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Abstract. Online discussion has become one of the important strategies for the teacher to teach the students to think critically when conveying their ideas and become more proactive and creative. In this paper, padlet online discussion communication was conducted to examine its effectiveness in enhancing critical thinking. In this study, there are two types of critical thinking: macro and micro critical thinking. A total of 70 Universiti Utara Malaysia Management Foundation Programme students involved in this experimental research design. The students in treatment class are divided to few groups. Every group uses padlet online discussion to discuss the topic given. All the group members discuss and write their ideas in padlet. Ideas that are posted in padlet will be displayed in front of the class so that the entire group in the treatment class could see the given ideas. Paul's (1993) model was used to analyze student's macro and micro critical thinking in padlet online discussion and communication. The finding shows that students who used padlet online discussion backchannel communication have greater macro and micro critical thinking level than students who do not use online discussion.

Keywords: Padlet, Online Discussion, Micro and Macro Critical Thinking, Communication

INTRODUCTION

In National Education Blueprint, 2015-2025, online learning and learning strategies towards students-centered learning has become an important collaborative learning. The Malaysian Education Minister believes that by using online, the gap between the rural and urban areas in term of achievement in education among the students from all levels could be reduced. Management Foundation Programme students are a group of students who further their studies after finishes their SPM exam (government exam). Promoting critical thinking skill among these students help them to apply cognitive presence and control their knowledge input as an aid to meaningful learning. In Malaysia, education departments hope that teachers will use strategies of teaching critical thinking skills (CT) and use some problems base questions in exams that test students' critical thinking skills (National Education Blueprint 2006-2010, 2007). Schafersman (1991) documented that the purpose of specifically teaching critical thinking in the sciences or any other discipline is to improve the thinking skills of students and prepare them to be succeed and face the world challenges. In this paper, online discussion among foundation students using padlet as tool was used to analyze their critical thinking skills and the ability to convey their ideas in given issues.

PROBLEM STATEMENTS

Implementing CT skills in University studies faced some challenges as universities often have many lectures. It is challenging to monitor and enhance every students critical thinking abilities. One of the ways to tackle these problems is to adopt online discussion in the class. Discussing online is a complementary channel for interactions and collaborations among students and instructors usually in the form of synchronous chat like Hotseat, TodaysMeet, Padlet and other related tools. Some of these tools allow learner to be anonymous when posting and discussing their ideas. According to the existing research, there are several studies demonstrating the benefits of having online discussion in the classroom or lectures. Among the positive benefits documented are the convenience of asking questions and getting responses from the instructors, learn new information from peers and having more fun learning (Du et al., 2012). However, very limited research has been done on examining whether the online discussion can promote critical thinking among undergraduate students.

RESEARCH OBJECTIVES

The objective of this research is analyzing the effectiveness of online discussion in enhancing students' macro critical thinking skills while discussing online the topic given in a group. It is also intended to reveal students' micro critical who use padlet online discussion compare to the student who do not use online.

LITERATURE REVIEW

Anderson (2003) identified six educational interactions involving learner-learner, learner-content, content-content, teacher-content, teacher-teacher and learner-teacher. In online learning or discussion, learner–teacher-content becomes a chain connection within one another. The interaction between teacher-content create learning content and activity by teachers. In online discussion, the teacher will continuously monitor the content resources posted in online to make sure learning goes on without disturbances (Illinois Online Network, 2003). Learner- peer interaction on online discussion improves asynchronous and synchronous communication using text and video. Learners' interaction provides new opportunities in a microenvironment, in online computer assisted tutorials and in the learner's attributes development. In teacher-students interaction, teachers are encouraged to apply their own knowledge growth and discoveries to help students' online discussion.

Padlet online discussion allows any students to become a participant where an individual or a group of people create or edit the actual site contents without a need to have any special technical knowledge. Padlet is easy handling tool which does not require know-how to involve in the activities (Kurubacak,2006). Mohan (2016) revealed that studying or discussing online will immerse the students' general knowledge and foster their interest in giving ideas. Padlet back channel communication is revised where it can be created collaboratively by sharing the creative processes and products of students in many groups. Students' interest in discussion online enable them think critical and identify a conclusion accurately.

