A preliminary evaluation of a web-mediated 'School for All'

S.S.C. Young*, T.W. Chan[†] & C.B. Lin[†]
National Tsing Hua University* and National Central University, Taiwan[†]

Abstract *School for All* in the *EduCities* programme is an innovative project funded by both the Ministry of Education and the National Science Council of Taiwan. The project aims to challenge the rationale of conventional education: only teachers teach and students learn. This paper reports on a project which investigated if anyone who is prepared to engage in web education can teach with the aid of Information Technology. This was done by holding contests of web courses. In the first contest, 290 courses were registered for the competition and were evaluated in several phases. Consequently 15 outstanding online teachers were selected for an award. The purpose of this paper is to document the study and to report the preliminary results that include the characteristics of the outstanding online teachers, such as age, occupation and pedagogical strategy.

Keywords: EduCities; Lifelong learning; Lifelong teaching; Online instruction; *School For All*; Web-based learning

Introduction

The new millennium brought a time full of challenges, of creative ideas and countless new opportunities for the integration of information technology (IT) into every aspect of life. With the assistance of IT new ideas that go beyond the conventional ways of thinking are already being seen. Lifelong learning and distance education over the Internet have become global trends and are seen as imperative in today's information-driven society. As new technologies are developed, if access is not a problem and the Internet is used primarily as an information gathering and sharing tool by the young generation, it is predicted that learning with the assistance of the IT will change in many new ways (Aggarwal, 2000; Nolan, 2000).

Project background, outline and related literature

In 1998, the Ministry of Education (MOE) and National Science Council (NSC) of Taiwan called for innovative Internet-based research proposals under the umbrella of the *4-year Programme for Promoting Academic Excellence of Universities*. Consequently, 17 outstanding projects among the hundred candidates were selected for funding. Only one of the 17 nationwide projects is related to applying

209

information technology to education. This project is called *Learning Technology: Active Social Learning and Its Applications from Taiwan to the World*. This research project aims to investigate and develop networked learning models that will profoundly affect education in the information era. The target user population is people from 8 to 80 years old and the project consists of four major subprojects: Future Classroom Learning; Structural Knowledge Learning; Task-based Learning and Community-based Learning.

This paper focuses on the preliminary evaluation of the last subproject that was implemented in 2000. The *Community-based learning* model is supported by a newly established website called *EduCities*. It is challenging to create a significant and rich learning environment on the web (Palloff & Pratt, 1999). Teaching on the Internet is different from traditional classroom teaching. Many of the skills of good teaching transfer to a distance-learning environment, but some additional teaching skills are required. Resta (2000) points out that to develop online courses with IT creates the following challenges:

- issues of quality control and standards for these new learning environments;
- the need to recognise that not all instructional outcomes can be achieved through web-based learning and almost any course can be facilitated and enhanced through web-based resources;
- the need for 'high touch' in these high tech environments that build learning communities among students, instructors and mentors;
- the need for authentic contexts, tasks and tools to be integrated into learning environments.

In order to deal cooperatively with these challenges, the project was jointly initiated by several universities in Taiwan including the National Central University, the National Tsing Hua University, the National Taiwan University and the National Yan-Ming University. The goal of *EduCities* is to explore the possibility and potentiality of the innovative use of IT in education through a number of experimental activities over the years 2000–2003.

Educities intends to provide a web-based educational environment that cultivates a cyber-learning community with members across different sectors of society, including students, teachers, parents, volunteers and any web navigators of various professions who are willing to make a contribution. It takes city and citizen as the operating metaphor, providing a variety of opportunities for students to take roles such as peer tutors, police and student journal editors to serve others. Through role-playing in this cybercity, students' efforts and contribution will be recognised and respected. It is assumed that good citizens in a cyber city will be more likely to reflect that they will be good citizens in real life. *EduCities* is also the integrative interface of this project, that is, it is the entry for all learning activities and content developed by subprojects in different laboratories in the country. In addition, a series of associated systems, *EduTown*, *EduRoom* and *EduStudy*, will be developed for use by schools, classrooms, and individuals, respectively, and they will all be linked together in *EduCities*. All *EduCities* will share learning resources and citizens, and contribute to learning models developed by the project.

