International Journal for Educational Media and Technology
2011, Vol.5, No. 1, pp. 86-96

Effects of e-Learning Information Literacy Instruction Program on Self-directed Learning Ability of University Students

Kyutae Jeon
Soongsil University, KOREA
Seongwoo Choi
Soongsil University, KOREA
Pansoo Kim
Soongsil University, KOREA

The purpose of this study is to examine the effects of university students' demographic features and an e-learning information literacy instruction program upon their self-directed learning ability. Study findings included that among demographic features of S University students, the reason of department selection, the plan after graduation, and the practice level of the learning plan had significant effects upon self-directed learning ability. Second, an e-learning information literacy instruction program developed by the library of S University had a positive effect upon the self-directed learning ability of students.

Keywords: self-directed learning, e-Learning, information literacy, self-directed learning readiness scale, university student, adult education

Introduction

A country's future competitiveness depends upon how advanced the country is in informatization. Therefore, people in all walks of life should work out strategies to meet the informatization of a knowledge-based society. Above all, policies in the field of education belong to very important tasks (Ministry of Education and Human Resources, 2001).

In the 2001 educational policy report of the OECD, a basic key capability is the self-directed learning ability of people using information communication technology in a knowledge-based society. Additionally, the Korea Institute for Curriculum and Evaluation (2008) names the core capabilities necessary for future Koreans as self-directed learning ability and information literacy. Both capabilities are required in the elementary and secondary education fields, vocational world and life-long learning fields. They are recognized as top priorities especially in a life-long learning society. A self-directed learning ability and information literacy are not only the core capabilities to adjust to a knowledge informatization society, but are also basic capabilities for learning activities. Further, such abilities have important influences on current

college life and careers after graduation.

According to Erickson (1963), the college period, corresponding to the beginning of adulthood, is a stage in which students participate in social activities, lead a life with freedom and responsibility, and experience the various problems of adulthood such as career, spouse, and friends, in addition to their personal problems. In this stage, one task is to establish friendships with others, and such friendly relationships can be maintained by the understanding of the self and others. During this period, unless close friendships are maintained, students feel isolated, establishing bad human relationships. In other words, the college years are an early adulthood stage in which learners establish their self-identity, live independent of their parents, and work towards their clear educational and vocational plans. Major development tasks include becoming emotionally independent of other adults, selecting and preparing for occupations. It will force students to adjust themselves to their current life and prepare for life as adults (Havighurst, 1972).

However, many students have more and more difficulties in deciding their courses in the drastically changing modern society. This is due to the circumstances in which students try to enter colleges without seriously reflecting on their courses under an education system centered on cramming for entrance examinations. Therefore it is imperative for students to understand themselves and cultivate and improve their self-directed learning abilities.

This necessitates learners to improve their self-directed learning abilities through the information literacy education on how to effectively find out, evaluate and use the required information in a knowledge-based society. However, most studies focus on elementary and secondary students and school curricula. Consequently, there are few domestic studies on the relationships between information literacy education and self-directed learning abilities in college students.

The college education environment is greatly different from those in elementary and secondary schools. For example, students have to learn the subjects in the curricula decided according to national educational policies regardless of their own desires. On the contrary, college education is so formed that students autonomously select and learn major and general subjects according to their aptitudes, interests and abilities. This is a transition from a long heteronymous environment into an autonomous one (Lee, 2005). In such an open environment, it is very important for students to cultivate the abilities to collect and use information and learn in order to have little difficulty in leading their college life and deciding their courses after graduation.

Hence, this study attempted to determine the differences between the self-directed learning abilities of different students how according to individual environmental factors, and what influences e-learning information literacy programs operated by college libraries have on the self-directed learning abilities of students. Not only will the findings help students improve their self-directed learning abilities especially at college, but they will be available for basic data for developing the educational programs to improve self-directed learning abilities.

This study aimed to determine the following matters:

1) What differences are there in the self-directed learning abilities of students according to individual environmental characteristics immediately after entering college?
2) What influences does the e-learning information literacy program have on the improvement of self-directed learning abilities?
3) What influences does the e-learning information literacy program have on the improvement of self-directed learning abilities according to their majors?

Methods

Design

This study was a pre-post test for a single group to determine the influences of the e-learning information literacy program on the improvement of self-directed learning abilities (cf. Figure 1). To this end, the self-directed learning abilities of S University freshmen were measured and compared before and after the implementation of e-learning information literacy education.