Paul's CT Model (1993) divides critical thinking into macro and micro cognitive strategies to aid redesigning lessons to ensure that critical thinking is applied There are a few strategies that have been used to encourage students to get involved in online writing and discussion (Wilson, 2002). 'Crafting Questions' have carried out strategies such as convergent questions for Online Discussions (2002). Under this strategy, convergent questions were used to ask learners to analyze information by breaking down parts, recognizing patterns, forming assumptions and inserting relevant ideas. Sometimes convergent questionnaire used to check the content information necessary to form a good essay.

Blanchette (2001) in his research on writing essays and discussion in an online environment mentions that divergent questions can be used to explore different possibilities, variations and alternative answers. Wilson (2002) said divergent questions usually stimulate creative and critical thinking and often challenge learners to synthesize information. He also pointed out that divergent question in online discussions could provide opportunities to expose learners to alternative possibilities, and new solutions are presented by different learners.

Online discussion can accommodate the aforementioned learning and communication activities. Marian Dork, et.al (2010) revealed that many students are interested in online communication as a mean of learning. Yardi (2004) in his research describes that a type of collaborative learning in which students share knowledge through self-motivated participation and engagement is by using discussing. Paul (1993) mentioned that one of the strategies to

inculcate critical thinking is having a small number of groups learning to learn online and analyze a case study through role-playing.

METHODOLOGY

The purpose of this study is to investigate the effect of online discussion in facilitating students' micro and macro critical thinking skill. The samples for this research were chosen from Universiti Utara Malaysia Management Foundation Programme students in Critical Thinking subject. An experimental research design applied in this research. There are seventy students from two classes involved as sample in this research from the population of 360 students. Each class consists of thirty-five students and has the same ability and qualification as they are selected students after their Sijil Pelajaran Malaysia government exam. The methodology of this research includes quantitative and qualitative research.

Class X was selected as the experimental group (using padlet online discussion) and Class Z became the control group (classroom discussion) while learning Critical Thinking subject. Padlet online discussion is a tool used to plot discussion in a group on the topic given by the teacher.

On the first week (8 hours), the treatment students were exposed on how to use padlet online discussion. On the second week, in the treatment class, the students are divided into seven groups with five members in a group. Every group uses padlet online discussion to discuss the topic given. All the group members discuss and write their ideas in padlet. Ideas that are posted in padlet will be displayed in front of the class so that the entire group in the treatment class could see the given ideas.

Summary of the research procedure is first, a topic is presented for online discussion and each student in a group develops questions and answers based on the topic discussed. Next, the peers in every group posts comments on the given ideas online. After observing the given comment, each student takes on roles representing different points of views on specific issues and presents them by suggesting, analyzing, evaluating, and giving explanations. This helps the learners to compare their reasoning's with their peers critically. The similar outcome has shown in McCarthy, J. & Boyd, D (2005), which indicated that student become more critical in their thinking when they try to defend their ideas in discussion. Every finding and ideas in the online learning will be summarized and presented for feedback. The macro critical thinking (MaCT) (Table 1) and micro critical thinking rubric (MiCT) (Table 2) assessment instrument was developed for this study to measure the student's macro and micro critical thinking. MaCT and MiCT is adopted from Paul's model of critical thinking who considers critical thinking as a fundamental structure of humans thought. In this study, the MaCT will extract student's writing quality and thinking skills from ideas writing on padlet online discussion backchannel communication.

All the ideas and point discuss based on topic given in padlet were print out. Four evaluators were appointed to analyzed students' idea and sentences after they have posted in padlet using marks scoring rubrics micro critical thinking rubric (MiCT) and the macro critical thinking rubric (MaCT)) as shown in Table 1 and Table 2 respectively.

Members of other group are allowed to give comments on the idea posted and at the same time, they give their own ideas on the topic discussed. After one hour of discussion, the respective teacher asked one of the member of each group to come in front of the class to explain what they have discuss about the topic (based on padlet).

Table 1: Macro Critical Thinking Rubric

Level	MaCT	Score
M_{a1}	Evaluating Arguments	6
M_{a2}	Analyzing Arguments	5
M_{a3}	Making interdisciplinary connection (giving logical sequence)	4
M_{a4}	Clarifying Issues (elaborate issues discussed)	3
M_{a5}	Generating Solutions	2
M_{a6}	Refining Generalizations (remove defects / identify mistakes)	1

Table 2: Micro Critical Thinking (MiCT) Rubric

	MiCT	Score
Mi4	Giving reasons and evaluating evidence	4
Mi3	Exploring implication and consequences	3
Mi2	Comparing and contrasting ideas	2
Mi1	Thinking precisely about thinking	1

The formula to measure the macro and micro critical thinking is shown below in Fig. 1.

$$Score = \frac{\sum (F \times V_{Rn})}{\overline{X}}$$

F : Frequency
V_{Rn} : Value / score for each items of micro critical thinking

$\overline{X}$: group average

FIGURE 1. Formula to measure the macro and micro critical thinking

An example of the calculation for macro and micro critical thinking for the control group is showed as Table 3.

