How Do Learners Utilize the Course Package and Learning Support Services in Distance Learning: A Survey on the Learning Processes

JIANWEI ZHANG, YANQING SUN, XUEYOU WANG, GENGSHENG WU

Distance Learning (DL) is more than 150 years old and has been a practical option for many students and institutions, but the advances in Information and Communication Technology (ICT) has accelerated the interest in DL to an unprecedented degree. A growing use of DL methods is being implemented throughout postsecondary education. Many higher education institutions are adopting distance and online learning as the next logical step in educational delivery systems (Selingo, 1998). However, as O'Malley and McCraw (1999) documented, the effectiveness of distance and online learning and its impacts on students' learning, have not been well researched prior to adoption. In the few in-depth quantitative studies on distance and online learning, The Institute for Higher Education Policy (2000) in the US conducted a survey among the well-recognized online education institutions of high quality to find out the benchmarks for success in internet-based distance education, which included the benchmarks in the spheres of institutional support, course development, teaching/learning, course structure, student support, faculty support, and evaluation and assessment. In a quantitative analysis of the online courses of 130 institutions from 26 countries, Paulsen (2000) concluded that most of the institutions were still in the beginning stage of online learning and couldn't

be recognized as virtual or online universities. This is because the institutions usually provided a small number of courses on average and did not offer learners rich and flexible learning support and services. As far as the communication tools adopted in these online courses were concerned, the frequently used tools in these courses included: e-mail (92%), bulletin boards (69%), student list (46%), instructor's presence (38%), chat (27%), telephone (27%), students' presence (23%), Bulletin Board System (BBS) (19%), video conference (15%), audio conference (15%), and Multi-user Object-Oriented environment (MOO) (8%). Mioduser, Nachmias, Lahav, and Oren (2000) presented a study of the pedagogical and technological status of web-based learning environments. The overall picture they unveiled was described as "one step ahead for the technology, two steps back for the pedagogy." Results indicated that many educational web sites were still pre-

JIANWEI ZHANG, TSINGHUA UNIVERSITY, BEIJING, CHINA
E-MAIL: zhangjw@tsinghua.edu.cn

YANQING SUN, BEIJING NORMAL UNIVERSITY, BEIJING, CHINA
E-MAIL: sunyq@bnu.edu.cn

XUEYOU WANG, TSINGHUA UNIVERSITY, BEIJING, CHINA

GENGSHENG WU, TSINGHUA UNIVERSITY, BEIJING, CHINA
E-MAIL: offwgs@tsinghua.edu.cn

dominantly text-based and did not yet exhibit evidence of current pedagogical approaches (e.g., use of inquiry-based activities, application of constructivist learning principles, and use of alternative evaluation methods).

In China, distance education had been confined within the Central Radio and TV University (a huge university system) during the last two decades, until Tsinghua University, a leading comprehensive university in China, established its E-Learning system in 1997. In this system, an integrated technological solution was adopted to combine computer networks with satellite-based Digital Video Broadcasting (DVB) and Cable TV technologies to cope with the bandwidth and access limitations of the computer network. In 1999, the Ministry of Education launched the Modern Distance Education Project aimed at promoting the development of lifelong learning systems across China. So far, more than sixty prestigious universities in China have been involved in this project to establish web-based Education Schools to offer DL programs from vocational training to undergraduate and graduate level education.

With the rapid development of online and distance learning, the problem of quality assurance emerges and entails in-depth research to find out how to promote effective online and distance learning. In one of the earlier studies, Zhang, Li, Duan and Wu (2001) investigated learners' self-efficacy beliefs of DL, successes with DL, and the relationship of their characteristics and DL. In the results, the students displayed relatively positive DL self-efficacy, which was closely related to their intrinsic motivation and Self-Regulated Learning (SRL) skills. The students perceived that they had attained much in most of the spheres of learning objectives including knowledge understanding, communication skills, study skills, and the like. DL self-efficacy, SRL skills, and computing skills proved to be the important predictors of learners' overall achievements in DL.

