is possible that ICT integration required teachers to do well not only on the new technology, but also on the teaching aspects such as learning about students, curriculum, and materials.

Table 2: Years of teaching on overall ICT average

Years of teaching	n	%	Mean	SD
< 5	1176	31.5	2.56	.45
6-10	1073	28.8	2.58	.35
11-15	705	18.9	2.52	.33
16-20	466	12.5	2.60	.34
Above 20	309	8.3	2.57	.37

Policy makers and school administrators should recognize that teacher training is a slow but important component to teacher's use of ICT. Professional development is a way to encourage teachers to explore new technology in teaching.

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