ACTION RESEARCH INTO E-LEARNING CURICULUM DEVELOPMENT FOR LIBRARY AND INFORMATION SCIENCE IN TAIWAN

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Introduction. E-learning is flourishing in higher education due to its ability to lift time and place restrictions from teaching and learning, giving those who do not have time to be full-time on-campus students an opportunity to receive professional education. Because many library staff have not received professional education, more e-learning curricula and programs by Library and Information Science schools is something that many libraries in Taiwan look forward to. Facing demand for e-learning from library staff, the Graduate Institute of Library, Information and Archival Studies (LIAS) at National Cheng-Chi University undertook an experimental curriculum project .

Method. The purpose of this study was to develop an e-learning master's program with six e-learning curricula for library staff and instructors in senior high schools in accordance with quality assurance mechanism .The study was conducted as action research with five stages as follows: (a) describing the problem and its focus; (b) exploring some action options for the problem; (c)seeking collaborative partners and discussing; (d)undertaking action options: the five lecturers of the LIAS planned and developed six e-learning courses with web-based learning systems; (f) evaluation and feedback: six courses were modified according to student learning outcome assessments and course reviews.

Results. In 2007, the Graduate Institute of Library, Information and Archival Studies (LIAS) at National Cheng-Chi University undertook an experimental curriculum project in which six e-learning courses were developed and program and curricular accreditation was applied for from the Ministry of Education. Six e-learning courses were Information, Organization and Access; Research Methodology; School Library Management; Seminar on Archival Studies; Seminar on Library and Information Science; and Digital Libraries.

Conclusion. In addition to describing the planning and implementation of the curriculum, the article also reviews the effectiveness of e-learning teaching and learning, as well as offering final conclusions and recommendations.

Keywords: E-learning; Accreditation; Quality Assurance; Library and Information Science Education; Web-based Instruction; Action Research; Curriculum Development

1. Introduction

E-learning is becoming an important force in the world today. It is used in various types of companies and government units and has become influential particularly in higher education institutions. Universities in the United States, as well as in Australia, Singapore and China, are currently actively involved in e-learning programs. Taiwan has also joined these countries, beginning the development of web-based instruction in 1996. There are now more than 100 Taiwanese universities offering on-line courses (Wang, 2007).

In the United Sates, more than 20 graduate institutes of Library and Information Science (LIS) provide master's degrees through e-learning courses. E-learning is valuable because of its ability to lift time and place restrictions from teaching and learning, giving those who do not have time to be full-time on-campus students an opportunity to receive professional education. Because many library staff in southern Taiwan have not received professional education, more e-learning curricula and programs from LIS schools is something that many Taiwanese libraries look forward to.

With e-learning becoming a global trend, quality and effectiveness have become important topics for discussion. Common approaches to improving the quality of e-learning include accreditation and quality assurance. In 2006, the Ministry of Education (MOE) in Taiwan announced the trial implementation of e-learning Master's programs for on-the-job adult learners and conducted e-learning accreditation on three levels: institutional, curricular and instructional materials.

The purpose of this study was to develop an e-learning master's program with six e-learning curricula for library stuff and instructors in senior high schools in accordance with quality assurance mechanism. Facing the demand for e-learning from library staff, in 2007, the Graduate Institute of Library, Information and Archival Studies (LIAS) at National Cheng-Chi University undertook an experimental curriculum project in which six e-learning courses were developed and for which program and curricular accreditation were applied for from the Ministry of Education. This article discusses the development of the Library and Information Science e-learning curricula using action research methods. In addition to describing the planning and implementation of the curriculum, the article also reviews the effectiveness of e-learning teaching and learning, as well as offering final conclusions and recommendations.

2. Context of Curriculum Development

2.1 The Accreditation of E-learning in Taiwan

As defined by Hsu,M. C., e-learning refers to all teaching activities conducted through the Internet or with digitized content, and it makes full use of the resources and communication methods

provided by modern information technology, creating a unique mode of learning. (Hsu & Yang, 2006a). Acquiring certificates and degrees through e-learning usually requires accreditation which can generally be categorized into two main types: accreditation, as used in the U.S., and quality assurance, used in the U.K. and Europe. Accreditation is "a voluntary process in which private educational associations conduct peer evaluations to determine if the institution examined achieves its goal set in self-evaluation and whether it meets applicable standards." While accreditation ensures and helps improve the quality of institutions or programs, quality assurance "establishes a set of systematic evaluation procedures through objective performance criteria to describe the state of educational system, which further serves as reference for decisions in achieving school development and accountability." (Wang, 2003) The concept of quality assurance influenced the MOE's decision to set up e-learning programs and curricula.

