

An Experimental Study on Community of Inquiry

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ABSTRACT: The purpose of this study is to promote social, cognitive, and teaching presence in a community of inquiry. The creation of an effective online educational community as involving three critical components: cognitive presence, social presence, and teaching presence. Those three presences can be applied to enhance learners' satisfaction and outcome if instructors use it in right way or right time. The research method used in this study is quantitative approach. An ASKS (Asynchronous Sharing Knowledge System), proposed by Anderson (2003) had been designed for evaluating learning activities. The results of this study reveal 4 discoveries: (a) Providing open communication environment can promote "social presence"; (b) Offering quick responses can enhance "teaching presence"; and (c) learning process may be inconsistent with learning outcome. (d) Setting course-related discourse can augment "cognitive presence". The implications of this study are also included.

1. Introduction

One of the over-riding factors in the academic success of adult and other non-traditional students in traditional academic settings appears to be the learner's sense of community (Tivo, 1975). The question of whether the development of a sense of community directly or indirectly affects learner success and/or satisfaction in asynchronous learning environments is a serious one for designers and instructors of online learning environments (Lowell & Persichitt, 2000). Furthermore, Garrison, Anderson, and Archer (2000) developed a conceptual model of online learning that they referred to as a "community of learning" model in Figure 1. The model postulates that deep and meaningful learning results when there are sufficient levels of three component "presences".

Firstly, sufficient degree of *cognitive presence* can take place in an environment that supports the development and growth of critical thinking skills. Cognitive presence is grounded in and defined by study of a particular

content; thus, it works within the epistemological, cultural, and social expression of the content in an approach that supports the development of critical thinking skills (McPeck, 1990; Garrison, 1991).

Secondly, *social presence* relates to the establishment of a supportive environment such that students feel the necessary degree of comfort and safety to express their ideas in a collaborative context. The absence of social presence leads to an inability to express disagreements, share viewpoints, explore differences, and accept support and confirmation from peers and teacher.

Thirdly, *teaching presence*, unlike informal learning opportunities, is critical for a variety of reasons such as teaching involves devising and implementing activities to encourage discourse between and among students, between the teacher and the student, and between individual students and groups of students and content resources.

Based on conceptual schema of “community of learning” model and ASKS (Asynchronous Knowledge Sharing System) (process evaluation, this study intends to explore the how to implement a real e-Learning course at graduate school. The research questions are: (a) Does providing open communication environment promote social presence”? (b) Does setting course-related discourse enhance “cognitive presence”? (c) Does offering immediate responses enhance “teaching presence”? (d) Is learning process consistent with learning outcome?

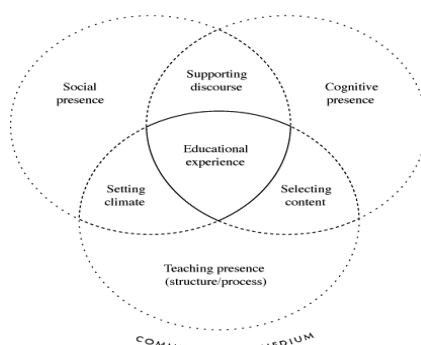


Figure 1: Community of Inquiry (Adapted from Garrison & Anderson, 2003)

2. Literature Review

Literature Review in this section consists of “inquiry of community” (Garrison & Anderson, 2003) and outcome evaluation in asynchronous

learning.

2.1 Inquiry of Community

Inquiry of community is proposed by Garrison & Anderson, 2003). It consists of three presences: social, cognitive, and teaching presences.

2.1.1 Social Presence

Social presence is an important topic to be addressed in e-Learning course. Firstly, we must learn how to remediate the feeling of isolation in e-Learning course. Second, learning in a collectivity where individual learners are aware of others and other's activities may be more productive. In other words, too little social presence may not sustain the community.

The indicator of social presence includes three key components: affective responses, open communication, and group cohesion (Garrison & Anderson, 2003). Affective responses are a tacit recognition of a reciprocal relationship within community whereas open communication has an affective quality that reflects a climate of trust and acceptance. In e-Learning course, instructor or teaching assistants should cultivate comfortable environment for all learners.