Table 3: Calculation for Macro and Micro critical thinking for Control Group

STUDENT	MACRO CRITICAL THINKING						Mark	SCORE	MICRO CRITICAL THINKING				Mark	SCORE
	MA1	MA2	MA3	MA4	MA5	MA6			MI1	MI2	MI3	MI4		
FAIZAL	1.00	1.00	0.00	0.00	0.00	0.00	3.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00
FARAHIN	0.00	0.00	1.00	0.00	0.00	0.00	3.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00
RAJES	0.00	0.00	0.00	1.00	0.00	0.00	4.00	1.57	0.00	0.00	0.00	0.00	0.00	0.00
ANBA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	4.00	3.89
RAIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
JANE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.00**	**2.00**	**3.00**	**0.00**	**0.00**	**0.00**	**10.00**	**3.93**	**0.00**	**4.00**	**0.00**	**0.00**	**4.00**	**3.89**

As showed in Table 3, Faizal contributed two inputs, one input on Ma1 and one input on Ma2. Farahin, contributed only one input on Ma3. Rajes contributed one input on Ma4. Anba, did not contribute any input on macro critical thinking but contributed two inputs on Mi2. Rais and Jane did not contribute any input that related to macro critical thinking or micro critical.

An example of the calculation for macro and micro Critical Thinking is showed in Table 4. As shown, Kamarul contributed two inputs, one input on Ma2 and one input on Mi1. Jamal, contributed only one input on Ma5. Kasturi did not contribution any input on macro critical thinking; however she contributed one input on Mi1 and one input on Mi2. Meng contributed one input on Ma5, while did not contribute any input on micro critical thinking. Anis contributed three inputs, one input on Ma6, two input on Mi2. Adilah contributed six inputs with one input on Ma2, two inputs on Ma3, one input on Mi2 and one input on Mi4.

Table 4: Example of calculation for Macro and Micro critical thinking for treatment Group

STUDENT	MACRO CRITICAL THINKING						Mark	SCORE	MICRO CRITICAL THINKING				Mark	SCORE
	MA1	MA2	MA3	MA4	MA5	MA6			MI1	MI2	MI3	MI4		
KAMARUL	0.00	1.00	0.00	0.00	0.00	0.00	2.00	0.25	1.00	0.00	0.00	0.00	1.00	0.49
JAMAL	0.00	0.00	0.00	0.00	1.00	0.00	5.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00
KASTURI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	3.00	1.48
MENG	0.00	0.00	0.00	0.00	1.00	0.00	5.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00
ANIS	0.00	0.00	0.00	0.00	0.00	1.00	6.00	0.76	0.00	2.00	0.00	0.00	4.00	1.97
ADILAH	0.00	1.00	2.00	0.00	0.00	0.00	8.00	1.02	0.00	2.00	0.00	1.00	8.00	3.94
Total	**0.00**	**4.00**	**6.00**	**0.00**	**10.00**	**6.00**	**26.00**	**3.31**	**2.00**	**10.00**	**0.00**	**4.00**	**16.00**	**7.89**

FINDINGS

After the calculating of the critical thinking score for each participant, independent t-test using *Statistical Package for the Social Science (SPSS)* software was conducted to test the proposed hypothesis. Specifically, hypothesis 1 proposed that students who used back channel have greater macro critical thinking level than students who do not use back channel. Hypothesis 2 proposed that: Students who used back channel have greater micro critical thinking level than students who do not use back channel.