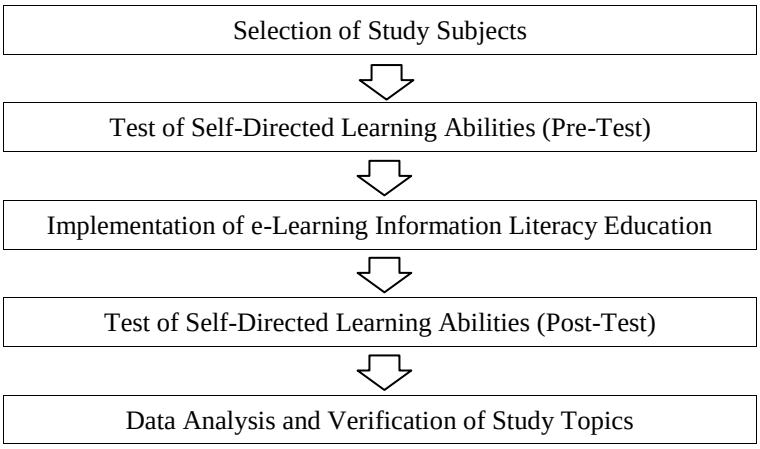

Figure 1. *Research design and process.*

Participants

The participants were freshmen who participated in the e-learning information literacy program among the students attending S University. They consisted of a total of 288 students: 180 in the Humanities and Social Sciences and 108 in the Natural Sciences and Engineering.

They were selected for the following reasons. S University operates an information literacy program in e-learning as a single university in South Korea. According to Park Soo Hee (2005), the e-learning literacy program of S University improved the information literacy abilities of learners and its effects proved similar to those of face-to-face education. Therefore, the most appropriate participants are the freshmen who were enrolled in the current e-learning information literacy program.

Reading of picture books to a child is regularly performed in many households. In particular, different styles of dialogue develop from reading at home. Even in the case of four-year olds, reading to a child functions as a "stage for emotional communication" such as enjoying the mother-child interaction with the "picture book" as an intermediary, and sustaining the diversity of conversation topics. And the reading style will reflect the picture book elements (Fujioka 1995). The picture book can be considered to have the aspect of a medium satisfying the role of an instrument that enlivens the conversation and not just a one-way medium.

Test tools

Test of Self-Directed learning Abilities

This study used the Self-Directed Learning Readiness Scale (SDLRS) of Guglielmino (1997). The SDLRS shows the whole self-directed learning readiness in grades by setting the trends of learners and measuring them according to a 5-stage Likert scale of 58 items. There are both the SDLRS-E for children and the SDLRS-A for adults. South Korea sees the most use of a translated version by Kim Mae Hee (1993) and of SDLRS-K-96 by Kim Ji Ja and Kim Kyung Sung (1996). This study attempted re-translation based on Guglielmino's original and SDLRS-K-96 and got two English language experts review the validity for test items after translation. The test tool consists of a total of 58 items in the 5-stage Likert scale (cf. Table 1).

Table 1. *Composition of self-directed learning ability measuring tools.*

Factors	No	Cronbach's α
Self-Directed Learning Ability	1 ~ 58	.90
1. openness to learning opportunities	1, 20, 22, 23, 29, 31, 32, 35, 44, 53, 56	.75
2. self-concept as an effective learner	7, 8, 13, 21, 30, 38, 57	.69
3. initiative/independence in learning	3, 9, 12, 19, 27, 42, 55	.61
4. responsibility for one's own learning	15, 50, 51	.60
5. love of learning	5, 6, 11, 14, 17, 18, 24, 28, 33, 40, 41, 45, 46, 47, 48, 52, 54, 58	.82
6. positive orientation to the future	26, 37, 39, 49	.71
7. creativity	25, 34, 36, 43	.63
8. ability to use basic study skills and problem-solving skills	2, 4, 10, 16	.65

Test of Individual Environmental Characteristics

The variables for individual environment characteristics consisted of eight items: gender, high school classification in major, residential area, academic performance in high school, reason for choosing a college department, career after college graduation, fulfillment extent of study plan, and internet information literacy for solving learning tasks.