Since 1998, colleges and universities in Taiwan have developed web-based instruction. There are currently 60 schools offering more than 1,700 web-based courses for nearly 12 million students, however, Taiwan has not yet to grant degrees or certificates gained through e-learning. The Ministry of Education (MOE) has approved the trial implementation of e-learning Master's programs for on-the-job adult learners in specific fields. In 2005, the Ministry set up standards for e-learning accreditation, leading to the launch of e-learning degree programs for on-the-job learners. In March, 2006, the Ministry announced the application and verification guidelines and started the audit. The three-year trial program can be implemented until 2008 by schools interested in the following areas: master's programs for on-the-job primary and middle school instructors; computer science, materials science, physics and precision machinery; business management; and liberal and fine arts. In 2006, the e-learning accreditation commission of the Ministry approved 5 trial e-learning degree programs in 3 schools. These programs have become a milestone for e-learning higher education in Taiwan. (MOE, 2005)

E-learning accreditation is conducted on three levels: institutional, curricular and instructional materials accreditation. Curricular accreditation is a dynamic process covering teaching materials and activities (Hsu & Yang, 2006 b).Accreditation is carried out by accrediting organizations in the MOE e-learning accreditation system, which is the basis of e-learning curriculum development. There are three guidelines proposed for e-learning accreditation at three levels: guidelines for institutional accreditation including 4 precepts and 35 specific guidelines, guidelines for curricular accreditation which involve three dimensions: learning activities, teaching management and system service, including 17 precepts and 101 outline guidance and guidelines for instructional materials accreditation including 8 precepts and 68 specific guidelines. (Yang, 2004)

2.2 Demands for E-learning Curriculum from Library Staff

The School Library Certificate Program has been provided by the Graduate Institute of Library

and Information Science at National Cheng-Chi University since 2001 and many library employees have gained certificates after completing the program. However, because of limitations of time and space, many motivated learners in central and southern Taiwan could not attend the program and they requested an e-learning courses or programs. Consequently, the Graduate Institute of LIAS responded to the needs of learners outside northern Taiwan by establishing an online master's degree program and applying to the Ministry of Education for its accreditation.

3. Method

This study is conducted as action research which is, put simply, "learning by doing". It was first conceived in the 1940s by Kurt Lewin, who sought to combine a theory of social change and its actual practice. Action research is now widely used in situations where new knowledge can be arrived at through the process of progressively improving change (Dickens, 1999). It is a collaborative effort conducted by members of the group or organization being studied. By collecting data from multiple sources, members seek to understand a situation, to identify areas needing improvement and to determine what changes should be made.

The process of data gathering and change spirals towards a solution, with knowledge being generated at each turn. There are three stages in each turn of the spiral: (a) defining context and purpose: determining the issues and using the diagnosis as the basis for which action will be planned and taken; (b) planning the action; and finally, (c) taking action (Coghlan, 2001). As Coghlan and Brannick (2001) and Stringer (1999) reported their researches, they adapted the traditional action research narrative to an "Introduction, Methods, Results and Discussion" format.

The study was conducted as action research with five stages as follows: (a) describing the problem and its focus; (b) exploring some action options for the problem; (c)seeking collaborative partners and discussing; (d)undertaking action options: the five lecturers of the LIAS planned and developed six e-learning courses with web-based learning systems; (f) evaluation and feedback: being evaluated by students and experts, six courses were modified according to student learning outcome assessments and course reviews.

The researchers collected reference data, developed teaching methods from action research strategy lectures and teaching and used interviews, questionnaires, on-line information and document analysis.

4. Curriculum Planning and Design

The action research was undertaken from June 2007 to May 2008. It included the design and development of an e-learning master's program with six e-learning courses, the development of digital

content with an e-learning system at National Cheng-Chi University, the implementation of distance learning and evaluation of the six e-learning curricula by students and experts.

