

Use of ICT by Primary Teachers

The Situation in Taiwan (The Republic of China)

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Abstract: The empirical research in this paper examines teachers' attitudes to, and uses of ICT for administration and management. Additionally teachers' views were sought on the factors that would influence their use of ICT, and the effects of their using ICT for administration and management. The primary teachers in the sample reported generally positive attitudes to all aspects of ICT use for administration and management and a wide range of uses, but managerial use was somewhat limited. Some concerns were expressed relating to the age of hardware and the level of technical support available, and although they were generally happy with the quality of the training they had received, a very large majority felt they needed more training to improve further their skills and use of ICT for administration and management. Teachers noted improvements in communications and access to a variety of data since ICT was introduced for administration and management in their schools. Ongoing investment is needed if the situation is to be sustained and improved.

Key words: ICT, Primary Teachers, Administration, Management.

1. BACKGROUND

Taiwan, or The Republic of China, lies off the southeast coast of The Peoples Republic of China (mainland China). With a total land area of 36,179 square kilometres, and a population of 22.6 million in 2003, Taiwan is a densely populated country. Nearly 70% of the population live in cities where the density of population in the most crowded city is 9,826 people per square kilometre. Mandarin Chinese is the official language and is used by most people in their daily lives. Taiwan is a wealthy country with a substantial trade surplus, and foreign reserves are the worlds' third largest. The GDP in 2003 was 13,167 US dollars (Government Information Office, 2005).

In Taiwan, the Ministry of Education (MoE) has overall responsibility for the education system and Local Educational Authorities (LEAs) in the different regions administer regional education matters (Ministry of

Education 2005). Compulsory education in Taiwan currently lasts for 9 years. Six years in primary school (age 7-12) and 3 years in junior high school (age 13-15). According to the MoE, there were 241,118 pupils in 2,627 primary schools in Taiwan in the 2002-2003 academic year.

The Taiwanese government has implemented ICT-related policies in education since the late 1980s and this has included the use of Information Technology in Educational Management (ITEM). In 1998, the Ministry of Education budgeted 6.47 billion NTD (about 196 million USD) to carry out "The Plan of Information Technology Infrastructure in Education". (Computer Centre of Ministry of Education 2001). Under this plan, computer rooms were set up in all primary and junior high schools; training courses to improve teachers' ICT capability were provided; and educational ICT Recourses Centres were set up in every region in Taiwan to support and promote ICT in education.

In 2000 the MoE asked an IT company to design a system, the FES system, for governmental document exchange and this went live in 2001. By May of 2002, 51.2% of governmental documents were issued and exchanged by the system. Also in 2001, the MoE announced the "Master Plan of Information Technology in Primary and Junior High Schools" (Computer Centre of Ministry of Education 2001) to promote further ICT development in primary and junior high schools in Taiwan. In the section on educational administration and management in this plan, it stated that the use of ICT would simplify the process of educational administration and management and contribute to the connection between administration and management, and teaching and learning. Thus, the efficiency of administration and management could be improved, and teachers could also integrate ICT into their work and enrich the quality of teaching and learning. It should be noted here, that in schools, administration and management are not only the province of head teachers or senior managers, but also classroom teachers. (Selwood, Smith and Wisheart 2001). Teachers administer and manage in the classroom, in monitoring attendance, marking and assessing and monitoring pupils' progress (TTA, 1998).

To encourage and promote the use of ICT in educational administration and management in all regions, in 2002 the MoE sent out "The data exchange standard of student learning assessment and academic background database, version 2.0" to all primary and junior high schools to standardise the exchange of data (Computer Centre of Ministry of Education 2005).

Although the Taiwanese government has implemented a number of ICT policies and plans since the 1980s, there has been no published research focusing on the area of ITEM in Taiwan.

2. RESEARCH QUESTIONS

The aim of this study was to investigate teachers' use of ICT for administration and management in Taiwanese primary schools and sought to

identify the factors that may influence this use. The following research questions were formulated to guide the work:

1. How do teachers perceive their ability to use ICT for dealing with their administrative and managerial work?
2. How do teachers use ICT for dealing with their administrative and managerial work?
3. What are the factors that would influence teachers to use ICT for administration and management?
4. What changes have teachers noticed resulting from the use of ICT for administration and management in schools?

3. RESEARCH METHODS

Data collection was undertaken in four Taiwanese public primary schools. As location and size were considered factors that could influence the findings the schools were chosen to be representative of large and small schools, and schools in rural and urban areas. Questionnaires were developed based on the work of Thomas et. al. (2004) and Selwood (2005) and, included both open and closed questions. One hundred and sixty questionnaires were distributed, and 92 were completed and returned. A response rate of 57.5%. Of the respondents, 27.2% were male and 72.8% female. The ages of the respondents ranged from 24 to 52 years old, with an average of the age 37.4. The average teaching experience was 8.6 years, and 19.6% of the respondents had special responsibilities as well as being teachers.