2.1.2 Cognitive Presence

Learner members need to keep on interaction among them and reach the critical or higher order thinking. This process consist of 4 stages: (a) trigger event;(b) exploration;(c) integration;(d) resolution. An appropriate event in the right time will make learners to explore and to think why it occurs in a real context. Then, what means for learners' existing experience. Furthermore, a community can reach the resolution which is agreed by most of community members. These processes of cognitive presence may make sense for all community members.

2.1.3 Teaching Presence

Teaching presence refers to that teachers intend to attain the specific teaching outcome. It is defined as “the design, facilitation, and direct of cognitive and social processes for purpose of realizing personally meaningful and educationally worthwhile learning outcome (Anderson, 2001). In an inquiry community, teachers may act upon three roles (a) design and organization; (b) facilitating discourse; (c) direct instruction.

There are a variety of ways to facilitate discourse such as proposing debate issues related to course content by teachers, or giving credits for frequently responders/posters. Once, they would like to share personal meaning in course content, their peers can make sense too.

2.2 Evaluating learning outcome in asynchronous learning

Increased interaction in asynchronous learning environments can

significantly increase costs to the institution (Annand, 1999). Therefore, asynchronous knowledge sharing via BBS is designed to overcome these difficulties in e-Learning course. It always uses BBS with capabilities characteristic of most group decision support systems. Learners and instructors access the system directly via the Web.

A student cannot view others' responses to a knowledge topic until they have made and submitted their own. When entries are submitted, they are accessible to the instructor for reviewing, and unavailable to the originating student for further editing. Other students cannot view these submissions until the instructor has reviewed them. Athabasca University developed ASKS (Asynchronous knowledge sharing) to evaluate group interaction on BBS. The mechanisms for evaluation consist of 4 key criteria: attendance, participation, articulation, and relevance. Whereas attendance, stands for browsing online materials; participation stands for joining discussion; articulation stands for clarity of presentation; and "relevance" stand for the importance of the point to the knowledge sharing topic.

3. Research Method

This study was implemented at "Special issue on e-Learning" course at Graduate Institute of Information & Communication, Southern Taiwan University of Technology (STUT) in first semester in 2007. The class has one instructor and 12 graduate students. An online BBS in Figure 2 had been established for group communication. Although those students did not know each other at initial stage, they did know how to use BBS as group communication tool.



Figure 2: ELIC2007 layout with announcement and students' e-portfolio

This section describes the stages of doing this study. It consists of research design,

3.1 The process of experimentation

A semester consists of 18 weeks. There are 5 stages in this study.

Firstly, the class was given in traditional classroom at the first 2 weeks.

Secondly, the 3rd week, a pre-test was given to make sure of their proficiency in subject matter. Also, a forum, ELIC2007 in Figure 2 had been built as communication platform. The instructor gave a kick-off and followed up such as quick responses in terms of social, teaching or cognitive presence. Those students were encouraged and asked to join sharing of their own insights publicly.

The 3rd stage began at 7th week, instructor chose theme-based BBS and announced criterion of grading. It aims at testing (a) whether proposing subject matter issues affect cognitive presence and (b) whether proposing ASKS as immediate grading responses affect learning quality.

The weight of those 4 criterions can be calculated by different weights such as Table 1. Then, student's grade (76) can be attained as Table 2.

Table 1: Criterion Weight

Criterion	Weight
Attendance	10%
Participation	20%
Articulation	30%
Relevance	40%

Table 2: A Sample of student's weighted score

Criterion	Score	Weight	Weighted
Attendance	100%	10%	10%
Participation	72%	20%	14%
Articulation	78%	30%	23%
Relevance	72%	40%	29%

The 4th Stage, the instructor gave course related questions or theme-based questions in BBS and chose selective feedback such as only responses for students who had wrong answer. It aims at testing whether immediate responses from instructor affect teaching presence.

At final stage, a pencil-and-paper test was given to examine the learning outcome in the whole semester. The whole flowchart of this study is shown in Figure 3.