4.1 E-learning Master's Program Design

The objectives of the e-learning Master's program in library and information science for on-the-job students include: (a) prepare students for professional careers in library and information science; (b) provide middle school instructors with further opportunities for education; (c) provide school library staff with further education in library and information services; and (d) cultivate e-learning instructional design professionals.

The graduation requirements for the Master's program for on-the-job LIAS students are as follows: (a) completion of e-learning study within two to four years; (b) a minimum of 30 credits for graduation (without thesis): 12 required credits, 18 elective credits; and (c) completing a thesis and having it approved.

There are a total of 12 courses included in the e-learning Master's program. In the first year, LIAS provides some core courses, allowing students to learn about library and information science philosophy and the profession. Students additionally learn the mission of libraries in the information society and acquire an understanding of information collection, conversion, storage, retrieval and various forms of use and dissemination. During the second year, courses include Library Management, Digital Libraries, the Integration of Information Technology into Teaching, Digital Content and Learning, and other advanced courses. The curricula of the e-learning master's program are listed as Table 1.

Table 1　LIAS E-learning Master's Program

Course Title	Required/ Elective	Credit	School Term	Instructor	Teaching Method
Seminar on Library and Information Science	Required	3	1st Term	Ming-Yueh Tsay	E-learning
Information, Organization and Access	Required	3	1st Term	Mei-Ling Wang	E-learning
Research Methodology	Required	3	2nd Term	Mei-Hwa Yang	E-learning
Seminar on Archival Studies	Required	3	4th Term	Li-Kuei Hsueh	E-learning
Seminar on Public Services	Elective	3	2nd Term	Ming-Yueh Tsay	Classroom

Information Technology Integrated into Instruction	Elective	2	2nd Term	Chih-Ming Chen	Classroom
Seminar on Technical Services	Elective	3	3rd Term	Mei-Ling Wang	Classroom
School Library Management	Elective	2	3rd Term	Mei-Hwa Yang	E-learning
Seminar on Contemporary Library Issues	Elective	3	3rd Term	Fang-Rung Juang	Classroom
Digital Libraries	Elective	3	4th Term	Chih-Ming Chen	E-learning
Reading and Libraries	Elective	2	4th Term	Shu-Hsien Tseng	Classroom
Special Topics on Multimedia and Communication Technologies	Elective	3	4th Term	Pai-Lin Chen	Classroom

4.2 E-learning Curriculum Design

The Graduate Institute of LIAS at National Cheng-Chi University planned six courses by means of asynchronous web-based instruction which included online lectures, three face-to-face lectures; as well as beginning, mid-term, and final examinations. The instructors for the Master's program for on-the-job LIAS students have rich teaching experience and expertise in library and information science, archives study and computer science. All courses were designed in accordance with 17 precepts and 101 outline guidances from the "Guidelines for Curricular Accreditation of MOE" relating to on-line course activity design, teaching management and system service. The six e-learning courses are shown in Table 2.

Table 2 Six LIAS E-learning Courses

Course Title	Required/ Elective	Credit	Instructor
Seminar on Library and Information Science	Required	3	Ming-Yueh Tsay
Information, Organization and Access	Required	3	Mei-Ling Wang
Research Methodology	Required	3	Mei-Hwa Yang
Seminar on Archival Studies	Required	3	Li-Kuei Hsueh
School Library Management	Elective	2	Mei-Hwa Yang
Digital Libraries	Elective	3	Chih-Ming Chen

5. Curriculum Development and Implementation

The Graduate Institute of LIAS conducted action research for the e-learning curriculum development through the following process: (a) inviting qualified instructors to share their professional knowledge of e-learning and library and information science; (b) ensuring that each course has structural integrity and easily digestible content; (c) ensuring that the library has abundant resources and easy access to the internet;(d) ensuring that the e-learning system has functional integrity and a user-friendly interface; and (e) developing teaching strategies with e-learning.

From September 2007 to January 2008, the Graduate Institute of LIAS developed six e-learning courses including: Information, Organization and Access; Research Methodology; School Library Management; Seminar on Archival Studies; Seminar on Library and Information Science;   and Digital Libraries.