Procedures

Pre-Test

From April 28 to May 1, 2009, the pre-test was conducted for the Humanities and Social Sciences freshmen that attended S University. From September 28 to October 1, 2009, the pre-test was conducted for the Natural Sciences and Engineering freshmen. 292 questionnaires were distributed and collected in classes. The rate of collection was 100%. An analysis was made of 188 questionnaires excluding four that showed insincerity in answers.

Implementation of e-Learning Information Literacy Education

The e-learning information literacy program developed by Park Soo Hee (2005), is operated by the library of S University. This program is manufactured to seek, use, and quote the books, master's theses, doctoral theses, and journal papers relevant to a subject so that students can write reports or papers on the subject. The program was introduced in connection with a general mandatory subject in each semester. Currently, S University allows the students in Humanities and Social Sciences and Natural Sciences and Engineering to attend the program in consideration of instructor assignment and classroom conditions in the first and second semesters. Accordingly, this study implemented e-learning information literacy education for the Humanities and Social Sciences freshmen from May 4 to 8, 2009 and the Natural Sciences and Engineering freshmen from October 5 to 9, 2009.

The education consisted of lectures, assignments and tests. First, learners could autonomously attend lectures via the library homepage. It took about one hour to participate in the program. These are screen captures that is provided when learners participate in this program (See Figure 2).

Subsequently, learners selected the topics in the areas that interested themselves, generated key Korean and English words and synonyms, recorded 5 or more books, 5 or more master's theses, and 5 or more doctoral thesis and papers that corresponded to the topics, completed worksheets (see Figure 3) of one page or more, and posted them to the assignment bulletin board of the homepage. For testing, 20 items were selected at random from 60 entered into the program, and each learner could take each test only once.

Post-Test

The post-test was performed for the freshmen in Humanities and Social Sciences from May 27 to June 2, 2009, and for the freshmen in Natural Sciences and Engineering from October 26 to 30, 2009. 292 questionnaires were distributed and collected in classes. The rate of collection was 100%. An analysis was made of 188 questionnaires excluding 4 that showed insincerity in answers.

Data Analysis

The SPSS win17.0 statistical package was used to analyze the collected questionnaires. The analysis used technical statistics (frequency, percentage, mean and standard deviation), t-tests, and a one-way ANOVA and set a statistical significance level at 95%.

Figure 2. *Screen for e-learning information literacy education.*

Worksheet

Type	NO	Reference (Author, Year, Title, Publisher, etc.)	Provider
example	•	Park, Soo Hee (2005). Development and Effects of a Web-Based information Literacy Program for Students. Master Thesis	Soongsil Univ.
Books	1	Kim, Pan Soo & Paek, Hyun Ki (2007). How to Perform Self-Directed Learning during the Absolute Period of Learning	Gyoyukgwahaksa.
	2		
	3		
	4		
	5		
thesis or dissertation	1	Guglielmino, L. M. (1977). Development of the Self-Directed Learning Readiness Scale. Doctoral Dissertation.	University of Georgia.
	2		
	3		
	4		
	5		
Article	1		
	2		

Figure 3. *Example of a worksheet.*

Results

Differences in Self-Directed Learning Abilities by Individual Environment Characteristics

The analysis showed that there were differences in self-directed learning abilities depending on the reasons for department selection, the career after college graduation, and the extent of study plan fulfillment. High self-directed learning abilities were shown by the groups that referred to the reasons for department selection as "favorable for employment" and "want to be an expert in one field;" career after college graduation as "other" and "employment;" and fulfillment of study plan as "always" and "yes." However, there was no difference in self-directed learning abilities according to gender, high school classification in major, residential area, academic performance in high school, and internet information literacy in solving learning tasks.

Self-Directed Learning Abilities by e-Learning Information Literacy Education

The self-directed learning ability grades showed statistically significant results by increasing 11.52 points from 193.40 points to 204.92 points on the average after completing the e-learning information literacy education (Table 2).