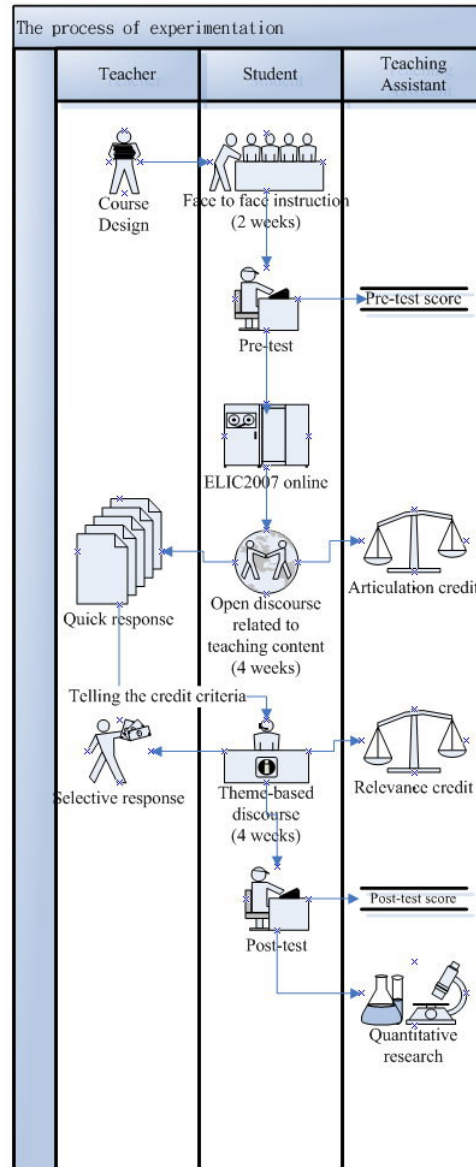


Figure 3: The flowchart of this study

3.2 Data analysis

The assessment used in this study adopted ASKS, proposed by Anderson (2003). 4 criteria to be accounted consist of attendance, participation, articulation, and relevance. Meanwhile, the score on pre-test and post-test was compared. Whereas attendance stands for joining discussion; participation stands for the number of post messages in BBS; articulation focuses on the quality of posted message. A Linkert 5-scale grading is given for those three criteria. By contrast, a relevance criterion aims at the degree of theme-based response by Linkert 7-scale grading.

4. Results of this study

4.1 Social Presence on affective response, open communication, and group

cohesion dimensions

The trend of affective, open communication and group cohesion dimensions are shown Figure 4~6. Given the BBS as communication, affective responses in Figure 4 were rapidly increased at 1st stage among students. It, however, rapidly decreased at 2nd stage. The instructor used event to trigger affective responses at 2nd stage. By contrast, open communication and group cohesion dimensions in Figure 5 and Figure 6 are highly irrelevant no matter whatever the instructor did.