Information, Organization and Access (shortened as Information Organization), a required course, was taught by professor Mei-Ling Wang of the LIAS and was taken by eight graduate students. Research Methodology, a required course, was taught by Professor Mei-Hwa Yang of the LIAS and was taken by thirteen graduate students. School Library Management course (Library Management) was taught by Professor Mei-Hwa Yang of the LIAS and was taken by twenty nine graduate students. The Seminar on Archival Studies course was taught by professor Li-Kuei Hsueh of the LIAS and was taken by fifteen graduate students. The Seminar on Library and Information Science (LIS Seminar),a required course, was taught by professor Ming-Yueh Tsay of the LIAS and was taken by fourteen graduate students. Digital Libraries course was taught by associate professor Chih-Ming Chen of the LIAS and was taken by two graduate students.

The six courses were developed by five instructors and six teaching assistants, with an e-learning system platform which provided many online functions including instructional materials management, assignment submission, online discussion, online examination, course news announcement, sending email etc.   Shown in Figures 1-5 are screenshots from six e-learning courses.
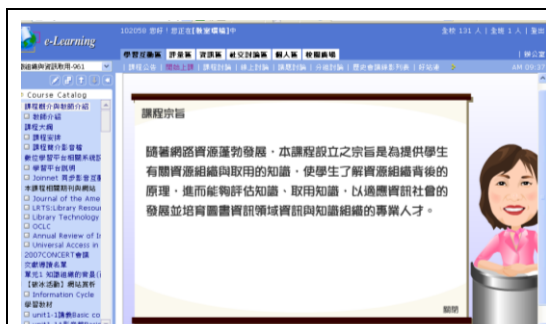
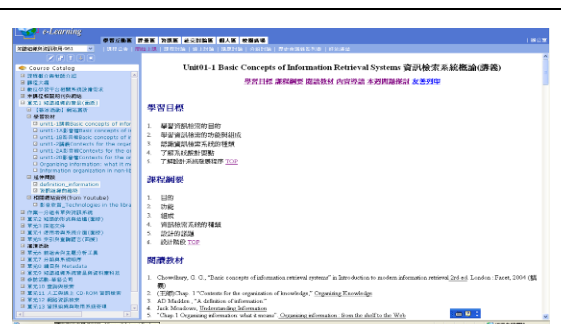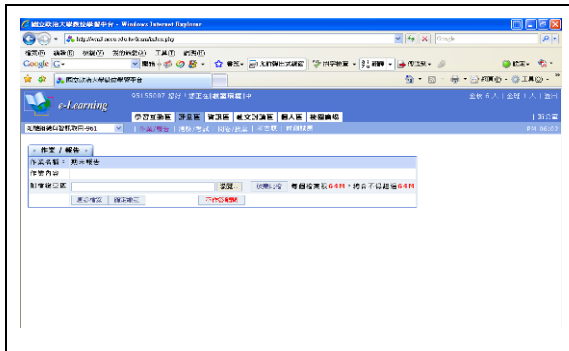|	
Figure 1. Screenshot of course introduction	Figure 2. Screenshot of instructional materials

Figure 3. Screenshot of an assignment submission

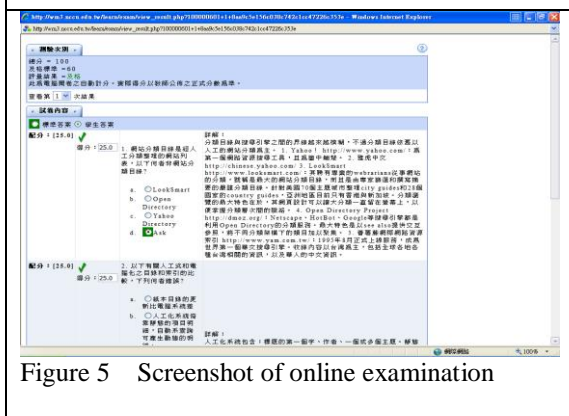
Figure 4. Screenshot of online discussion

Figure 5   Screenshot of online examination

6. Evaluation

After the LIAS developed six e-learning courses, it undertook evaluation and made modifications. To assess the effectiveness and performance of teaching and learning, multi-evaluations were implemented by six e-learning courses, which included students' learning outcome assessment and review of courses by students and experts.