Although this is a newly funded project, it is in fact a longitudinal study built on a solid foundation of work over the past years on learning companion systems, social learning systems and the global social learning club (Chan, 1995; Chan *et al.*, 1996; Chan, 1996). It is also a reaction to a phenomenon within current research work in

which most researchers tend to report prototype development and evaluation, and very few researchers have reported on the mainstream use of their products and ideas. Work seems to stop at an early stage and is not being taken to the final stage of implementation where it could really have an influence. The research reported here attempts to go beyond this trend. Under the leadership of a group of professors and researchers, *EduCities* has received great attention by media and people of all walks of life since its start early in January 2000. To date, *EduCities* has over 436,800 enrolled citizens and the population grows day-by-day.

'School for All' — the first web course contest in the EduCities

Nowadays students have much more intellectual freedom on the Internet (Nolan, 2000). Moreover, it has long been predicted from the advent of the Internet that if access and communication turn out to be free and natural, then the emergence of informal, subject-oriented groups of learner/teachers can be expected. Those who educate will not be exclusively teachers but fellow web navigators in cyberspace (Pickering, 1995). The Web Course Contest of the *School for All* aims to experiment with the above prediction and challenge the traditional concept of education, i.e. only teachers educate and only students learn. The *School for All* in *EduCities* is in an attempt to provide a significant environment where active web users can simultaneously play the multiple roles of teacher, co-teacher, learner, co-learner, tutor and tutee, applying their energy, creativity and commitment. Therefore, the first phase aims to address the following questions:

*This is a time of lifelong learning. Is this also a time of lifelong **teaching**? Now that learning is everybody's right and privilege, can everybody have the privilege to teach as well? Is that possible that the privilege to teach by offering courses on the Internet can be shared by people of all ages? Can we provide people with the free access to teach via offering courses of their own interests or expertise on the Internet? Can anyone who is willing to dedicate him/herself to Web education teach regardless of age and profession if he/she wants to with the assistance of Information Technology? Can online courses be free to people through collaborative efforts of the active web navigators if they can be supported by a well-designed web environment?*

The purpose of holding the contest was two-fold: one was to identify outstanding online teachers by encouraging more active web navigators to contribute their expertise through teaching and the other was to nurture active lifelong learners so as to learn more about their interests. Prize money of more than NTD 4500,000 (£90,000) raised from computer and other private sector companies was used as an incentive for the series of contests. Selected outstanding teachers who were the winners of the contest have received awards. The courses were judged not only by course materials but also by instructional processes such as assignments, class management, interactions between teachers and learners.

The contests will be held twice a year until 2003 to identify characteristics of the online teachers, such as age and occupation, and the pedagogical strategies they use to attract their remote learners. Consequently, learning models will be identified. After the implementation of the contest, the outstanding online teachers will be selected, and then they will form a 'Web Network Teacher Association' that will elect the managers of each discipline, be responsible for checking web courses and for coplanning the vision of the web-based *School for All*.

Purpose of the study and research questions

The purpose of the study is to provide a new perspective on web-mediated instruction and learning which incorporates peer tutoring and peer assessment. The focus of this preliminary paper is on the characteristics of the outstanding online teachers; more about the learners will be reported later. A number of questions have been raised:
- is there a possibility that accessible and free courses to all people in Taiwan can be provided?
- in addition to the accredited teachers, who will be willing and able to become online teachers in the Internet-based learning environment?
- what are the characteristics, such as age, motivation and profession, of the outstanding online teachers and what are the pedagogical strategies that they exploit to attract their distributed, remote learners during their online teaching?
- what course areas are most popular with the navigators?

Approach and methodology

Participants, instructional setting and course delivery
During the first contest, a total of over 17 000 participants enrolled as online learners. In the physical world, a school this size formed in such a short period of time could not be found! Their age range was from 10 to 60 years. There were more than 968 courses offered and in the *School for All* approximately 290 out of the 968 courses were registered for the contest. Because it was the first time that this contest was held in *EduCities*, the major theme focused on computer/information technology related topics. However, to increase the variety of course content, topics of general interest were also encouraged. So, the courses were further categorised into two major areas: computer/information technology related topics and general topics. Three groups (G1, G2 & G3, see Table 1) of online teachers completed the contest:

G1 — general topics and the topic of computer/information technology;
G2 — a teenager group;
G3 — a young adults group.

