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Interaction Patterns in Distance Only Mode e-Learning

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The purpose of this study was to identify the interaction patterns in distance only mode e-Learning. In order to investigate this study, messages shown in the electronic notice board were analyzed to see how interaction occurs between teacher and learner or learner and learner under the e-learning of cyber university. To analyze messages was applied according to the framework by Henri's contents analysis model.

As a result of contents analysis on electronic board, the participative dimension was 399 messages. A learner put on 7~8 messages a day. The number of messages was low compared to the number of learners, but the number of inquiries was about 140. That means that each learner contacts and checks messages at least once a day. The meaning dimension was 600 units. The main interaction patterns were Interactive-social-cognitive-metacognitive. This means that e-Learning in distance only mode leads a positive attitude of learners as a self-directed learning, and needs teacher's well-structured instructional strategies for increasing interaction.

In conclusion, social dimension and interactive dimension of messages support learners psychologically in the process of learning though they directly guide learning under the circumstances of e-learning lacking face-to-face element. It can be interpreted that the teacher's role is significantly important in order to attract learners' positive participation and cognitive and meta-cognitive dimension of messages and activities

Keywords : Interaction Patterns, e-Learning, Distance Education, Interaction, Contents Analysis

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Introduction

Development of high information & communication technology has changed teaching/learning-related circumstances in various ways. Especially, Rapid development of the Internet has made e-Learning an available medium, instead of the face-to-face teaching and learning style between teacher and learner in a classroom. E-learning based on the Internet has enabled teacher and learner or learner and learner to mutually communicate with each other. This means that learners can participate in the learning process in a positive way.

In the prospect of instructional method, education of cyber university to be composed e-Learning can be overcome the critical points of the existing distance education. That is, e-Learning can be increases interaction between teacher and learner and provides good education environment for teaching/learning by anytime and anywhere(Jung & Rha, 2004; Dabbagh & Bannan-Ritland, 2005). Interaction in the cyber university education using e-learning can be an important factor to determine the effectiveness of education.

Interaction in the e-learning of cyber university is performed through various methods and means. A representative means of interaction is to utilize electronic notice board. High level of interaction between teacher and learner or learner and learner is possible in that a message can be put up and a reply to the message can be given and taken in the electronic notice board of the e-learning. Open access to/between learners is possible and the messages are opening to the public. So the contents mainly include provision of information or generally recognizable materials, rather than private materials. In the sense of utilization of the electronic notice board, the important thing is the contents included in the messages, rather than the methods to transfer messages. The reason is that the contents of messages between teacher and learner influence the effect of learning(Kim & Noh, 1999; Lee & Lim, 2003; Jun & Shung, 1999; Jung & Choi, 1998).

Interaction between teacher and learner or learner and learner is essential and the key element to determine the learning effect because e-learning of cyber university lacks of the face-to-face element. Then how is interaction between teacher and learner or learner and learner being done in e-learning of cyber university? In what case does interaction occurs actively? In what case doesn't interaction occurs? What makes these phenomena occur?

To undertaken those problem questions, in this study, I analyzed the types of messages shown in the electronic notice board in order to see how interaction occurs between teacher and learner or learner and learner under the circumstances of e-learning of cyber university. If the answer to this question is acquired, it can be an important suggestion of instructional strategies to promote interactivity under all the learning circumstances of e-learning as well as cyber university.

Theoretical Background

In order to analyze the interaction patterns under learning circumstances of e-learning of cyber university, I examined the concept and characteristics of e-learning of cyber university to analyze the messages of the electronic notice board and studied the contents analysis model of Henri(1992), who showed theoretical ground for analyzing messages.

Concept and characteristics of e-learning of cyber university

E-learning of cyber university is an education type that leaning activity occurs in the cyber space. E-learning is available and utilizable for anybody who equipped with computer and modem system in any place of the world owing to characteristics as world common space of cyber space not limited to certain region or culture(Lim & Jung, 1998). Moore and Kearsly(2005) emphasized that the most

advanced type of distance education is cyber space of limitless programs that individual learners can access through telecommunication engineering established on the combination of the digital communication network. Accordingly, e-learning is an open type of education where learners can study at any time and place.