6.1 Learning Outcomes Assessment

There were various methods of learning outcomes assessment within the six e-learning courses, such as examinations, cooperative learning, participation in group discussions, individual reports, group reports and course attendance. Instructors used assignment and examinations to evaluate students' learning achievement. In addition to keeping student portfolios, instructors also observed students' learning attitudes and their interaction in the learning environment. These learning assessments served as a basis for helping instructors not only understand the learning status of students, but for adjusting the curriculum.

6.2 Course Evaluation by Students

Evaluations of the six e-learning courses were designed by National Cheng-Chi University's Center for Teaching and Learning Development and completed by students. The course evaluation

questionnaires consisted of 18 statements focused on course content, the e-learning system, learning materials, and teaching methods. The evaluations used a five-point scale (1 – lowest; 5 – highest), representing responses ranging from "strongly disagree" to "strongly agree."

During the middle of the semester, the LIAS delivered the six e-learning course evaluation questionnaires in order to improve instructions.   From the findings of the questionnaire survey, most students were satisfied with the six e-learning courses and agreed that these courses were suitable for asynchronous distance learning. The findings of the course evaluation questionnaires are shown in Table 3.

In regarding to the questionnaire survey, recommendations for improving instructor performance were as follows: (a) modify the font size and color scheme of the teaching content for better legibility; (b) encourage the transition of all courses to entirely asynchronous distance courses; (c) strengthen student interest in learning; (d) adjust workload intensity; (e) enhance the connections between instructors, teaching assistants, and students; and (f) beware of the interaction between instructors and students.

Table 3. Student Scores of Course Evaluation

courses / statement	Information Organization N=8	Research Method N=13	Library Mgt. N=29	Archival Studies N=15	LIS Seminar N=14	Digital Libraries N=2
1. This course was appropriate for face-to-face interaction	4.38	4.15	4.21	4.67	4.50	4.00
2. This course was adequate for distance learning	4.50	4.31	4.34	5.14	4.29	4.50
3. This course stimulated student interest in learning	4.38	4.23	4.62	5.00	4.50	4.50
4. The teaching medium was appropriate for the course content	4.63	4.31	4.72	5.00	4.43	4.50
5. The teaching methods were adequate for distance learning	4.75	4.00	4.52	4.50	3.93	4.50
6. The course organization and arrangement were systematic and adequate for distance learning	4.50	4.38	4.41	4.71	4.57	5.00
7. The teaching materials were appropriate for and helpful to	4.38	3.92	4.48	5.00	4.43	4.50

learning					
8. The font and color of the teaching materials were clear and easy to read	4.38	4.38	4.31	4.57	4.64	4.50
9 I understand how to contact instructors and teaching assistants	4.50	4.62	4.38	5.00	4.36	4.50
10. Communication with the teaching staff was good	4.50	4.31	4.48	4.71	4.57	4.50
11. Communication with classmates was good	4.75	4.46	4.66	4.29	4.36	5.00
12. We were not overloaded with assignments	4.25	4.00	4.21	4.64	4.71	4.50
13. The method for submitting assignments was appropriate	4.50	4.38	4.34	3.93	4.50	4.50
14. The assessments correspond with the expected learning outcomes	4.50	4.31	4.48	4.79	4.50	4.50
15. Grading policies are clear and reasonable	4.50	4.23	4.34	4.79	4.50	5.00
16. When I have problem, I can easily contact the instructor	4.88	4.54	4.41	4.00	4.43	4.50
17. When I have problems, I can easily contact the teaching assistant	4.50	4.54	4.41	4.57	4.79	4.50
18. I am willing to take e-learning courses in the future	4.50	4.23	4.31	4.93	4.64	4.50

6.3 Course Evaluation by Experts

To assess the effectiveness of the six e-learning courses, the National Cheng-Chi University Center for Teaching and Learning Development invited five experts to evaluate the six e-learning courses of LIAS from January 16 to 30, 2008. Five experts were invited to report, discuss and make suggestions. As a result, experts showed positive attitudes towards the six e-learning courses and highly commended instructors and online learning systems with comprehensive functions.