The present study focused on learners' interactions with the various types of DL resources during the learning processes. There are two essential sub-systems in a effective DL system: (a) the course package that is responsible for the design, development, and delivery of learning content,, and (b) the learning support and services that promote and facilitate distance learning by providing learners with the opportunities and tools to interact with the institution, instructors, and mentors, peers, and the wider communities (Holmberg, 1989). These two sub-systems continue to function when DL has evolved from its earlier stages to the era of online e-Learning.

This study explored how learners interacted with, and benefited from, the various types of learning resources ranging from the sub-system of course package to that of learning support and services. The problems that lie in the two sub-systems and the directions for future development will be discussed based on the quantitative analysis. This study used DL at Tsinghua University as the focus because Tsinghua University is a pioneer in online and distance learning in China and has established the typical and representative DL system.

METHODOLOGY

Subjects

The subjects in this survey were 112 distance learners of Tsinghua University. Thirty-two point seven percent of them were female, and 67.3% were male. Eighty-four of the learners were graduate students majoring in computer applications, business management, or civil and commercial law. Twenty-eight of them were undergraduate students majoring in law, foreign language, or economics. Most of the learners had full-time jobs as business managers or professional technologists.

Questionnaire

A questionnaire was designed to reveal how learners had interacted with and benefited from the various types of resources made available to students at Tsinghua University. The content in the questionnaire involved: (a) the demographic data and primary information of the subjects; (b) learners' ratings of their interactions with various formats of learning resources; (c) a four-point Likert scale requesting learners to indicate their perceived attainment in DL from 9 spheres, which will be elaborated in the results. (The self-perceived attainment was chosen as the indicator of the effectiveness of DL because it is difficult to evaluate the multi-facets outcomes of DL, and also the perceived attainment per se is of great importance in evaluating DL); and (d) learners' experiences of distance learning. The questionnaire was reviewed and revised by three experts to help improve its reliability and construct validity. The specific items in each part can be seen in the results and analysis.

Procedure

The survey was administered at the end of the 2001 semester. The students were told to review and reflect over their distance learning by completing the questionnaire in paper format. One hundred twelve of the 126 questionnaires were handed in, with a return rate of 88.89%. The responses of the subjects were then coded according to the coding system. SPSS V9.0 was used to conduct all the statistical analyses.

RESULTS AND ANALYSIS

Time Spent on Distance Learning Activities

Since almost every distance learner in this survey has a full-time job, it is of particular concern to know about their engagements in distance learning activities. In this survey, the learners were asked to report how much time per week they usually spent on studying, except attending the regular distance lectures at the local substations, browsing the Internet overall, and browsing the Internet for the purpose of learning. Table 1 shows the responses of the subjects. It is noticeable that more than 40% of the learners spend less than four hours on studying per week, except attending the regular distance lectures at the local substations. More than half of the students spend four or more hours using the Internet each week, but mostly not for the purpose of learning.

Interactions with Various Formats of Learning Resources

Reflecting the scope of distance learning resources provided by Tsinghua University, 11 formats of learning resources were listed in the questionnaire, and required the learners to indicate: (a) how frequently they had used each format of resources, (b) the extent to which they had benefited from the learning resources, and (c) the demands of the improvement and enrichment of the learning resources. Four-point Likert type scales (1-4) were used for all the questions developed in each of these three areas. The eleven formats of distance learning resources were:

(1) Digital Video Broadcasting of lectures;

(2) online courseware;

(3) CD-ROMs;

(4) question-answering and discussion through two-way videoconference;

(5) textbooks and other printed materials;

(6) electronic resources in the university library;

(7) related websites;

(8) online communication tools (e.g. e-mail, BBS, chat);

(9) consulting instructors by way of telephone;

(10) audio tapes; and

(11) the help and support from local teaching assistants.

Figure 1 presents the results of learners' ratings for all the resources.

