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Content Introduction	The purpose of this study is to review the use of educational technology in Taiwan. In the following discussion, educational technology will be divided into two major sections: learning technology integration and distance education. This study will briefly introduce several educational systems and institutions in Taiwan, such as the structure of the education, the general curriculum, teacher's training, and a brief history of educational technology. The discussion will focus on four major elements: learning, technology, administration, and society.

A Profile of Educational Technology in Taiwan

The use of educational technology in Taiwan can be divided into two main categories: learning technology integration and distance education. Throughout the past to the present, Taiwan's educational technology can be divided into several stages, while the learning technology integration in Taiwan can be separated into three periods: the 1880s, the 1990s, and the late 1990s (Tu & Twu 2002).

In the early stage of educational technology development was focused on integrating technology in teaching and learning. In the early 1980s, collages, universities and high schools began using computer technology in administrative work and in classroom instruction. In the mid 1980s, the government made a six-year plan for computer-assisted instruction (CAI). The goals of this project were focused on establishing computer laboratories in all junior and senior high schools, on training teachers how to use computer and technology in the classroom, on encouraging the implementation of CAI, and on developing the hardware and software equipments of CAI. All public junior and senior high schools began establishing their own computer classrooms. In the beginning of CAI project was used to help students drill and practice. In the late 1980s, the government provided several funds for public high schools to purchase computer equipment. Moreover, over 800 school teachers had been trained in workshops on CAI and over 200 CAI courseware units had been developed.

However, in the early 1990s, the result of the CAI six-year plan had big differentiation between the actual operation in the schools and government expectations. The government found out that most of the computers and software were not been used in regular classroom instruction, and that a lot of computer laboratories were not be used effectively most of the time. Most school staffs utilized computers only for administrative purposes, but most teachers did not apply computer technology in their classroom instruction. The problem may include a lack of an effectively strategic technology plan, of teacher training courses, of computer curriculum development, of hardware access, and of educational software development.

Based on the pervious educational technology implementation experience, the Ministry of Education (MOE) made three major technology reform plans to improve educational technology during the 1990s. The first project was the Information Education Fundamental Plan. The second project was the National Information Infrastructure (NII) Project, and the third project was the Medium-Range Plan for Distance Education. These three educational technology improvement plans focused on the following goals: all levels of schools needed to build computers, software, and networks; encourage teachers to use computer and networking technologies in their classroom instruction to increase the instructional quality; schools needed to build the educational technology resources database and provide access for teachers, students and every citizen; and government continuing to build better technology plans to improve educational

technology and apply distance-learning technology to achieve the goals of lifelong learning. These first-wave of implementation plan goals showed better planning for the application of educational technology.

This project also demonstrated several goals and standards of educational technology curricula for all school levels. The Ministry of Education set various study goals for students to approach different levels of computer technology use. At the elementary school level, instruction would focus on the relationship of computing and life. The content of the curricula would focus on basic computer operation and give students interactions with computing. At the junior high school level, the instruction would focus on basic computer literacy, correct utilization and manner of information. At the high school level, the instruction would focus on basic computing concepts and theories. Students should have the ability to use computer to solve problems. At the collage and university levels, instruction would focus on advanced computer application and development. Students needed to know more about computer systems, database management, and computer technology application in other professional areas.

In order to follow the previous plans, the MOE continued to build the second wave of educational technology improvement plan. Compared with the pervious technology plans, networking is an additional subject of the technology plan. Following are several goals of this project: making standards of educational technology curriculum for all school level; training

professional skills of information technology (IT) to meet the future needs; integrating information technology into all subject areas and utilizing interactive and heuristic teaching strategies in the instruction, and applying networking to assist open learning and share information.

In order to improve the computer availability and internet access, the government provided several funds and set several goals for hardware and software improvement. Before 1997, all schools from junior high school to above needed to build network and update hardware and software. The government provided two billion dollars for all elementary schools to improve internet access and networking. Before 2001, all elementary schools had to be networked. In order to improve teachers' computer skills and implement educational technology, the government provided several computer training courses for all school teachers. MOE provided a lot of on-the-job training courses and workshops for all school teachers in the collages and universities.

From late 1990s to the present, the major media of instruction has focused on computer-based instruction. The third wave of educational technology improvement is distance education (DE), which applies computer-mediated communication (CMC) technology to offer students an interactive distance learning (IDL) environment. The National Information Infrastructure (NII) Project is one of the major educational technology plans. It categorizes

distance education into three different modes: the real-time multicast systems (RTM); the virtual classroom systems (VC) and curriculum-on-demand (COD) systems. Throughout the history of education in Taiwan distance education has played an important role in this field of technology. The purpose of distance education in Taiwan is to provide education for all member of society, to build full lifelong learning, and to create equal educational opportunity. Moreover, distance education can provide every person a chance to get an education without discrimination, because the classroom can be everywhere without limitation.