Table 2. *Differences in self-directed learning abilities based on the e-learning information literacy education.*

Factors	Test	*N*	*M*	*SD*	*t*	*p*
Self-Directed Learning Ability	pre post	288 288	193.40 204.92	19.36 20.29	-9.394	.000*
1. openness to learning opportunities	pre post	288 288	37.43 38.59	5.51 6.33	-2.798	.005*
2. self-concept as an effective learner	pre post	288 288	22.18 24.23	2.62 3.05	-9.593	.000*
3. initiative/independence in learning	pre post	288 288	22.02 22.91	3.18 3.63	-3.788	.000*
4. responsibility for one's own learning	pre post	288 288	10.55 10.81	1.87 1.97	-1.739	.083
5. love of learning	pre post	288 288	61.64 65.58	7.50 7.22	-7.750	.000*
6. positive orientation to the future	pre post	288 288	13.96 15.05	2.23 2.06	-7.423	.000*
7. creativity	pre post	288 288	12.81 13.89	2.30 2.42	-6.428	.000*
8. ability to use basic study skills and problem-solving skills	pre post	288 288	12.82 13.86	1.89 2.11	-7.208	.000*

*p<.05

In the sub-composition factors of the abilities, the average grade of each factor was improved. The *t*-test showed statistically significant differences in all sub-composition factors excluding the sense of responsibility for one's own learning ($p<.05$).

Such results were obtained because the program used the self-directed learning, experience learning, and evaluation oriented to learners as design strategies for instruction and learning.

First, while most e-learning programs are designed to perform sequential learning in a fixed order, this program is designed to not present learning units in sequence, but to list all learning processes and then to learn the content directly selected by learners. Maybe, this enabled learners to select and learn the content suitable for them and thus to be more open to learning and have more affection and enthusiasm for learning.

Second, this program contains the methods to solve individual topics and assignments and is designed to personally work out worksheets in every class. Such activities can improve the ability to use basic study skills and problem-solving skills as the sub-composition factors of self-directed learning abilities.

Third, this program, connected to a general mandatory subject, has an influence on grades by evaluating assignments and test grades after learning. It seems that this affected the sense of responsibility for learning, the affection and enthusiasm for learning as the sub-composition factors of self-directed learning abilities.

Major-Specific Self-Directed Learning Abilities by e-Learning Information Literacy Education
This study performed difference verification (*t*-test) by comparing pre-test and post-test grades to analyze whether or not there are differences in the self-directed learning abilities of majors before and after e-learning information literacy education. As seen in Table 3, the *t*-test showed that 13.04 and 8.99 points were increased on the average in the self-directed learning ability grades of learners in Humanities and Social Sciences and Natural Sciences and Engineering, respectively ($p<.05$).

In the Humanities and Social Sciences learners, there were increases of average grades in all sub-composition factors and statistically significant differences according to *t*-test ($p<.05$). But with the Natural Sciences and Engineering learners, there were significant differences only in the self-concept of efficient learners, the affection and enthusiasm for learning, futuristic orientation, creativity, and the basic learning and problem solution techniques ($p<.05$).

The results indicate that the e-learning information literacy program of S University Library improved the self-directed learning abilities of college students regardless of major, improving them more in the learners in Humanities and Social Sciences than those in Natural Sciences and Engineering. Also, the learners in Humanities and Social Sciences showed greater improvement of self-directed learning abilities in all sub-composition factors than those in Natural Sciences and Engineering. Such results indicate that the program was more effective for the learners in Humanities and Social Sciences in improving the self-directed learning abilities of college students.

Table 3. *Differences in Major-Specific SDL Abilities by the E-Learning Information Literacy Education*

Factors	*M*		*SD*		*t*		*p*	
	Humanities and Social Sciences	Sciences and Engineering	Humanities and Social Sciences	Sciences and Engineering	Humanities and Social Sciences	Sciences and Engineering	Humanities and Social Sciences	Sciences and Engineering
Self-Directed Learning Ability	13.04	8.99	0.08	2.61	-9.727	-3.779	.000*	.000*
1. openness to earning opportunities	1.07	1.28	0.95	0.58	-2.150	-1.784	.033*	.077
2. self-concept as an effective learner	2.26	1.71	0.27	0.69	-8.559	-4.714	.000*	.000*
3. intiative/independence in learning	1.15	0.44	0.52	0.36	-4.220	-1.042	.000*	.300
4. responsibility for one's own learning	0.44	0.04	0.19	0.01	-2.455	.142	.015*	.887
5. love of learning	4.49	3.02	0.77	0.43	-7.455	-3.328	.000*	.001*
6. positive orientation to the future	1.18	0.95	0.14	0.22	-6.277	-4.000	.000*	.000*
7. creativity	1.27	0.78	0.09	0.14	-5.993	-2.798	.000*	.006*
8. ability to use basic study skills and problem-solving skills	1.18	0.83	0.31	0.05	-6.754	-3.231	.000*	.002*