As was revealed by Multiple Analysis of Variance (MANOVA), a significant difference exists among the responses relating to the questions on the frequency of each of the eleven formats of learning resources ($F(10,920)=69.69$, $p=.000$). The three most frequently used formats of resources in order are: (1) Digital Video Broadcasting of lectures, (5) textbooks and other printed materials, and (2) online courseware. The three most scarcely used formats were: (4) question-answering and discussion through two-way videoconference, (9) consulting instructors by way of telephone, and (6) electronic resources in the university library. Similar trends existed in learners' ratings for the helpfulness of the resources. When it comes to the demands for the improvement and enrichment of the resources, significant main differences were observed among the eleven formats ($F(10, 660)=10.95$, $p=.000$). The learners indicated great demands for increasing the opportunities of videoconference-based discussion, opening more library resources and services to distance learners, and providing more instructional CD-ROMs of better quality.

The Status of the Course Package System and Learning Support System

To gauge the status of the two sub-systems in DL, we aggregated ten of the eleven formats of learning resources into two categories: (a) *course*

Table 1. Time spent on learning, using the Internet, and using the Internet for learning per week

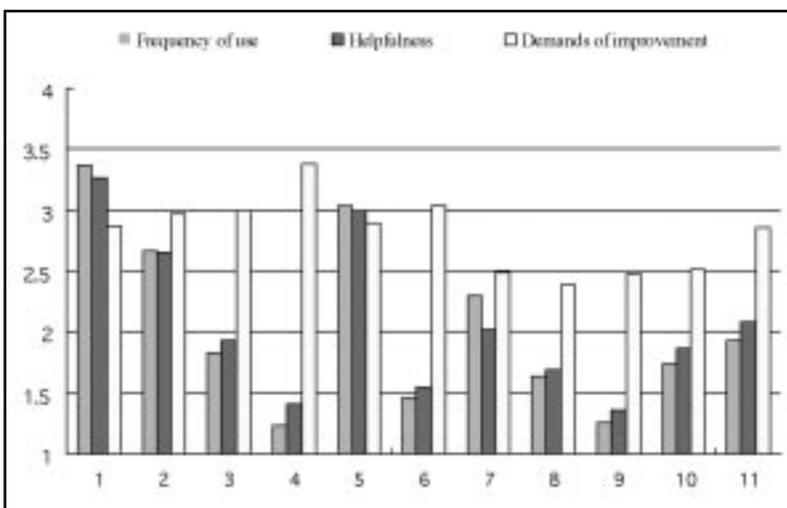|	Less than 2 hrs	2-4 hrs	4-6 hrs	More than 6 hrs
Learning	17.1%	24.3%	32.4%	24.3%
Using the Internet	31.5%	16.2%	27.9%	24.3%
Using the Internet for learning	56.7%	26.1%	12.6%	4.5%

Figure 1. Learning ratings for the eleven formats of distance learning resources

package that is responsible for the delivery of learning content. It includes (1) Digital Video Broadcasting of lectures, (2) online courseware, (3) CD-ROMs, (5) textbooks and other printed materials, and (10) audio tapes; (b) *learning support and service* that provides learners with opportunities and tools for interactions with the institution, instructors, peers, and the wider communities. It encompasses five formats of the resources including: (4) question-answering and discussion through two-way videoconference, (6) electronic resources in the university library, (8) online communication tools (e.g. e-mail, BBS, chat), (9) consulting instructors by way of telephone, and (11) help and support from local teaching assistants. Visiting related websites was not included in either of the two categories because it is not deliberately designed and provided by the distance education institution.

Figure 2. Learners' ratings for the course package and learning support systems

Figure 3. The self-perceived learning attainment in nine spheres on a four-point Likert type scale

Learners' ratings of the two categories of resources in terms of the frequency of use, helpfulness in learning, and the demand for improvement and enrichment are depicted in Figure 2.