E-learning of cyber university has substantially the same education system as the existing education, such as completion of a certain curriculum, conference of a degree, etc., though the external form of e-learning is different from the ordinary education. In a broad sense of e-learning, it means an education type to use the cyber space system based on information & communication technology, including satellite, TV, the Internet, CATV, etc., at least even partially. In a narrow sense of e-learning, it means the education is the use of information and computer technologies to create learning experiences(Horton, 2006).The learning pattern of e-learning of cyber university does not accept a simple knowledge delivery-oriented learning pattern, but aims at a learning pattern performed through various interaction among teacher, learner and program using information & communication technology and broadcasting technology in the reciprocal participation space. In the e-learning system, learners can study difficult matters repeatedly, teacher and learner can exchange views of information through the electronic notice board and learners can adjust the learning speed for self-controlled study and individual learning.

Contents analysis model

Contents analysis technique of Henri(1992) was designed to acquire basic data causing proper cognitive and meta-cognitive learning between teacher and learner by diagnose conditions of the learning process in computer mediated communication. So they are focused on how learning is done, rather than what is said, and what cognitive strategies shown in the process.

The meaning of contents analysis

Contents analysis technique is a tool to analyze the messages exchanged between learners in order to understand the contents discussed through computers. Interaction in the computer discussion is done through exchange of messages, so analysis of message contents enables the teacher to better understand the learning process of learners and provides learners with a framework to increase efficiency of interaction between learners.

The information an teacher can get through message analysis is the following three things(Henri, 1992). First, the contents exchanged between teacher and learner or learner and learner can be known. Second, the types of exchanging messages can be known. Finally, learning process performed and strategies used can be known. It is meaningful that data to support and promote the process of cooperative learning can be acquired through this contents analysis model.

Framework of contents analysis

Henri(1992) designed a tool to analyze the contents of the messages exchanged in the computer media communication meeting on the basis of cognitive psychology. He classified messages into participative, social, interactive, cognitive and meta-cognitive dimensions. He suggested category, definition and index of contents analysis as shown on Table 1.

Participative dimension

Participative dimension is divided into whole participation and positive participation in learning. Whole participation is the whole number of messages and contacts as the contact period for an teacher and a learner. Positive participation in learning is the number of statements directly related to learning performed by an teacher and a learner.

Table 1. Analytical framework for five dimension of contents analysis

Dimension	Definition	Indicator
Participative	Complication of the number of messages or statements transmitted by one person or group	Number of 'messages Number of statements
Social	Statement or part of statement not related to formal content of subject matter	Self-introduction Verbal support 'I am feeling great...'
Interactive	Chain of connected messages	'In response to Celine..' 'As we said earlier...'
Cognitive	Statement exhibiting knowledge and skills related to the learning process	Asking questions Making inferences
Metacognitive	Statement related to general knowledge and skills and showing awareness, self-control, and self-regulation of learning	Formulating hypotheses 'I understand...' 'I wonder...'

Social dimension

The contents of social dimension are the statements not directly related to the contents of learning, but partially having influence on the participation level and are the standards for cohesion of a learning group and a sense of belonging of learners. Excessive social expression may interfere with learning and can also be helpful to the learning process in a cooperative learning, where several learners study together for one purpose.

Interactive dimension

Progress situation of the learning process of a learner can be grasped through interactive dimension. A learner can have knowledge of how the replies or comments to a teacher or other learners are recognized. You can get to know who leads the learning initiatively, who is alienated and how interactive cooperation among learners is performed.

Cognitive dimension

Cognitive activities of learners can not be stated through cognitive dimension of analysis of message contents, but it is meaningful that you can determine if learners are commanding proper cognitive activity, and technology and meaningful information with proper cognitive support is provided to learners.

Meta-cognitive dimension

Meta-cognitive dimension is divided into meta-cognitive knowledge and meta-cognitive technology. A teacher gets to know the characteristics of the learning process and meta-cognitive activity and using technology of learners.

Method

Participants

The object of this study is "K" cyber university located in Seoul. It includes 109 students(out of 119 students attending the "Utilization of Distance Education" class), one teacher and one tutor who put on messages in the electronic notice board

Research method

The method of contents analysis of Henri(1992) and the analysis framework Table 1 were used in order to analyze the contents of the messages shown as a result of interaction between teacher and learner or learner and learner through the electronic notice board under the circumstances of e-learning of cyber university.

Analyzed messages are 342 messages(by learners) and 57 messages(by teacher) exchanged between teacher and learner or learner and learner through the

electronic notice board(free notice board and Q&A board).

Data analysis

Messages are divided into participative dimension and meaningful dimension for analysis. In participative dimension, physical number of participations was analyzed centering on the number of notices and inquiries. In meaningful dimension, the contents of messages were analyzed centering on the process, 'How is learning performed?', rather than the result, 'What is learned?' In the meaning analysis of messages, a message is not analyzed as 'a whole one idea unit', because the length of message contents is various and one message may include 'several idea units'. On the contrary, if 'several idea units' have the same meaning, they are analyzed as a one meaning unit.