Unlike traditional modes of teaching, in the web-mediated learning/instructional environment, teachers and students are remote so that a good presentation of digitised course materials on the Internet in order to attract the anonymously distributed students is considered critical and also the first step in organising this type of online learning/instructional mode. In other words, the capability of designing and producing web-based multimedia courses should be coupled with the online teachers. In this circumstance, in order to guarantee the learning and instructional qualities therefore how the online teachers design and present the learning materials, how they manage their classes and students through different pedagogical strategies, and commit to the course delivery and interact with the students via multi-electronic communicative means, such as email newsletter or online chat in order to keep their students in the class are of concern. The above factors all deserve exploration in this contest. Conclusively, in addition to the web course materials, the whole instructional and learning process is highly important in evaluating the success of the online teachers. Thus the criteria used for evaluation were: course materials (20%); interactivity (20%); beneficiaries (20%); class management (20%) and overall performance in reference to instructors' age group

(20%). Other materials to support evaluation included: students' online questionnaires, postings, and assignments.

In addition to the regular observations and the intensive focus group interview process, the top 5% of the outstanding online teachers as well as courses (about 3–9 in each group) were primarily identified through a two-stage evaluation process:

- by peer learner evaluation through online vote casting;
- by an evaluation committee composed of six referees, including educators, scholars and experts from different academic levels (high school and higher education) and disciplines (computer science and instructional technology).

In Stage 1 a total of 32 outstanding teacher candidates were identified, from each of the three groups (16 in Group 1; 8 in Group 2; and 8 in Group 3). In Stage 2 the final 15 winners out of the 32 were selected.

Table 1. The three groups of outstanding teachers, course titles and class sizes

	Teacher codes	Age	Course title	Class size
Group 1 (General topics)	lii	26	Self Affirmation	78
	xfttk	26	Introduction to Japanese	183
	chengshan	24	Powerful Management	25
	mp5162*	21	Myths of the Pyramids	122
	teach058	28	Basic Photography	72
	leeti	32	Rivers in Taiwan	31
	cyokaicity	35	Learning about Dolphins	84
	powerful	23	Appreciation of Red Wine	67
	awk	31	Environmental Education	58
	Average age: 27		**Average class size: 80**	
Group 2 (IT: Teenager group)	tingsong	16	Homepage Design	92
	lluk	16	Advanced Web Applications	129
	cutekenny	13	Visual Basic and Applications	53
	Averageage: 15		**Average class size: 92**	
Group 3 (IT: Young adult group)	prettys	21	Easy E-Commerce	189
	yess	21	Design of VB & ASP	221
	cybertrek	28	EZ-ASP	89
	mp5162*	21	EZ Chinese Processing	116
	Average age: 23		**Average class size: 154**	

*Note: mp5162 appears in both Group 1 and Group 3. Actually his 2 courses were nominated for outstanding online teacher competition. He is counted as one person instead of two.

Research design

The first contest was in two phases: a pre-contest/promotional phase (January to March, 2000) and a contest phase (March to June 2000). To implement the contest a web-based multilayer-distributed learning system had been developed starting three years ago. The system has a database that integrates Internet resources and system modules, including user management, course management, content/exercise management, discussion management and grading (Chang, 2000). To promote the *School for All* and to encourage more participation, three workshops on the use of the system were conducted during January and February of 2000 in three major cities: Taipei, in the north; Taichung, in the centre and Kaoshiung, in the south. Each workshop attracted 80–100 participants. In addition, the system, along with a self-explaining digital manual, was made freely available on the website. Preliminary data from the first year indicated that more than one thousand people have downloaded this individualised web-based learning system. Generally, people who downloaded the system offered at least one and up to five courses on their own website.