MANOVA, using the categories of the learning resources as the within-subject factor and the type of students (graduate /undergraduate) as the between-subject factor, indicated that there was a significant difference in the frequencies of using the two categories of learning resources ($F(1,107)=293.26$, $p=.000$). The frequency of using course packages was distinctively higher than that of using learning support and services. A clear interaction was observed between the two factors ($F(1, 107)=5.87$, $p=.017$), indicating that undergraduate students had used the learning support and services more frequently than graduate learners. Similar trends were also observed in learners' ratings of the helpfulness of the learning resources. As far as the demands for improvement and enrichment were concerned, the learners showed great demands for both of the categories – to access higher quality course packages, and to obtain much more comprehensive and convenient learning support and services.

The Relationship between the Uses of the Course Package and Learning Support and the Attainments in DL

How do students perceive their attainments in DL? Figure 3 shows learners' reported attainments in nine spheres on a four-point Likert type scale (1=exstremely little, to 4= extremely much). The nine spheres are:

(1) memorization of basic facts and concepts;

(2) basic skills;

(3) conceptual understandings;

(4) knowledge integration;

(5) application and problem solving;

(6) creative /critical thinking;

(7) communication with others;

(8) skills for information access and independent learning; and

(9) academic research abilities.

The students believed that they had benefited much in most of the spheres, with a mean rank of 2.77. They seemed to have benefited much more in conceptual understanding of knowledge and independent learning abilities, while little in the ability to do research. As Table 2 shows, the frequency of using the course package and learning support services was significantly correlated to learners' overall self-perceived attainment in DL.
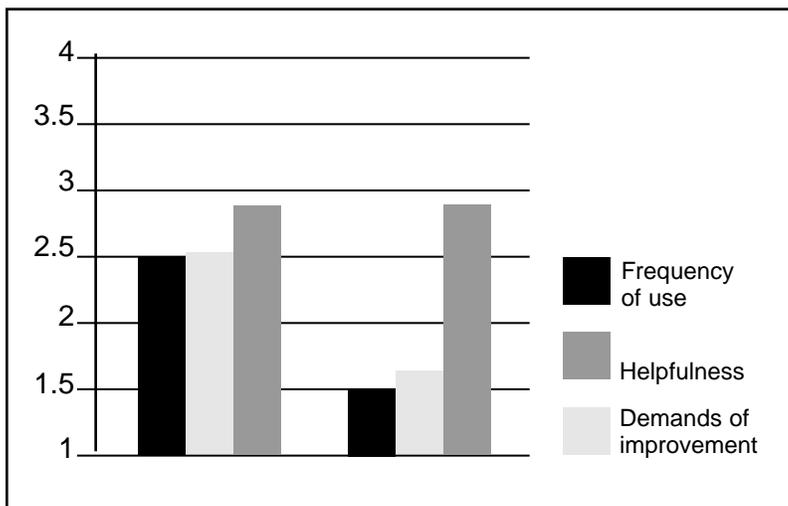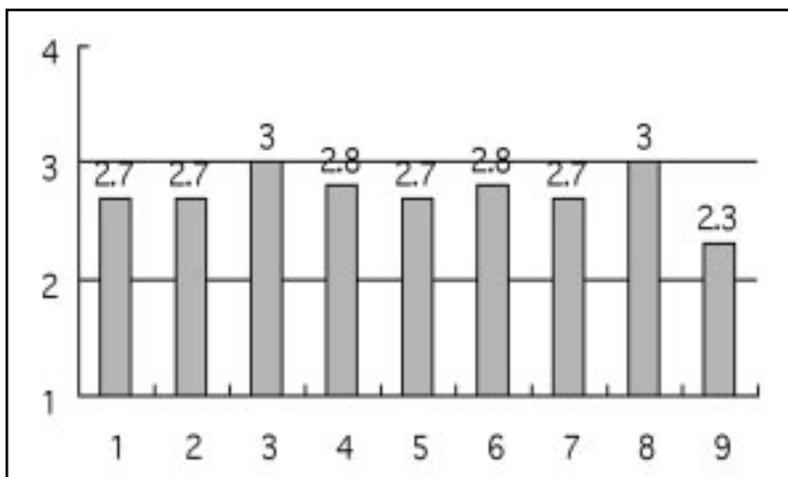
The In-depth Analysis of Learners' Experiences of the Course Package and Learning Support Services