After analyzing the same messages in cooperation with two students attending the doctorate course majoring in education engineering, the evaluation result was adjusted till agreement is made for the items having different views, considering the reliability of analysis of message contents collected from the electronic notice board,

Findings

Participative dimension of contents analysis

Table 2 shows the analysis result of the number of messages and inquiries placed in the free notice board and the Q&A board to analyze the participative dimension of contents analysis.

Table 2. The Result of Analyze the Participative Dimension of Contents Analysis

Number of messages(%)

	Main messages	Reply messages	Total
Free notice board	208 (87.0)	31 (13.0)	239 (100)
Q&A board	68 (42.5)	92 (57.5)	160 (100)
Total	276 (69.2)	123 (31.8)	399 (100)

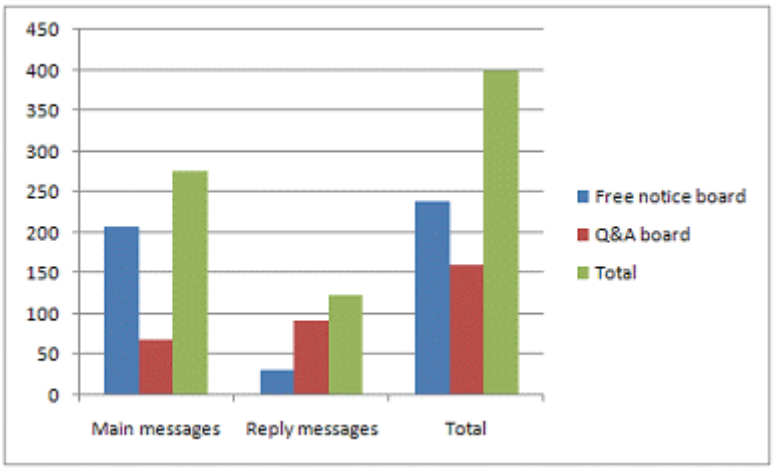

Figure 1. The Score Comparison of the Participative Dimension of Contents Analysis

The number of messages in the whole electronic notice board is 399, in the free notice board is 239 and in the Q&A notice board is 160. When the number of the teacher and learners is 110, the number of writings per capita is 3~4 and the number of writings per day is 7~8.

According to the kinds of notice board, in the case of free notice board, the main writing showed 87%(208) of participation rate and the reply writing showed 13%(31) of participation rate. It is interpreted that the number of main writings is

larger than the number of replies because of the nature of the free notice board that one's own ideas and opinions and individual learning situations can be freely put on.

On the contrary, in the case of Q&A notice board, the main writing showed 42.5%(68) of participation rate and the reply writing showed 57.5%(92) of participation rate. Q&A notice board showed a fewer number in the whole number of messages than the free notice board, but showed more number in the number of replies than the free notice board. It can be interpreted that interaction is actively performed by exchanging ideas and opinions freely between teacher and learner because Q&A notice board is a space for asking and answering.

Table 3 shows the analysis result of the number of messages and inquiries placed by teacher and learner in the electronic notice board in order to examine the concrete participation level of teacher and learner.

The number of messages and inquiries placed in the electronic notice board was divided into that of the teacher and that of learners. The teacher accounts for 14.3%(57) and the learners account for 85.7%(342) out of the whole messages(399). And the teacher accounts for 20.9%(1603) and the learners account for 79.17%(6067) out of the whole inquiries(7670). This means that a learner inquires messages 1~2 times a day and the whole learners inquire 140 times. In the number of inquires to messages of the teacher and learners, the number of inquires to the teacher is 28~29 per message and the number of inquires to learners is 17~18 per message. More interaction is shown to the messages of the teacher.