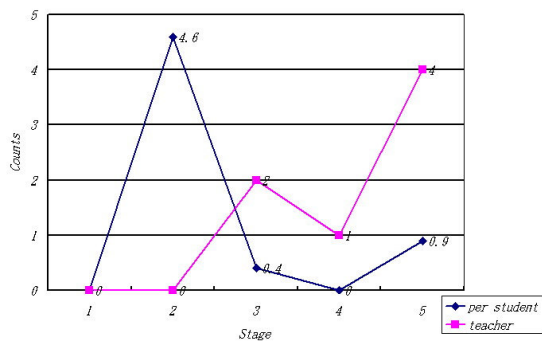


Figure 4: Trend of affective response

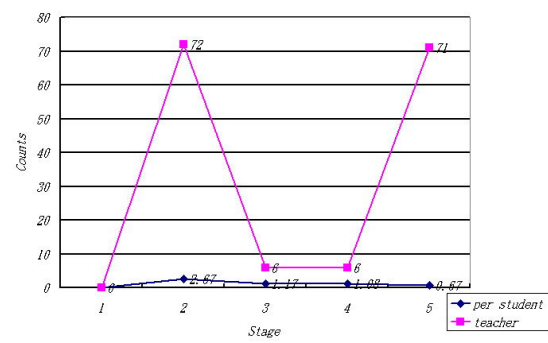


Figure 5: Trend of open communication

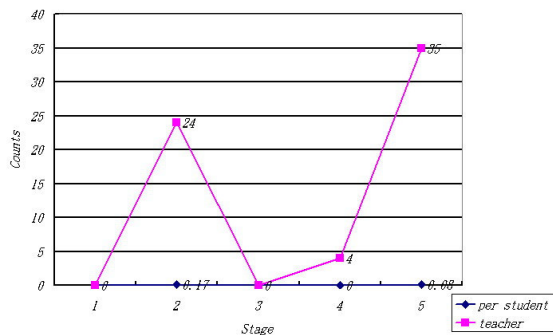


Figure 6: Trend of group cohesion

4.2 Cognitive Presence on trigger event, exploration, integration, and resolution actions

At 3rd stage, the instructor proposed course related issue, four criteria consisting trigger event, exploration, integration, and resolution were analyzed. The former 2 criteria showed their positive responses whereas the latter 2 criteria were no progressive evidences among 12 students (A..L) in Figure 7. In other words, high-order thinking in this study did not occur. Most students just replied their insights instead of integrating posted messages and giving resolutions among students. The student H did quit this course at 3rd stage, so the exploration numbers appeared negative number.

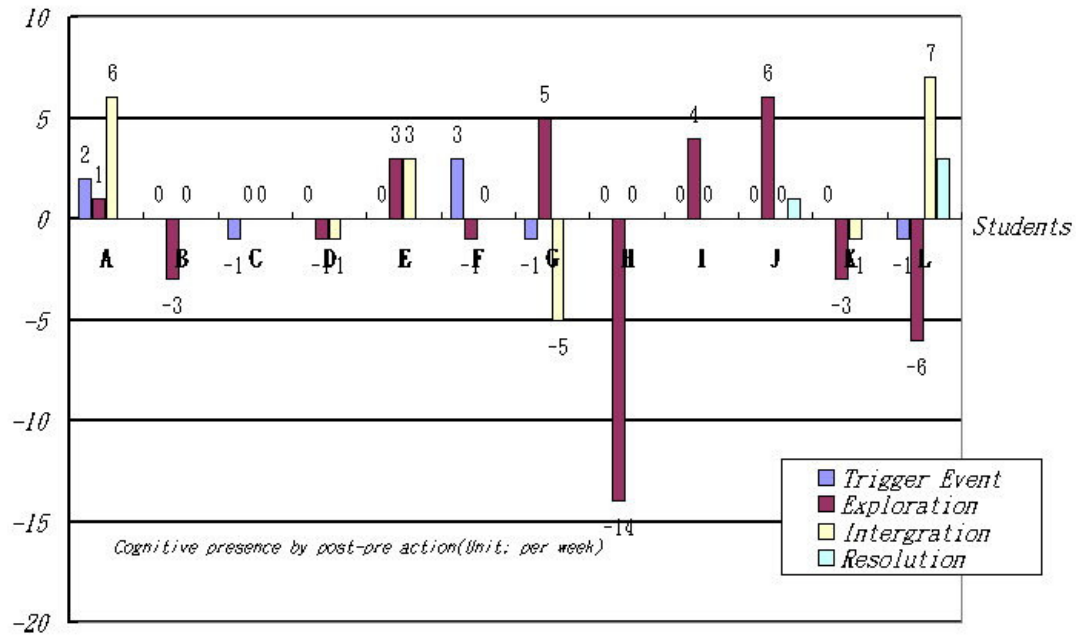


Figure 7: A comparison at 3rd stage for cognitive presence by post-pre action

4.3 Pre vs. post actions for attendance, participation, articulation, and relevance factors

In this study, the data collected from ELIC2007 platform and based upon ASKS grading mechanism were summarized by 4 criteria: attendance, participation, articulation, and relevance dimensions. In Table 3, attendance, pre-participation vs. post-participation, pre-articulation vs. post-articulation, and pre-relevance vs. post-relevance at 3rd stage were identified.