To collect more in-depth information about learners' experiences of the course package and learning support services in DL, this survey included special items to ask learners to report their experiences of DL in the spheres of course package and learning support services. The learning support services were divided into two types of interactions in this section: the interactions with instructors and the interactions with peers. A six-point Likert type scale was used to ask the learner to indicate the extent to which he/she agrees with the provided statements, from 1 (strongly disagree) to 6 (strongly agree). Table 3 gives the learners' responses to the items.

MANOVA revealed that there was a significant difference in learners' evaluations for the three dimensions ($F(1, 109)=85.36$, $p=.000$), with the highest rating for course package and the lowest rating for the interaction with instructors. The surveyed distance learners tended to feel inadequate learning support from their instructors and mentors. As the specific items display, it is not convenient for the learners to consult their instructors for learning help. The local teaching assistants had not functioned as expected in promoting learners' learning activities. Besides, more than half of the learners reported that their instructors couldn't grade and return their assignments on time, and seldom gave them meaningful learning advice in their feedback. It is also important to notice the insufficiency in the interactions among the learners. It is regrettable that they didn't take the advantage of the Internet to communicate with their peers frequently. About 70% of the learners reported feeling somewhat lonely in learning and eager to communicate more with their classmates. All the outcomes support our previous finding that the current DL system is suffering the imbalance between the course package and the learning support sub-systems. One of the urgent missions is to establish a more powerful and facilitative learning support and service system to enhance the quality of DL.

To examine the differences between the freshmen and older students in their experiences with DL, we divided the surveyed students into two groups: (a) the freshmen who were enrolled in Tsinghua University's DL program in 2000, and (b) those older student who began the DL programs in 1998 or 1999 and have more than one year of experience with DL. The two groups' responses to the previous three dimensions are shown in Table 4. Significant or marginally significant differences were observed between the two groups on the dimensions of course package ($F(1,104)=4.92$, $p=.029$) and the interaction with peers ($F(1,104)=3.49$, $p=.065$), showing that the older students had better experiences in the two perspectives. DL is a distinctive learning format and requires special strategic adaptations by the learners. These senior learners might have accu-

Table 2. Pearson correlations between the using of course package, learning support and the perceived learning attainments

	Frequency of using course package	Frequency of using learning support
Overall learning attainment	.253**	.224*

Note: ** $p < 0.01$, * $p < 0.05$

Table 3. Learners' responses to the survey of course package and learning support and services

	Items	Mean	SD	Sub-total
Course package	My teachers always use effective visual methods in the lectures.	4.14	1.21	
	Overall, the lectures are very clear and good at facilitating my understanding.	4.12	1.03	3.78
	The textbooks are not adaptive to self-study.	3.76	1.29	(.78) *
	Adequate learning materials have been provided for the distance courses.	3.57	1.20	
Interaction with instructors	I can contact my instructors conveniently whenever I need.	2.76	1.24	
	I don't know whom I should ask for help when I have difficulties or problems in learning.	3.66	1.38	
	My instructors usually handle my assignments on time.	3.39	1.27	3.06
	My instructors usually give me helpful learning advice in the feedback on my assignments.	2.76	1.32	(.81) *
	I often ask questions of my instructors through e-mail.	2.65	1.23	
	The local teaching assistants have done good jobs in facilitating my learning.	3.32	1.48	
Interaction with peers	I often have face-to-face discussions with my classmates in learning.	3.94	1.32	
	I feel lonely in learning and eager to communicate with others.	3.75	1.35	3.16
	I often have discussions with my classmates through the Internet (e-mail, chat, BBS).	2.41	1.13	(.83) *
	The courses have provided adequate opportunities for discussion and communication.	3.08	1.29	

Note: * The means and standard deviations of the three dimensions

mulated more experiences in distance learning and developed better learning strategies. Therefore, they could make better use of the course package and the opportunities for interaction with their peers.