Table 3. The Result of the Number of Messages and Account in the Participative Dimension

Number of messages(%)

	Free notice board			Q&A board			Total		
	Teacher	Student	total	Teacher	Student	total	Teacher	Student	total
Number of messages	1 (0.4)	238 (99.6)	239 (100)	56 (35)	104 (65)	160 (100)	57 (14.3)	342 (85.7)	399 (100)
Number of Account	34 (0.8)	4135 (99.2)	4169 (100)	1569 (44.8)	1932 (55.2)	3501 (100)	1603 (20.9)	6067 (79.1)	7670 (100)

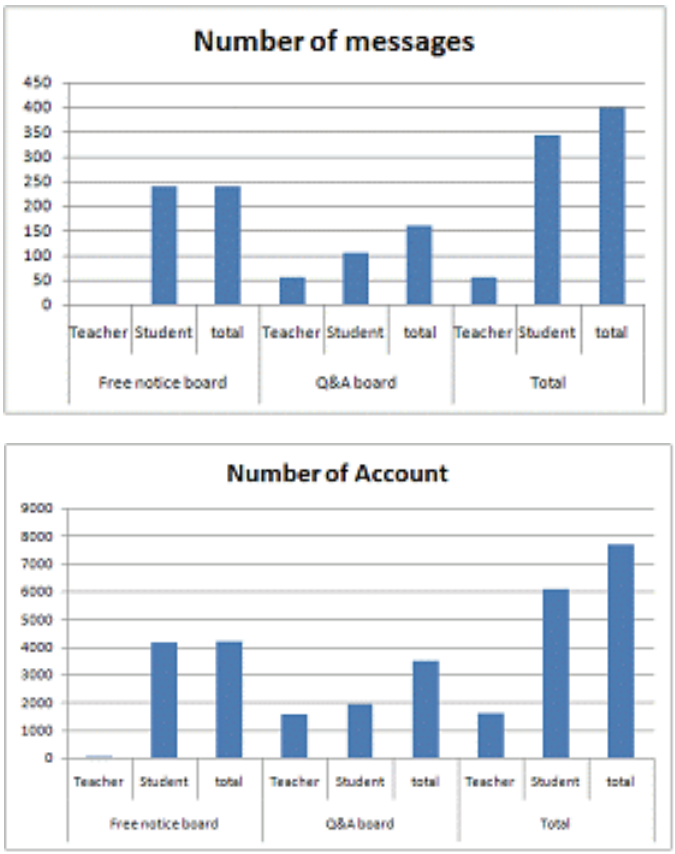

Figure 2. The Score Comparison of Teacher and Student in Messages and Account of the Participative Dimension

Learners' messages are mainly put on in the free notice board as shown above It is interpreted that learners' free ideas and opinions interact with each other. On the other hand, in the case of Q&A notice board, the number of messages of the teacher is smaller than that of learners, but the number of inquiries of the teacher is about the same as that of learners. This means that learners ask about the contents of learning and learning process mainly in Q&A notice board and the teacher provide learners with well-structured answers and explanation.

Meaning dimension of contents analysis

As a result of contents analysis in participative dimension, the number of total meaning units of 399 messages is 600. The number of meaning units of 239 participative dimension messages is 419 in the free notice board. The number of meaning units of 160 participative dimension messages is 181 in Q&A notice board on Table 4.

Considering each dimension of result of contents analysis in the meaning unit shown in the electronic notice board, 419 meaning units are composed of social dimension -139(33.2%)-, interactive dimension -151(36.0%)-, cognitive dimension -65(15.5%)- and meta-cognitive dimension -64(15.3%) in the free notice board. 181 meaning units are composed of social dimension -26(14.4%)-, interactive dimension -123(45.70%)-, cognitive dimension -18(10.0%)- and meta-cognitive dimension -14(7.6%) in Q&A notice board.

In the analysis of the contents of messages in the electronic notice board, interactive dimension is the highest, then social dimension, cognitive dimension and meta-cognitive dimension in order. The contents of interactive dimension and social dimension account for great amount because e-learning of cyber university lacks face-to-face situation. So participants try to put on social dimension of messages to start and end by greeting. There are many interactions on personal explanation and question to the assignment instead of matters directly related to the contents of learning.

Cognitive and meta-cognitive dimension of messages accounts for 27%. It is interpreted that interaction is not enough when considering achievement of learning as cognitive and meta-cognitive dimension. Cognitive and meta-cognitive dimension of interaction is more active in the free notice board than in the Q&A notice board. It is interpreted that 'In what notice board does interaction occur more actively?' is meaningless. For the analysis of cognitive and meta-cognitive messages in the free notice board says that learners participate in learning assignment in a negative way rather than participate in learning voluntarily and actively.

