DIFFUSION OF INFORMATION TECHNOLOGY FOR EDUCATION IN TAIWAN: REFLECTIONS AND CONCERNS IN RESPONSE TO HALVERSON AND COLLINS' PAPER

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In response to Halverson and Collins' paper, the author reports her reflection and concerns of the diffusion of information technology for education in Taiwan, including national IT projects, barriers for using of IT technologies in core teaching practices, and alternative ways in informal learning based on her past experiences in conducting related studies.

Keywords: Diffusion of information technology; technological innovation; formal education; informal learning.

Active diffusion of information technology by policy-makers through investments in national information infrastructure and education has become a world trend (Young, 2001). Taiwan is no exception to this global phenomenon. For example, effective use of information technology in improving learning and teaching to reform education and to increase manpower has become a pressing issue. This diffusion of Information Technology impacts not only on formal education but also quite strongly on lifelong distance education (Bates 1993; Young, Huang & Jang, 2000). IT in education is being promoted and studied in various countries, and, in general, their goals are similar — more effective learning and competitive manpower in the international market. However, research conducted in a given country may not yield results completely applicable to other countries because of cultural differences, educational traditions, economic status or political priorities. Every country has its contextually specific problems (Belland, 1998). The inability of schools to embrace new core technologies in Taiwan might stem from both the reluctance of teachers to embrace new technologies and also lie in the nature of schools as social institutions.

In order to adapt to this technological innovation in education and to keep abreast of world trends, Taiwan's Ministry of Education (MoE) regards the diffusion of IT in education as one of its major tasks and has invested a great deal of money

toward this end since the early 1990s. For example, a total of NT\$6,470,000,000 was invested in the project, Information Education Plan — Expanding Internal Needs, 1998–1999 to upgrade and improve the computer facilities in P-12 education (MOE, 1999). The MoE has actively assisted schools at all levels to establish networked computer labs and classrooms and meanwhile has promoted various projects to train and encourage teachers to integrate information technology in all disciplines for more effective learning and teaching. A number of national projects have been approved and implemented. Some representative projects are "TANet (Taiwan Academic Net) to Schools" (since 1994); "Information Education Plan — Expanding Internal Needs" (1998–1999); "Distance Education Project" (1997–2000); "Classroom Wired up to the Internet by 2003"; "Learning Technologies — Active social learning: From Taiwan to the world through the Web-based EduCities" (2000–2004); and "National IT Master Plan" (2001 to present). Consequently, the availability of computer equipment seems not to be a major problem in facilitating IT in education in Taiwan.

Educators and educational researchers agree that teachers are the key factor affecting the full development of technology's use in the schools (Davis, 1999; NCATE, 1997; Willis, Thompson & Bull, 1998). However, if teachers do not understand how to employ IT effectively to promote student leaning, the money being invested in educational technology initiatives would be wasted. Related studies (Young, 1999a; Young, 1999b; Young, 2000; Young, 2001) indicate that the factors that hinder teacher use of IT in Taiwan could be attributed to the following: (1) Joint entrance examination-oriented teaching practices; (2) Heavy teaching load (18–25 class periods per week) and large class size (30–50 students per class); (3) Slowness in entering Chinese words on the keyboard; (4) Lack of continuous technical support and financial support to maintain a course website; (5) Lack of course re-design and new learning evaluation; (6) Lack of peer teacher support; and (7) Need for more extensive training. Among the above factors, some (1, 2 & 3) are pertinent to educational tradition or cultural context. For instance, keyboards are western technological devices and their integration in oriental contexts brings local users more difficulties and problems in use. In addition, some teachers revealed that parents of some prestigious secondary school students discouraged the inclusion of too many additional Internet resources that had no value in raising scores in the joint exams; some parents were also afraid of inappropriate web content and also worried about children's surfing behaviors on the Internet (Young, 2001).

However, observations of schools indicate that the national policies on implementing IT in education indeed have had a profound impact on teachers and motivated them to change. Those senior teachers who were above age fifty and had difficulties coping with the use of new technology chose to take on an early retirement project, but those teachers who were early adaptors to technology were more likely to adapt to the change by taking on innovative projects designated by schools. However, the problem is that we do not see much active widespread use of technology practices for the regular curriculum in the schools. Consequently, those

early adopters integrated IT by providing an additional alternative curriculum for students that was not acknowledged by the regular school curriculum/education. For instance, teachers encouraged their students to use their time out of regular classes to participate in the Web-based 'School for All' — the first web course contest in EduCities (Young, Chan, & Lin, 2002; Young, 2004; Lin, Young, Chan, & Chen, 2004) — or the Web-based International School Fair contest that has been organized in the USA (http://www.globalschoolnet.org/gsh/cf/). There would be an opportunity for the participants to win awards. This type of project encourages local collaboration and international competition that allows students to have more in-depth understanding of their community through project-based action studies and to present their work via multimedia on the Internet. The activities incorporate valuable cooperative learning within and between countries and communities. Ultimately, the localized contents of different countries displayed on the Internet facilitate the development of global concerns and visions. The integration of IT enabled them to open up a new window to the world and to bridge the information divide.

Furthermore, in Taiwan the goal of education and the prevailing social value on bachelor's or higher degrees continue to dominate the core practices of schooling, which do not differ much from what is described as the "factory model" in the Halverson & Collins paper. The three imperatives of information technology, customization, learner control and interaction, can well address the individual interests and needs of the learner, but at a significant cost that the formal schooling system cannot afford. The problem of adaptation to the overwhelming school culture also remains. Like the public schooling system in the USA, the common goal of Taiwan's education is to cultivate learners with civic responsibility.

Thus, technological innovations have made some changes in teaching practices in schools but they are still marginal. Most of the time the effects of applying IT yield from project-based experiments in certain given periods of time. Indeed, like what has been reported above, integration of IT into schools does introduce some changes, such as supplementary digitized learning resources, alternative web-based learning opportunities that might not happen without IT, and some variation to the mostly unified curricula and alternative teaching practices. Sustainable changes, however, in teaching practices require continuous effort in many aspects including upgrading and maintenance of hardware and software, teacher long-term commitment, human resources, and so forth.

I agree that unlike modern workers, students in schools do not do much of their work in computer environments. As a result, computers in schools in Taiwan mostly are used for administrative management and also found in labs for special courses. They remain peripheral to core instructional practices. As information technologies accelerate change in modern workplaces, the gap between the technologies of work and school grows wider. Like in the USA, the demands of work place and lifelong learning push to open up new alternative opportunities for learning with the assistance of information technologies. Gradually, the seeds of an alternative system are

also springing up in recent movements in Taiwan toward virtual schools, distance education, community colleges, workplace learning, adult education, computer gaming environments, educational television and videos, technical certifications, and Internet cafes. Those seeds can flexibly address various needs for people of all ages to pursue informal learning or interests on their own terms rather than in formal education.

Acknowledgments

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