4. DATA ANALYSIS AND RESULTS

For clarity, in this section, the data and results are presented in the sequence of research questions.

4.1 Teachers' perceptions of their ability to use ICT for administration and management

If ICT is to be used for administration and management, positive attitudes towards ICT are essential. Teachers' attitudes on using ICT for administration and management tasks were therefore investigated, and these were generally positive. Teachers felt using ICT was easy (77.1%), not boring (84.7%) and did not make them nervous (88%); and they were confident (83.7%) and happy (91.3%) to use it. They also felt that using ICT could enhance their work efficiency (90.2%), reduce their workload (79.3%) and support their administration and management (91.3%).

4.2 Teachers' use of ICT for administration and management

In the questionnaire, teachers were given a list of topics where ICT could be used, and asked to indicate which tasks were carried out using ICT. Surprisingly exam entries and results (94.6%) was used most widely. In addition, more than four fifths of the respondents used ICT for record keeping (89.1%), organizing resources (85.9%), clerical work (84.8%), material preparation (84.8%), and writing reports (82.6%). Strangely, monitoring student progress was quite low (21.7%), bearing in mind how high record keeping was ranked. Also low was using ICT for registration 16.3% but this was due to only one school using this application and this obviously influenced monitoring attendance (18.5%).

A factor that influences the use of ICT is the availability and quality of hardware. Respondents' views regarding the adequacy of hardware are discussed later in section 4.3.1. In this section, we present data concerning the hardware used by teachers in school and at home. Desktop PCs and printers were the most widely used in both locations, with desktops being used by 97.8% of respondents at school and 79.3% at home; similarly printers were used by 97.8% at school and 77.2% at home. Over half the respondents also reported using Internet equipment (71.7% and 57.6% respectively) and digital camera (80.4% and 63% respectively) at school and at home. This high use of the digital camera merits further investigation. On the low use end, few respondents used a PDA at school or at home, and unsurprisingly few used a 'digital projector' at home.

Whilst hardware is crucial to the use of ITEM, the type of software used probably gives us a better indication of how teachers use ITEM thus the respondents were asked what software they used for administration and management tasks at school and at home. Word processor, Internet explorer, and e-mail were unsurprisingly the most widely used packages both at school and at home all scoring 80% usage or above. Additionally, 67.4% respondents used the school information management system from school, but access from home was limited with only 23.9% of respondents reporting this. Use of Spreadsheets (80.4%), PowerPoint (69.6%) and FrontPage (62%) all scored highly for use in school.

In demonstrating teachers' use of ICT probably more important than either hardware or software is the frequency that they use ICT and the amount of time they spend using ICT. 57.6% of respondents reported daily use of ICT for administration and management in school and 42.4% respondents at home. When we further examined the data, it could be seen that 81.5% of teachers use ICT for administration and management at least one per week in school and 72.6% reporting this use of ICT at home (at least once per week).

The most common amount of time that the respondents spent using ICT for administration and management was between 2 and 3 hours (40.2%). The majority of respondents (60.9% in total) spent 3 hours or less each time

they used ICT at school. At home, there were also similar percentage of respondents (60.8% in total) using the computer for the same amount of time.

4.3 Factors, which influence teachers to use ICT for administration and management

A large number of factors are liable to influence whether teachers are likely to use ICT for administration and management. Previous studies (Selwood 2005) have shown these include support, training, quality of hardware and software. In the open-ended questions respondents pointed out many factors that influenced their use of ICT for administration and including: teachers' needs for access to hardware, software, and immediate technical support; training; time; workload and financial support.

4.3.1 Teachers' needs for hardware, software, and technical support

The majority of respondents (57.6%) agreed that the hardware in the school met their needs, 69.6% that software met their needs and 71.8% that technical support met their needs. However, this left a substantial minority of respondents who felt that their needs were not being met (43% hardware, and approximately a third for software and technical support).

Open-ended questions revealed that respondents felt that the schools should increase the quantity of hardware, particularly printers and digital projectors because with limited hardware, it was not convenient for teachers to use ICT for their work. In addition, they felt that the quality of the hardware should also be improved because much of it was obsolete and unstable and this influenced teachers' use of ICT. There were also some complaints concerning the speed of the school network at busy times like the end of term when large numbers of marks had to be entered into the schools' information management system.

More than half of the respondents agreed that the software used in their schools was efficient (78.3%), stable (63.1%), and user friendly (75.0%). In addition, more than four fifths of the respondents agreed that it was easy to find required information, input, and correct information. Around 85% of respondents agreed that the information format matches their needs, and the information could be used for planning and decision-making.