Table 4. The Result of Contents Analysis by Meaning Dimension

Dimension	Social	Interactive	Cognitive	Metacognitive	Total
Free notice board	139 (33.2)	151 (36.0)	65 (15.5)	64 (15.3)	419 (100)
Q&A board	26 (14.4)	123 (68.0)	18 (10.0)	14 (7.6)	181 (100)
Total	165 (27.5)	274 (45.7)	83 (13.8)	78 (13.0)	600 (100)

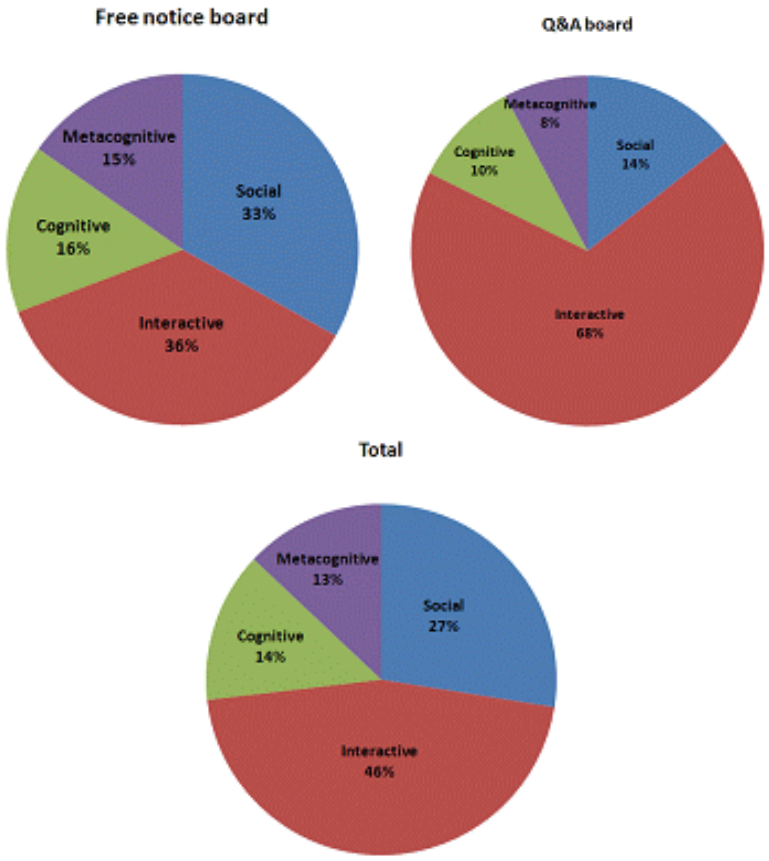

Figure 3. The Score Comparison of Contents Analysis by Meaning Dimension

Conclusion

As a result of contents analysis shown in the electronic notice board under circumstances of e-learning of cyber university, the number of participative dimension of messages was 399. A learner put on 3~4 messages on the average. 7~8 messages were put on a day. The number of messages was low compared to the number of learners, but the number of inquiries was about 140. That means that each learner contacts and checks messages at least once a day. It can be interpreted that learners do not interact actively owing to the characteristics (various personal and environmental factors) of e-learning based on the Internet but they check the messages place on the notice board for learning. Therefore, teachers should not conclude that learners do not study simply because learners do not put on messages or check messages. Teachers should try to help learners do active learning activities, considering that learners always study voluntarily.

As a result of analysis of messages in the meaning unit, interactive dimension and social dimension accounted for great amount. This means that the environmental factor of the beginning of the semester leads a positive attitude of learners and initiative participation. Persistent participation of learners does not follow. Only a few learners participated actively. Instruction strategies need to be developed to attract positive participation, considering that the attitude of learners is an important element.

Cognitive and meta-cognitive dimension of interaction accounted for smaller amount than other dimension of messages. This is because cognitive and meta-cognitive interaction is difficult to perform. As a result of analysis of the causes of putting on cognitive and meta-cognitive messages, cognitive and meta-cognitive dimension of messages were put on according to the teacher's assignment not owing to learners' voluntary and active participation. Namely, in or mesto lead learners' positive participation and cognitive and meta-cognitive dimension of activities, it is important that learners participate in learning initiatively and

positively and it is more important that the teacher should play its role. Accordingly, well-structured instruction strategies of the teacher make learners participate positively and actively in the learning process of e-learning. It is concluded that teacher's consistent research and effort are strongly needed.

In conclusion, social dimension and interactive dimension of messages support learners psychologically in the process of learning though they directly guide learning under the circumstances of e-learning of cyber university lacking face-to-face element. It can be interpreted that the teacher's role is significantly important in order to attract learners' positive participation and cognitive and meta-cognitive dimension of messages and activities. Namely, quantity and quality of learning depend on learners' self-directed learning attitude and the teacher's management and utilization strategies.

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