Data collection

The paradigm adopted has elements of both qualitative and quantitative research methods, with the researcher collaborating with two co-researchers and five other research assistants in data collection. Major data were collected during the contest (March to June 2000). Additionally, triangulation was used to improve the probability that findings and interpretations found would be reliable. The data concerning how the online teachers designed and presented their web materials and how they interacted with the distributed students were gathered throughout the period of the contest. Observations were conducted intensively on the Internet. The data collection methods have produced data that are largely of a qualitative nature. In chronological order, the following methods have been employed.

Online questionnaires. The first questionnaire requested personal and background details (demographical data, such as sex, age, profession, behaviours of using the Internet) of the online teachers and students. The follow-up questions at the end of the project solicited thoughts and feelings about their own role and specific skills experienced in teaching in or learning from the *School for All*.

Individual email questions. At the half-way point of the course, the 285 online teachers still remaining were sent an email containing a few questions about the organisation, management and communication within their classes.

Personalised email questions. On a daily basis, the webmasters of the *School for All* who were monitoring the system would send email questions to the online teachers to check if they had any problems in running courses on the Internet.

Focus group interview with online teachers. Focus group interviews were conducted with the final 15 outstanding online instructors at the end of the project to record their motivation, the strategies that they used to interact with their students and their views and use of the system in the *School for All*.

In addition, data from each online class were analysed to identify teachers' and students' use of the course for their class management and pedagogical strategies.

Preliminary results

In the contest, 15 students comprised an online class size minimum. Any class that failed to maintain 15 students would be cancelled. Throughout the contest, about 8% (22 out of 290) of the courses were terminated for various reasons, such as not enough students, poor course contents or inability to fulfil course requirements. The online teachers' ages ranged from 10 to 55. The primary group of the online teachers fell in the age range of 23-30 (Fig. 1). According to the data analysis, people who
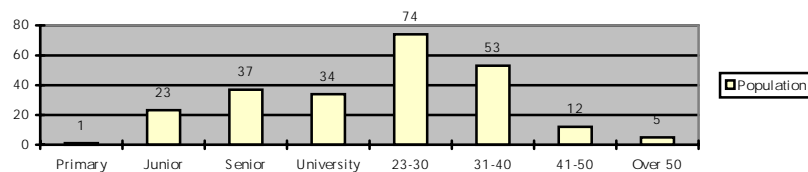
Fig. 1. Age distribution of the online teachers: (total = 239)

offered courses came from various occupations, such as psychologist, lawyer, government official, interpreter, teacher, student, administrator, and teaching assistant. Consequently, among the final 15 selected outstanding online teachers, 8 were students, 5 teachers, an interpreter, and a teaching assistant (Table 2) and their

course titles and class sizes are listed in Table 1. Interestingly, some online teachers offered more than one course at the same time. Online teacher 'mp5162', for example, who belonged to both Group 1 and Group 3, is an unusual case because he won 2 prizes at the same time. Results of this study reveal that the youngest outstanding teacher, a junior high school student, was 13 years old. He offered Visual Basic (VB) on the Internet and during his course there were more than 50 students taking VB with him. Anonymous presence on the network kept the learners from finding out how old the teacher was!!

According to the data collected from the focus group interview, their motivations to offer courses in *EduCities* can be categorised into 3 types:

- self-fulfilment — to seek new information, to improve homepage skills and to enjoy teaching as a highly respected job;
- job-related and job-extended — to support their primary teaching work or to associate with their research work and
- group-sharing — to look for a group of people with whom the online teacher could share his/her expertise through intensive interactivity and mutual understanding; to teach and to learn (Table 2).