Note: *N* (Humanities and Social Sciences) = 180, *N* (Sciences and Engineering) = 108

This was because no sufficient account was made of the major-specific learning characteristics in the development of the e-learning information literacy program. In colleges, classes are held according to major. This causes students to have their learning characteristics fit for their major, thus making the participation in learning different according to the learning forms to which they are accustomed. Therefore, it will be more effective for the improvement of self-directed learning abilities to develop the e-learning information literacy programs according to user interfaces, learning tasks, and evaluation methods after analyzing the learning styles, preferences, and motivation methods of learners in each major.

Conclusion

The present questionnaire study compared the self-directed learning ability grades of S University freshmen before and after e-learning literacy education to determine what differences there are according to individual environment characteristics of students, what influences the e-learning information literacy education of the university library has on the improvement of self-directed learning abilities, and what differences the influences show along major lines. The findings produce the following conclusions and suggestions:

First, self-directed learning abilities are affected by reasons of department selection, career after college graduation and fulfillment extent of study plan, while not directly affected by gender, high school major, residential area, academic performance in high school, and internet literacy for task solution, among the individual environment characteristics variables of freshmen. This

suggests that the self-directed learning strategies of early adulthood learners especially at college bear fruit, when approaching them in different ways in consideration of the characteristics by department, career after college graduation, and fulfillment extent of study plan.

Second, the e-learning information literacy program of S University Library improved the self-directed learning abilities for students. However, the sense of responsibility for learning was not improved among the sub-factors of such abilities. This indicates that it is more effective for the improvement of self-directed learning abilities to use self-directed learning, various kinds of experience learning, and systematic evaluation so that learners can recognize their responsibilities for learning.

Third, the program improved the self-directed learning abilities of learners in both Humanities and Social Sciences and Natural Sciences and Engineering. However, the program had no direct influence on the learners in Natural Sciences and Engineering in the three areas of openness to learning opportunities, initiative and independence in learning, and sense of responsibility for learning among the sub-factors of self-directed learning abilities. Therefore, it will be more effective for the improvement of self-directed learning abilities to develop the e-learning information literacy programs according to user interfaces, learning tasks, and evaluation methods after analyzing the learning styles, preferences, and motivation methods of learners in each major.

Lastly, this attempt to improve the self-directed learning abilities of freshmen presents a few proposals for further studies. First, the findings have limitations in understanding the freshmen of all universities, since this study addressed the freshmen of only one university. Hence, further studies will have to be made of the e-learning literacy learners at diverse universities and institutions.

Second, the e-learning information literacy education in this study had a learning time of one hour and a learning period of one week. Further studies will have to be performed through programs with larger learning times and periods.

Third, this study addressed only S University freshmen in Humanities and Social Sciences and Natural Sciences and Engineering. Further studies will have to be done on the learners of various academic years and age groups including arts, sports at other universities.

References

The Ministry of Education and Human Resources (2001): *Guidance Data for Information Communication Technology Application.* Seoul: Korean Textbook Co., Ltd.

Kim, Ji Ja et al (1996). How to Develop and Use the Self-Directed Learning Readiness Measuring Tools for Primary School Teachers. *Studies in Social Pedagogy, 2*(1), 1-25.

Kim, Pan Soo & Paek, Hyun Ki (2007). *How to Perform Self-Directed Learning during the Absolute Period of Learning*. Seoul: Gyoyukgwahaksa.

Park, Soo Hee (2005). Development and Effects of a Web-Based information Literacy Program

for Students. Master Thesis. Seoul: Soongsil Univ.
Lee, Ji Young (2005). Operation Cases and Effects of Seminars for Freshmen. Master Thesis. Seoul: Yonsei Univ.
Korea Institute for Curriculum and Evaluation (2008). *Seminars for Seeking the Core Capabilities of the Future Koreans*. Seoul: Yujinmunhwasa.
Erikson, Erik H. (1963). *Childhood and society*. (2nd ed.). New York: W. W. Norton.
Guglielmino, L. M. (1977). *Development of the Self-Directed Learning Readiness Scale*. Doctoral Dissertation. University of Georgia.
Havighurst, R. J. (1972). *Developmental tasks and education*. (3rd ed.). New York: David McKay Co.