Finally, the experts suggested improvements in the following areas: instructional materials, learning activities, student interaction and online learning system. For the instructional materials, the

experts said that the framework of the curriculum was clear and contents rich but characteristics were not expressed so the instructional materials should be further diversified in accordance with each course features. For learning activities, the experts recommended that instructors design learning activities on the basis of learner-oriented principles, as well as consider the possibility of delivering the teaching modes to distance learning. Competent **e-tutors** should provide their expertise and knowledge to help students become familiar with the online learning system. Further suggestions were made such as limiting the length of scholars' lecture videos for improved learning efficiency. As for learning interaction, the experts suggested that students should have more dialogue and interaction with each other, and that there be clear grading policies for students' participation in online activities. For increased ease of student learning, experts suggested that specific computer hardware and software equipment should be prepared and technical support be available in accordance with students' needs,

After the experts reviewed the courses, the LIAS immediately modified and adjusted six e-learning courses between January and April 2008. Some modification were made as follows: (a) modifying the curriculum framework to make it more consistent and user friendly; (b) adjusting fonts and layout of instructional materials; (c) adjusting course modules to make the layout of the six courses consistent; (d) using Flash animation to enhance the diversity of curriculum materials; and (e) re-recording the instruction videos. In May 2008, the LIAS submitted an application for the e-learning Library and Information Science Master's Program for On-the-Job learners to the Ministry of Education for program accreditation and curricular accreditation.

7. Discussion and Conclusions

This article has presented a reflective history and described an evolutionary journey of e-learning curriculum development. In particular, it clarifies the core issues involved in the development and delivery of e-learning content while also trying to address the pragmatic issues that arise for learners pursuing professional and academic development while in full-time employment.

Adopting an action research orientation has ensured that changes to the curriculum have been incremental and primarily based on reflection and analysis. The process of planning, acting, observing and reflecting with an emphasis of the value of participation, collaboration and empowerment was explicit in the curriculum and differentiates action research from other form of research. In the study, five instructors with assistants worked together, created many different discourses concerning course content, evaluation and development of curricula and learners' experiences. The process of action research entails a series of successive cycles with each incorporating the possibility of providing evaluative feedback with and between many cycles of action.

Through action research, six e-learning courses were developed and implemented, and further modified after learning outcome assessments and curriculum evaluations were carried out. The study

indicated that e-learning provided students with an opportunity for active and flexible learning. E-learning materials used hyperlinks with various multimedia materials, such as voice, video, and animation to arouse student interest in learning. Using the Internet, students can easily read instructor lectures and even animations can guide students in learning by themselves. When students met difficulties, they could ask questions and discuss them on-line discussion immediately. Furthermore, without constraints on time and space, e-learning provided more flexibility in learning, giving students a chance to learn anywhere, anytime.

As students can easily arrange learning procedures according to their needs in the online learning system, e-learning achieves the goal of providing students with a   personalized learning experience. The on-line learning system can give students their own learning experience, record the learning process of each student and apply different strategies to meet each individual's needs, strengthening the effectiveness of learning.

Experts commented on instructors and students getting good support in using the online e-learning system. According to the findings of the evaluation survey, students agreed that the six courses were suitable for the e-learning mode and aroused student interest in learning. The evaluation by experts also indicated that the six courses performed well and had successful learning outcomes.

The study encouraged the LIAS to develop the e-learning Master's program. In light of the quality and accreditation standards adopted by the Ministry of Education, the LIAS should look into the implementation and accreditation of e-learning Master's degree programs for full-time library staff and school teachers. This will be a milestone in the history of library and information science education in Taiwan.

The six on-line courses were developed and implemented according to the guidelines for trial e-learning master's programs for on-the-job learners proposed by the MOE. However, through the process of action research, five instructors found that some guidelines were not feasible and useful for curriculum development. We recommend that the Ministry of Education hold a conference inviting participating instructors, assistants and students from those institutions implementing e-learning Master's programs on a trial basis to discuss how to implement e-learning Master's programs, as well as how to modify the accreditation system for e-learning Master's programs and the guidelines.

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