The result shows that students in treatment group have greater macro critical thinking level (M = 7.857, SE = 4.77) than to those in control group (M = 2.543, SE = 3.137). This difference was significant t = -5.505, p < .05 which supports H1. The details of the analysis result as below Table 5 below:

Table 5: Independent t-test result for H1

	Group	N	Mean	Std. Deviation	Std. Error Mean	F-value	p-value
Total Macro	Control	35.000	2.543	3.137	0.530	4.888	0.000**
	Treatment	35.000	7.857	4.772	0.807		

Note: ** denotes significance at p < 0.05 level

For hypothesis 2, the result shows that students in treatment group does not show greater micro critical thinking level (M = 2.029, SE = 2.684) than those in control group (M = 1.029, SE = 1.839). This difference was not significant t = 0.073, p > .05. Hence, H2 was rejected. The details of the analysis result shown in Table 6 below:

Table 6: Independent t-test result for H2

	Group	N	Mean	Std. Deviation	Std. Error Mean	F-value	p-value
Total Micro	Control	35.000	1.029	1.839	0.311	6.347	0.073
	Treatment	35.000	2.029	2.684	0.454		

DISCUSSION

The Effect of Backchannel Communication on Macro Critical Thinking Skills

The development of macro critical thinking among students is not only a common objective of various disciplines of this study but also goals that the university aspires to achieve. In Malaysia, the Education Departments hopes that lecturers will use strategies of teaching CT skills and include problems question in exams that test students' critical thinking skills (National Education Blueprint 2006-2010, 2007). Most of the students in Malaysia

Management Foundation Programme could refine generally on topic given. By using online discussion, the students feel more comfortable to write their ideas. Students in every group who uses online discussion padlet could see the ideas from other group on the padlet wall. This give them confidence to convey their ideas.

Online discussion also enhance non outspoken students' to apply their macro critical thinking skill in any learning discipline and improve their ability to prepare evaluating the credibility of information sources. They tend to clarify issues using their existing knowledge. As what has revealed by Shea et al. (2003), student tend to contribute greatly and involve actively in giving and explaining ideas. Garrison et al. (2000) in his research said the core properties of online learning are the ability to provide collaborative learning experience at the convenience of the individual. It involves both interaction and interdependence in the learning environment. The students could convey good ideas in discussion. Therefore, in this new paradigm of education, the students' macro critical thinking skill helps them to ask appropriate questions, gather relevant information, sort out efficiently the given information, and make logical reason and reliable conclusions.

Morgan (2001) recommended that the macro ability of developing ones perspective of creating or exploring beliefs, arguments or theories as a strategy to encourage critical thinking along logical lines of thought will make the students to be more mature. Likewise the Management Foundation Programme students in UUM have used their existing knowledge effective in curriculum development. From this study, it is noted that the students could use their ability to think critically to clarify issues and make conclusions. Although the lecturer encourage the students to think precisely about thinking using critical vocabulary and examining or evaluating assumptions before posting in padlet, the students however make a simple interdisciplinary connection on the topic given and generate solutions. Padlet helps them to analyze the given ideas within the group or between the groups. The formation of ideas between the students enables them to use macro critical thinking skill to gather relevant information effectively.

Micro Critical Thinking Skills in Online Discussion

Thinking by notifying significant similarity not a simple aspect. It is related to a process to identify a conclusion accurately and master the elements of reasoning. In this study, students are newly introduced the method of simultaneous online discussion. They need to be able to generate their own perspective while giving feedback to their peers. The students have to engage in active learning and communication processes so that they produced, gained and evaluated knowledge. The finding shows that students may face challenges to read, listen, understand, and remember knowledge successfully and simultaneously communicate their ideas through the backchannel tool (paddle). Hence the development of their micro critical thinking skills is hindered.

Additionally, as shared in Springer and Deutsch (1993) studies showed that it is not easy to determine students' micro critical thinking skills because they haveto think independently rather than engage in some prescriptive learning. Even though, online discussion content helps the student to be more specific in assessing facts and suggestions to avoid misinterpretation, the student could not give reason supporting with data or able to contrast ideas of their peers by giving sources or his/ her search on relevant topics. In the future, other ICT tool that provide systematic classification or structuring information may be explored.

Another factor that potentially contribute to the non-significant result of H2 is due to the diverse cultural, ethnicity, and racial heritages. Due to this diversity, students may face challenges in handling diverse stereotypes, biases and misconceptions. In using the backchannel tool which has lesser gestural cues may pose difficulties for the learners to interpret others perspectives and prone to attribution error which may lead to conflicts.

CONCLUSION

Online learning now days is being widely used in our education system. As critical thinking subject is an ill-structured domain in that it includes a wide range of knowledge disciplines, students are encouraged to discuss online among themselves to learn this subject in a meaningful manner and discuss maturely.

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