Table 3: Summary of 12 students' information

ID	Attend	Pre Posted #	Post Posted #	Pre-A.	Post-A.	Pre-R	Post-R.	Pre-test	Post-test
A	9	10	19	2.8	3.42	3.9	4.53	70	70
B	8	4	13	3	3.77	3.75	4.62	65	70
C	5	5	9	2.8	3.22	3.8	3.89	90	80
D	8	4	11	3	3.55	4	4.55	75	80
E	8	5	11	2	3.27	2.6	4.18	80	70
F	9	4	15	3.25	3.47	4.25	4.2	80	70
G	9	7	10	2.71	3.5	3.43	4.3	65	50
H	7	9	13	2.44	2.85	2.67	3.54	75	90
I	5	4	7	3.25	3.43	4.25	4.29	75	80
J	6	9	3	2.56	4	3.44	5.67	90	70
K	2	2	23	3.5	1.78	3	3.33	70	100

L	7	4	5	2.5	4	3.5	5.4	80	60
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Based on Table 3, this study adopts 2 stages for analyzing those data. Firstly, a standardized procedure is processed according the differences between pre and post scores. Secondly, parallel axis software (Inselberg, 1981) was computed. Then, the plot was generated by Microsoft Access in Figure 7.

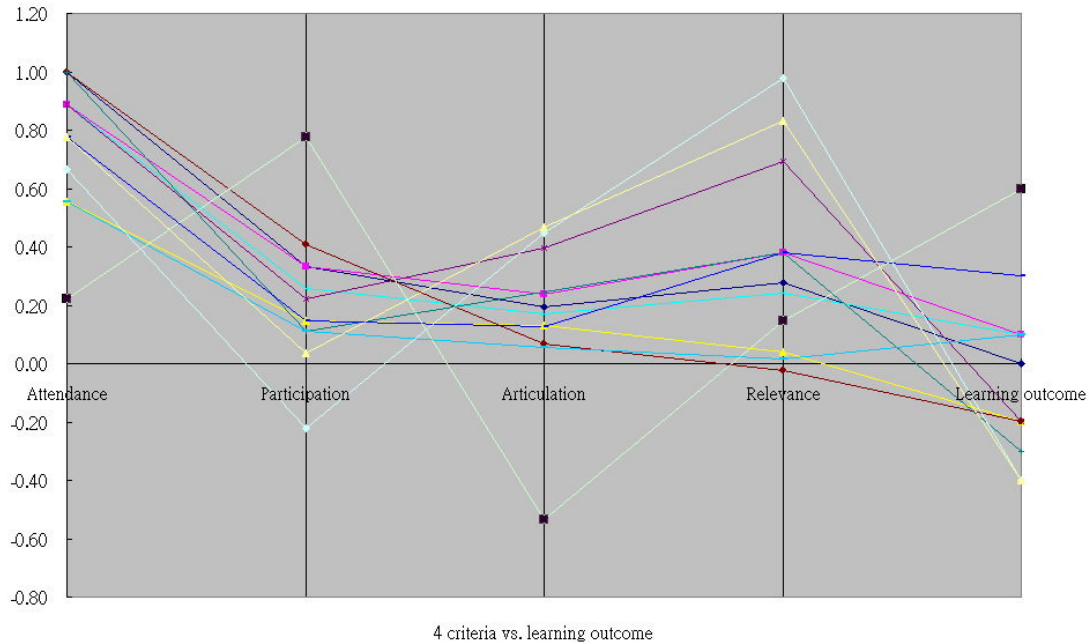


Figure 8: 4 criteria vs. learning outcome by “Parallel Coordinates”

In Figure 8, that the highest grade students had low 3 criteria except the number of posted messages is beyond our common sense as he/she might join the class at the last few weeks and posted messages such as how to use some software and social messages such as “hi”, “how are you doing?”, “I am coming to join with you” ...etc. Therefore, an interview was given in follow-up.

The student told that the score from pencil-and-paper test highly depended on the degree of student’s memorization instead of understanding. After one month, he almost forgot what he attained in the class. By contrast, another student who was lowest score could tell something in the class and apply what he learned from the class. In other words, BBS forum can keep track of students’ learning processes and help students to get insights from peers in a community of inquiry for true learning..