DISCUSSION

To gauge the current status of the DL system at Tsinghua University as an example of DL carried out in China, this study administered a survey of how learners interacted with the course package and learning support resources during distance learning. One of the important findings was the distinctive imbalance between the two sub-systems, which means that the distance education institution usually focuses much more on the development of course packages while to some extent neglecting the importance of providing complete and convenient learning support and services.

The sub-system of learning support and services plays a critical role in an effective DL system in that it provides learners with channels and opportunities to interact with the institution, instructors, peers, and the wider community. All types of interactions are unsubstitutable for engaging learners in ongoing distance learning and helping them resolve the difficulties and problems encountered, keeping the interests and motivations for learning, and gaining a sense of belonging to the learning community. Unfortunately, many distance education institutions concentrate too much on the development and delivery of course package while they overlook the importance of learning support and services, assuming that the functions of learning support and services could be "packed into" the course package to cover the varieties of needs of the learners (Sewart, 1993). This is definitely a misconception. Learning support is the type of service that is provided along with the ongoing learning processes, rather than the predesigned product that can be packed and delivered in bulk.

As this survey displayed, the available learning support and services in the present DL system are relatively insufficient in terms of quantity and quality. The learners have few chances to contact their instructors or mentors to ask questions, communicate with their classmates in learning, or access the online resources and services of the university library. It is one of the most urgent tasks to establish a more powerful and effective learning support and service system to assure qualified distance learning. The specific treatments in this perspective might include:

1. Allotting adequate assistant tutors with explicit responsibilities. The Open University of UK has good experiences in this perspective to allot one tutor for about every 23 students. There are explicit requirements for the tutors, such as marking learners' assignments according to the provided standards, giving learning advice in feedback with assignments, participating in the BBS discussions, and answering learners' questions and inquiries by way of email and telephone, and so forth. These treatments will help to overcome the prominent insufficiency in the interactions between the distance learners and their instructors.

2. Developing and adopting a more powerful web-based Learning Management System (LMS), with which the institution can provide comprehensive learning support. The LMS can also provide automatic, intelligent, and adaptive learning services (e.g. intelligent question-answering services).

3. Building online learning communities to promote the communications and collaborations among the distance learners as well as enhancing the sense of belonging (Moller, 1998; Zhang, 2000). The variety of Computer-Mediated Communication (CMC) tools in internet-based distance education can be used to promote substantive interactions among distance learners. Several researchers have studied the teaching methods for CMC (Paulsen, 1998) and learners' actual interactions based on CMC tools (Levin, Waugh, Chung, and Miyake, 1992; Fishman, 2000).

4. Increasing the amount of digital learning resources and services in the university library to promote convenient access for distance learners.

5. Arranging necessary face-to-face activities to facilitate distance learners in resolving their problems in learning and to benefit from the on-campus resources of the university.

More comprehensive and specific learning support services can be referred to Khan's (2001) framework for open, flexible, and distributed learning and Kumiko and Pogroszewski's (1998) Virtual University Reference Model. Kember (1995) also offered a conceptual model of distance education and recommendations for policy

Table 4. Experiences of distance learning among freshmen and older students

	Course package		Interaction with instructors		Interaction with peers	
	Mean	SD	Mean	SD	Mean	SD
Freshmen	3.68	.79	3.00	.83	3.10	.86
Older students	4.02	.71	3.22	.75	3.41	.69

and practice that link the principles of instructional design and the provision of learner support. The establishment of comprehensive and convenient learning support and service systems is of particular significance when DL enters the era of online e-Learning, or the so-called "Post-Fordism" stage (Campion, 1995).