Table 2. Job description, motivation & pedagogical types of the teachers

	Outstanding teachers	**Total**
Job Description		
1. Teacher	awk cyokaicity leeti liili teach058	5
2. Assistant	chengshan	1
3. Interpreter	xfttk	1
4. Students	cutekenny cybertrek lluck mp5162 powerful prettys tingsong yess	8
Motivation		
1. Self-fulfilment	cutekenny lluck mp5162 powerful teach058 tingsong	6
2. Job-related and job-extended	awk cybertrek cyokaicity leeti prettys xfttk yess	7
3. Group –sharing	chengshan chlii	2
Pedagogical Types		
1. Rich web course design	cutekenny cyokaicity leeti teach058	4
2. Appealing expression	lluck prettys yess	3
3. Dialogue	mp5162 powerful tingsong tixfttk	4
4. Extension of real-world teaching	awk	1
5. Learning community of similar interests	chengshan cybertrek liili	3

Pedagogical types

From the data analysed from their class homepages, the pedagogical characteristics of these outstanding online teachers included: rich web course design; multimedia presentation to attract students; appealing expression; teacher intensively posting messages via e-newsletters, requiring students responses; dialogue; teacher responding immediately to student's enquiries; extension of real-world teaching; teacher using the website to enhance students' learning and learning community of similar interests; students and teachers sharing and learning closely together and having additional face-to-face meetings (Table 2).

Discussion and conclusion

The preliminary results of this study show that people who teach excellently on the

Internet are not necessarily accredited teachers. This fact indicates that the active web navigators who took advantage of web literacy/information literacy could become outstanding network teachers if they dedicated themselves to web-based teaching. The result of this contest confirms Pickering's point (1995) that those who educate on the Internet will not be exclusively teachers, but fellow navigators in cyberspace. Teaching on the Internet is different from the traditional way of teaching. It is noteworthy that without information/web literacy, accredited teachers could not become online teachers.

More challenges to teach on the Internet

It was very challenging for the online teachers to practice on the Internet because everything they did was open to scrutiny in terms of time, space, course material preparations, content verification and their frequency of web participation. Almost all of the instructional procedures and documentation were accessible and transparent. Free course offerings and easy access enabled every web navigator to observe and 'surf' around the *School for All* and choose their favourite courses. If the course title or syllabus was not attractive at first sight, students might not double-click on the course for more information. Or if the course content was not delivered on time, or if the online teachers were not responding to student's questions in a timely way, then those remote students faded away and dropped out.

Pedagogical strategies

According to the digital data collected and analysed, in order to attract and keep the network navigators, the online teachers in this project adopted a number of strategies: giving the courses interesting and appealing titles; establishing good relationships with their students by greetings or requiring mutual self introductions; organising their enrolled students into small groups for collaborative work; actively posting questions and email messages to their students; offering awards for group project contests; offering unlimited online adaptive tests; or gathering together in the physical world and then publishing their pictures taken at the gatherings on the Internet. One of the 15 outstanding online teachers, 'prettys', employs her talent in editing her school's e-newsletter and published an e-newspaper to communicate frequently her emotions and reflections of her network teaching with her students. Additionally, some of the online teachers took other online teachers' courses in order to learn what effective approaches might be used to attract and interact with their students. Their role in the *EduCities* could be multiple: as teacher, learner, friend, and rival.

Characteristics of the online teachers

Data collected from the focus group interview, web classes and observations indicate that the 15 successful teachers in the web-based environment have certain characteristics in common. They
- are comfortable with the use of a computer network or Internet;
- enjoy the sharing of ideas and thoughts with anonymous people, and feel self-fulfilled in online teaching;
- are students in the physical world (eight out of the 15 online teachers);
- are active and highly self-motivated; are very self-disciplined, and have high expectations of themselves;

- are good at online classroom management and organising students into groups;
- spend huge amounts of time (day and night) in web discussion and communication (including emailing) with students;
- adapt their teaching methods to accommodate the web-based learning environment by integrating creative ideas and including other means, such as group contest awards, unlimited online tests, etc., in the instructional process;
- tend to possess a serious attitude and responsibility toward their course offerings;
- tend to establish good relationships and connections with distributed students;
- use their nicknames or registered codes, instead of their real names, to interact with distributed students.

Learning by teaching and co-teaching

Some of the 15 outstanding online teachers confessed to the researchers at the focus group interview that their course work was morally and spiritually supported by a group of people, such as a computer club at their high school or their former elementary school teacher and fellow classmates. Those winners who were students in the physical world admitted that by teaching on the Internet they learned more and thus pushed themselves to be more diligent and well-behaved at school in the physical world, because they could now empathise with their teachers in the physical world and, moreover, expected that their distributed students on the Internet could perform as well to become their own devoted students.