Taiwan's DE development can be described in three major periods: broadcast radio and television instruction, broadcast television instruction and computer-based instruction. In 1966, the government built the first educational radio station in Taiwan. In 1971, MOE built the first open learning institution, and began with a trial of the "School Over the Air". Between the 1960s and the 1980s, broadcast radio and broadcast television were the major media of instruction. In the 1986, National Open University (NOU) was established in Taiwan. It provides many kinds of undergraduate major such as social science, business, information, and management. Every citizen of Taiwan, over the age of 20, with a high school or vocational-high graduation diploma can become a NOU student.

The RTM systems applied videoconferencing and cable television technology to connect a master classroom with one or many classrooms. The RTM systems can provide two-way video

and two-way audio transmission for both instructors and students. Moreover, it provides opportunities for students to take courses from other institutions that are not offered in their own university. In 1995, three Taiwan's major universities (National Taiwan University, National Chen-Hwa University and the National University of Communication) began to provide cross-university courses through RTM. Actually, more and more universities are joining the development of the RTM system, therefore the net work of RTM is gradually developing and improving in Taiwan (Chu, 1999).

The virtual classroom (VC) systems are instructional systems based on the network. The VC systems can simulate classroom instruction and learning activities so they are the best ways to enhance computer-mediated communication for teaching and learning. Moreover, the VC systems include online course or various educational materials, such as electronic blackboard system, frequently asked questions (FQSs) and E-mail services. The VC students can share their study questions and thoughts with teachers or classmates, and can also take tests, download learning materials from the internet, read the electronic literature, and take online course without going to a regular classroom. The VC systems enhance student–teacher and student-student interaction by utilizing computer network technology. The purpose of these interactive activities is to facilitate two-way interpersonal communication, which includes instructors, users, and Web masters (Chou, 2003).

The curriculum-on-demand (COD) systems are also based on network systems, which utilize technology that allows remote access to instructional software and interactive learning at a learner's own pace. The interaction in COD systems is asynchronous communication and only between the students and the software. Learners can register in the previous courses and choose the type of interactive activities or software to study and practice.

Three interactive relationships associated with distance education are learner–content interactions, learner–instructor interactions, and learner–learner interactions (Moore, 1989). Within the national information infrastructure (NII) project, all interactive distance learning (IDL) systems have several common characteristics. These common characteristics include the idea that most projects are focused on higher education, that the RTM systems are the major development, that most of projects are inter-institution and co-operation between universities, and that most of projects are course-based application (Chu, 1999).

Discussion

After these periods of educational technology development in Taiwan, most teachers and students benefited from this implementation. More and more school teachers prefer to use computer technology or internet resource rather than interactive video equipment or calculators. They also believe that computer and internet technology can help enhance their instruction and student learning. In order to support and sustain educational technology for future needs,

Taiwan's government needs to increase infrastructure, design high quality software, provide technological training and support for the users, increase funding from multiple sources or stakeholders, and diversify evaluation and assessment. To approach these goals, the government needs to update the educational technology implementation plan to manage and overcome new challenges and problems.

Although Taiwan has built its own educational technology, there are still several challenges and difficulties for future improvements. To further the policy of educational technology development, Taiwan's government needs to have a strategic technology plan for the deepening divide which involves four main chapters: material access, skill access, usage access, and motivational access (Dijk, 2005).

The improvement of material access should involve creating broadband access, organizing interconnectivity, building more public access service, updating hardware, and building high speed internet to connect all government institutions, public organizations, hospitals, libraries, and universities and schools. Moreover, the needs assessment of material access should include hardware and software performance, compatibility, expandability, availability and costs (Picciano, 2002). Although all Taiwan's schools and universities have built their own computer laboratories and internet connection, these software and hardware need continuing updating and improvement.

The improvement of material skill access should include updating educational software, providing more training course for teachers and users, improving teachers' and students' computer skills, supporting users' learning on the work pace and at home, and improving distant education and education conferencing. Although the Ministry of Education provides many teacher training courses and set curricula standards for students, job training is not enough for users to deal with the new challenges of technology.

The improvement of usage access should contain the designing of special software for learners, the opening of access to all public information, the providing of life long learning support, and the providing of special content for culture minorities and deprived groups. Many teachers like to use audio, movies, CD (Compact-Disc), interactive motile media, and computer assisted technologies in their instruction. These materials are not only increasing interest and fun in the classroom, but they also give students more motivation to learn. Instructors can find more computer assisted activities on the internet. (Taylor & Francis, 2003) In order to update the software to increase the usage of classroom instruction and home learning, software development, copyright issue and product costs will be the challenges for the future.

The improvement of motivational access should involve encouraging information and communication technology (ICT) utilizations, regulating the ICT to gain users' trust, increasing usability of ICT, and integrating ICT into social environments. More and more school teachers

accept the utilizing of computer technology in the classroom. However, some teachers still have computer anxiety and technophobia. Moreover, maintaining the efficiency educational technology use is another challenge for the future.

Conclusions

Throughout those years, Taiwan has built its own educational technology. However, during different time periods and withy different steps, the improvement of educational technology has resulted in some problems. The government needs to make different educational plans to solve these problems. Although technology improves quickly and brings more challenges to educational improvement, using the technology in education is really helpful for instructors and students.

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