4.3.2 Training

The respondents were generally very happy with training they had received; with 86.9% of respondents agreeing that the ICT training they had received was helpful, and 88% agreeing their ICT skills had improved after training. However, only 59.8% of respondents felt that they had been trained in all necessary ICT skills for their work, and 95.7% respondents in total agreed that they needed more training to improve their ICT skills further.

ICT training was seen as important to improve teachers' ICT capabilities, and increase their use of ICT for administration and management. In the open questions, 12 respondents pointed out that providing more useful/relevant training courses to teachers was important in developing teachers' use of ICT. It was also suggested that the training courses would not only improve the trainees' ICT abilities, but would allow the trainees to cascade the training to their colleagues in schools. However, teachers were concerned that they might need to spend their own time attending the training courses, and this would affect their willingness to attend the courses. Furthermore, there was some concern expressed that; courses did not always match the needs of participants.

4.3.3 Time, workload, and support

In the open-ended questions, time, workload, and staffing (for technical support) were also seen as important factors by teachers. Time and workload are obviously closely related. Seven respondents stated that they had to deal with lots of work with their classes, and therefore their time to use ICT for administration and management was limited. They felt they needed extra time to use ICT facilities and also faced potential ICT problems caused by obsolete and unstable systems. Two teachers also highlighted the problem that schools had limited staffing to maintain the ICT facilities and provide immediate support when teachers needed it. However, respondents noted that they could seek help from their colleagues but their colleagues might be too busy to help them.

4.3.4 Schools' budget (for ICT)

Some of the factors noted above do in fact come down to financial issues. In the open-ended questions, seven respondents mentioned that lack of financial support was an important issue for schools. Noting also that finances affected such issues as: upgrading hardware and software, providing immediate technical support, and increasing staffing to maintain the facilities. Schools' budgets are obviously limited, but it was noted that they needed to devote more money to ICT. It was recognised that it was difficult for the government to provide sufficient and regular financial support to every school for ICT, but that more could be done.

4.4 Changes noticed by teachers resulting from the use of ICT for administration and management

58 out of 92 respondents answered that they found some changes in the processes. The positive changes mentioned include:

- Data storage, correction, and transfer had become easier; in particular, it was now easier to deal with students' marks and this led to time saving.

- It was more convenient to access information or teaching materials via the Internet, this again saved time.
- Communication had become faster: the use of e-mail as a communication tool between teachers and parents or pupils.
- Less wastage of resources, particularly paper, because a lot of information could be published or distributed via the Internet.
- Managing and searching information had become easier.
- A lot of work was now computerised, and thus the quality of the output had improved and become easier to control.
- Teachers were inspired to use ICT and had become more active in developing their ICT skills.

Additionally, there were also negative effects noted, including:

- Time was seen as problematic, for example: teachers had to frequently update the information on their homepages; spend extra time developing ICT capabilities; deal with problems of ICT hardware and software.
- Security of data was seen as problematic.
- If teachers relied on ICT more and more and the ICT facility was out of order, what would happen?
- Health concerns regarding computer use including the possible bad effect on the eyes from prolonged computer use.

5. CONCLUSIONS

The primary teachers in the sample reported generally positive attitudes to ICT use for administration and management with over 75% positive responses to all the measures used for this. Large numbers of teachers reported using ICT for a wide range of administrative and managerial tasks. Each of the following tasks achieved more than an 80% response rate – exam entries and results, record keeping, organising resources, clerical work material preparation and writing reports. Notably only just over 20% used ICT for the managerial tasks of monitoring student progress.

Hardware used was predominantly desktop PCs, printers and Internet equipment. With respect to what software teachers used, the Word processor, Internet explorer, and e-mail were unsurprisingly high (all scoring 80% usage or above). Additionally, use of the school information management system, Spreadsheets, PowerPoint and FrontPage all scored highly (greater than 60%). Patterns of usage revealed high usage at both school and home.

Teachers' attitudes to the quality and quantity of hardware, software and technical support were generally positive. Nevertheless, concerns were expressed relating to the age of hardware and the level of technical support available. With respect to training, respondents were again generally happy with quality of the training they had received but nearly 96% felt they needed more training to increase their skills.

With respect to changes, teachers had noticed that related to the use of ITEM, again teachers were generally positive noting improvements in ease of storage and access to data (pupil records), ease of access to teaching resources and faster and more effective communication.

To conclude, the use of ITEM by Taiwanese primary school teachers appears to be well established and well received. However, there were some concerns regarding the need for sustained investment in infrastructure and training if the use of ITEM is to grow and play its full part in school improvement.

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