4.4. The results of 3 presences at different stages

In Figure 9, it shows that learning experiences profoundly shapes students' educational experiences while the instructor proposed subject matter

related question to clarify students' understanding at stage 4. Their posted responses attained more than 2.5 times from 46 to 117. Many students reported that those questions positively affected their participation in the discussion and their individual cognitive processes for engaging with the teaching material in the real class. In addition, students indicated that those questions provided a clear advantage in facilitating the work of small groups.

As for the comparison among the 3 presences along with 5 stages, Instructor and students took more efforts on social, teaching, and cognitive presences from Stage 1 to Stage 2. Therefore, another peak occurs at Stage 2 in Figure 9.

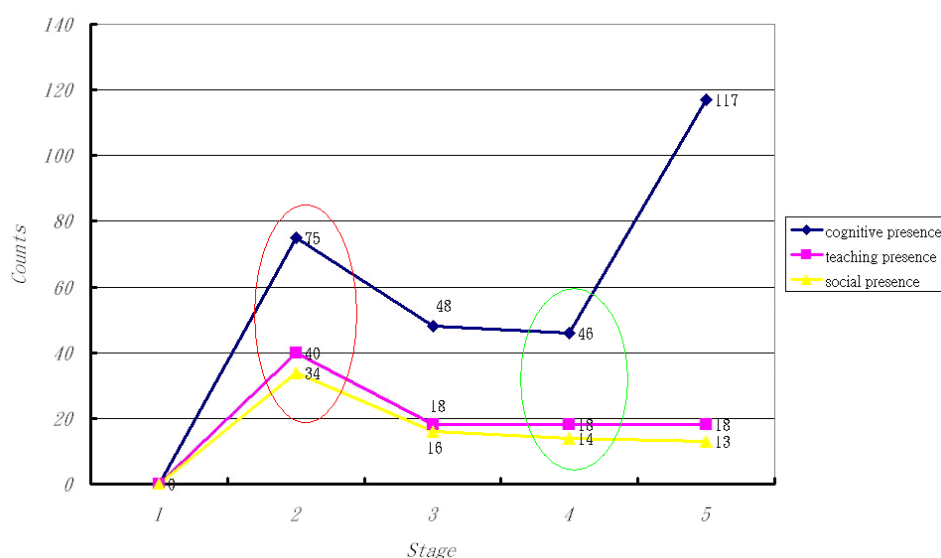


Figure 9: 3 presences at different stages

5. Conclusion

Based upon the results from section 4, some discoveries are shown as follows,

- (a) Providing open communication environment can promote “social presence”;
- (b) Offering quick responses can enhance “teaching presence”;
- (c) Learning process may be inconsistent with learning outcome; and
- (d) Setting course-related discourse can augment “cognitive presence”.

In this study, it reveals that the traditional way on pencil-and-paper test cannot verify what students' learning in an inquiry of community. Therefore, an asynchronous BBS may be useful for keeping students' learning e-portfolio. BBS can be a supplement for an inquiry of community in terms of attaining a comprehensive evaluation.

This study is a field or experimental study while Anderson (2003)

proposed “a model of inquiry of community” for e-Learning practice. The model needs to be verified at different educational context. The most part of results in this study comply with Anderson’s model. Furthermore, the results in this study give some insights for this model.

6. The implications for future study

Educational contexts in the real world differ at different locations, cultures, and instructors’ course design. This study only chose a course at STUT in Taiwan. The future study might apply this framework to different subject matters, different level of education via BBS as group communication tool. They might have different discoveries in different educational contexts.

Guided and directed by the teacher, dialogue through class discussion is considered the ideal instructional method. It is important that the dialogue include communication of information and subject-matter related questions that are educationally significant.

Specifically, analytical educators focus on content that is worthwhile, while emphasizing the need for clarifying concepts, arguments, and policy statements. The ELIC2007 used in this study offered a sound record for both instructor and students. The e-portfolio like ELIC2007 is a partner with traditional pencil-and-paper test if an instructor tries to deepened awareness, in meaningful touch with reality (Salmon, 2000).

7. Reference

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