One outstanding teacher ('cyokaicity' in Group 1) told the researchers that he actually did the co-teaching work with his friend. Their course was actually codesigned and shared by two people; one was responsible for the homepage design and one for the course content. For them, it was their first try but they cooperated very well and learned so much both by co-teaching and from their students. Some ('prettys', 'mp5162', 'cutekenny', 'lluk' & 'cybertrek') said that they were learning by teaching and they were proud of their accomplishments. Moreover, the two younger winners in Group 2, 'cutekenny' and 'lluk', expressed their reflections excitedly that they never dreamed before that they could have the opportunity to become another type of online teacher at their age.

Students could teach and learn well on the network

Students made up the highest percentage of the outstanding network teachers. The intensive observations and results show that with the integration of IT in education:
- students can play the roles of teachers;
- students can teach other students;
- students learn much faster by teaching others;
- students can develop web-based multimedia content;
- students are interested in contributing through teaching;
- students can create their own opportunities.

Final remarks and future work

So far there has been only one round of the Course-offering contest. The preliminary results pave the way for future work. In the next three years, more data will be collected through a series of different campaigns as stated earlier. The support of the Ministry of Education (MOE) and National Science Council (NSC) for this project has enabled this research project. This study provides evidence that free courses on

the Internet are possible, but not without placing substantial demands on system maintenance and online teachers. The results also confirm the possibility, as mentioned in Pickering's paper, that those who educate on the Internet will return education to more convivial and less authoritarian practices.

It is hoped that more people will participate in many significant experimental activities held in the *EduCities* and that business and industry will continue to support this innovative web site. Those online teachers are the representatives of the web generation who have revealed much about the 21st century and they can enhance future education with their creativity, commitment and enthusiasm. Teaching online is a totally new experience. In order to be able to understand how to teach well online, the possibility and potentiality of the use of the Internet via the *EduCities* will continue to be explored in the years to come challenging the traditional concept of formal education.

Acknowledgements

References

Aggarwal, A. (2000). *Web-Based Learning and Teaching Technologies: Opportunities and Challenges*. IDEA Group Publishing, London.

Chan, T.W. (1995) Social Learning Systems: An Overview. In *Innovating Adult Learning with Innovative Technologies: IFIP Transactions a-61* (eds. B. Collis & G. Davies) pp. 101-122, North-Holland, Amsterdam.

Chan, T.W. (1996) Learning Companion Systems, Social Learning Systems, and Intelligent Virtual Classroom. Invited Talk, World Conference on Artificial Intelligence in Education. *Journal of Artificial Intelligence in Education*, **7**, 2, 125–159.

Chan, T.W., Lin, C.C., Lin, S.J. & Kuo, H.C. (1996) OCTR: a Model of Learning Stages, Proceedings of the National Science Council, Republic of China, Part D. *Mathematics, Science, and Technology Education*, **6**, 2, 80–90.

Chang, S.B. (2000) *EduClasses: A Web-based Multilayer-distributed Learning System*. Unpublished Thesis. National Central University, Taiwan.

Nolan, R. (2000) The Internet and 21st Century Education: What Silicon Valley is Planning? In *Proceedings of Symposium on the Effects of the Internet on Education* (ed. C.Y. Lin), **16–17,** 1–6, Taipei, Taiwan.

Palloff, R. & Pratt, L. (1999) *Building Learning Communities in Cyberspace: Effective Strategies for the Online Classroom*. Jossey-Bass Publishers, San Francisco.

Pickering, J. (1995) Teaching on the Internet is Learning, *Active Learning-Using the Internet for Teaching* **2,** 9–12. www.ilt.ac.uk/public/cti/ActiveLearning/issue2/pickering/index.html (access date: 13/7/2000).

Resta, P. (2000) The Internet and University Teaching: Will the Networking Technologies Change the Teaching-Learning Process? In *Proceedings of Symposium on the Effects of the Internet on Education* (ed. C.Y. Lin), **16–17,** 7-21, Taipei, Taiwan.