As far as the status of the course packages in DL is concerned, the most frequently used three formats of resources in order are (a) Digital Video Broadcasting of lectures, (b) textbooks and other printed materials, and (c) online courseware. CD-ROMs are also frequently used to provide offline courseware and learning materials. These results reflect the current status of the course resources structure in the present DL practices carried out in China. The course resources model that integrates computer-based instruction, satellite-based DVB, as well as printed materials is a cost-effective model adapting to the situations of the technological infrastructure and the social economic development in China. In this survey, the learners also demonstrated great needs for the improvements and enrichments of the course resources, particularly to increase the amount and quality of CD-ROM-based materials and online courseware, as well as to provide rich printed materials that are adapted to distance learners' needs. The improvements and enrichments of the course resources imply another direction for the future development of DL in China.

CONCLUSION

In conclusion, to gauge the current status of the DL system at Tsinghua University as a case of the DL carried out in China, this study administered a survey of how learners interact with the course package and learning support resources during distance learning. One of the important findings is the imbalance between the two sub-systems, which means that the distance education institution usually focuses much more on the development of course packages while to some extent neglecting the importance of providing comprehensive and convenient learning support and services. It is one of the most urgent tasks to establish a more powerful and effective learning support and service system to assure qualified distance learning. These conclusions are drawn based on the case study of DL at Tsinghua University. Further studies need to be conducted to involve a wider sample and more in-depth analysis and comparisons across the cases. ✪

REFERENCES

Campion, M. (1995). The supposed demise of bureaucracy: Implications for distance education and open learning – More on the Post-Fordism debate. *Distance Education, 16* (2), 192-216.

Fishman, B. J. (2000). How activity fosters CMC tool use in classrooms: Reinventing innovations in local contexts. *Journal of Interactive Learning Research, 11*(1), 3-27.

Holmberg, B. (1989). *Theory and practice of distance education.* London: Routledge.

Kember, D. (1995). *Open learning courses for adults: A model of student progress.* Englewood Cliffs, NJ: Educational Technology Publications.

Khan, B. (2001). A framework for Web-based learning. In B. Khan (Ed.), *Web-based training.* Englewood Cliffs, NJ: Educational Technology Publications.

Kumiko, A., & Pogroszewski, D. (1998). Virtual university reference model: A guide to delivering education and support services to the distance learner. *Online Journal of Distance Learning Administration, 1*(3).

Levin, J., Waugh, M., Chung, H.K., and Miyake, N. (1992). Activity cycle in educational electronic networks. *Interactive Learning Environments, 2*(1), 3-13.

Mioduser, D., Nachmias, R., Lahav, O., & Oren, A. (2000). Web-based learning environments: Current pedagogical and technological state. J*ournal of Research on Computing in Education, 33*(1), 55-77.

Moller, L. (1998). Designing communities of learners for asynchronous distance education. *Educational Technology Research & Development, 46*(4), 115-122.

O'Malley, J., & McCraw, H. (1999). Students' perception of distance learning, online learning and the traditional classroom. *Online Journal of Distance-Learning Administration, 2*(4).

Paulsen, M.F. (1998). Teaching techniques for computer-mediated communication. Unpublished doctoral dissertation, The Pennsylvania State University.

Paulsen, M.F. (2000). An international analysis of web-based education and strategic recommendations for future development of online education. Keynote on the 16th World Computer Congress: The educational uses of information and communication technologies (ICEUT), Beijing.

Selingo, J. (1998, July 17). Small private colleges brace for competition from distance learning. *The Chronicle of Higher Education* [Online serial]. http://chronicle.com.

Sewart, D. (1993). Student support systems in distance education. *Open Learning, 8*(3), 3-12.

The Institute for Higher Education Policy (2000). *Quality on the line: Benchmarks for success in internet-based distance education.* Research Report of The Institute for Higher Education Policy.

Zhang, J. (2000). On the web-based learning community. *Distance Education in China*, special issue, 52-54.

Zhang, J., Li, F. Duan, C., & Wu, G. (2001). Research on self-efficacy of distance learning and its influence to learners' attainments. In C. H. Lee (Ed.), *Proceedings of the International Conference on Computers in Education/SchoolNet 2001* (pp. 1510-1517). Incheon Korea: Incheon National University of Education.