

The Effect of Backchannel Communication in Developing Students' Critical Thinking Skills

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Abstract

The purpose of this study is to examine the effect of backchannel communication in developing students' critical thinking skill: macro and micro critical thinking. There are many tools in backchannel communication (BC). Padlet has been used as one of backchannel communication in this research. There are seventy students from two classes (Class X and Class Z) involved as sample in this study. Quasi-experimental research design applied in this 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 was used as tool to plot discussion in a group on the topic given by the teacher. The finding shows that students who used back channel communication showed greater macro critical thinking level than to those who did not use back channel communication. While for students who used BC did not show greater critical thinking level than to those who did not use BC. This study will contribute to the body of knowledge on technologies for learning and online learning. This will allow better understanding on how technology can facilitate learning especially critical thinking.

Keywords: Backchannel communication; Macro and micro critical thinking; Padlet online.



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1. Introduction

In the second phase of the Excellence in Malaysian Higher Education policy, the education system has emphasized that students should be taught to be more proactive, discuss analytical and creatively. Continuous quality improvement in teaching and learning online as well as understanding the students' ability in learning is an important task. Promoting active learning among the foundation students have become an important agenda in educating new intake students in the Malaysian university. Hence, to accommodate the importance of thinking maturely, one of subject listed is "Critical Thinking Skill". Therefore, critical thinking skill is pertinently important among first year university students. The course syllabus indicates that students should be independent in thinking and have proficient in the use of language (Paul and Elder, 2004).

Nevertheless, from the researchers' observation, first year university students are facing problem to identify, communicate and to integrate the syllabus content. One of the reasons could be attributed to the fact that student likely to perceive it is a boring subject. Besides, it is observed that students are totally depending on the course facilitator to prepare all the materials, ideas, notes and discourse models of specific academic areas (Paul and Elder, 2004).

One of the ways to tackle these problems is to adopt back channel communication (BC) in the class. Back channel 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 backchannel communications in classroom or lectures. For the purpose of this research, padlet has been used as BC. Among the positive benefits documented are the conveniences of asking questions and getting responses from the instructors, learn new information from peers and having more fun learning (Bolliger and Halupa, 2012; Yardi, 2006).

However, very limited research has been done on examining whether the backchannel communication can promote critical thinking among undergraduate students. It is therefore, important for the lecturers to understand how undergraduate students use the BC to deeply engage with the instructors, peers and the subject matter or just merely discussing informally about class topic or sometimes "off-topics" that will not enhance their learning process. Also, there are several challenges of BC implementation that are not well understood. The opponents argue that back channel may become a source of distraction among students (Schwartz, 2003) (Phalen, 2003). Students may not be

motivated to use the back channel communication and the underlying reasons are being less examined. Thus, this research aims to fill these gaps in this field of research.

Specifically, this study aims to investigate the factors influencing students' adoption of this kind of tool, the role of back channel in facilitating critical thinking and the benefits and drawbacks of tools of this kind in classrooms. There are 2 hypothesis in this research. Hypothesis 1 proposed that students who used back channel have greater macro critical thinking level than students who do not use back channel. Whereas hypothesis 2 proposed that students who used back channel have greater micro critical thinking level than students who do not use back channel. The outcome of this research will contribute to Malaysia Education Blueprint 2015-2025 (Higher Education), specifically through globalized online learning and information technology to produce integrated thinking skills to help undergraduate students to understand cognitive strategies and appropriate communication in problem solving.

2. Literature Review

Critical thinking skills are imperative and valuable across all fields of life whether in academic or profession with the benefit of analytic thinking in solving specific problems. In academic settings, educators have deliberated and attempted numerous methods in engaging students in classrooms during learning activities (McCormick *et al.*, 2015). Learning activity can be defined as a collaborative activity that befalls in an environment which encompasses elements of practicing, explaining and teaching (McCormick *et al.*, 2015).

The definition of critical thinking has been deliberated over the years and several definitions are presented. Critical thinking is a process to precisely determine a correct conclusion and acquire proficiency in cognitive elements (Khandaghi and Pakmehr, 2012) (Paul and Elder, 2004) (Umar and Rathakrishnan, 2012). Paul's CT Model (Paul, 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. 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.

In addition, promoting critical thinking skills for a larger group of students can be an intimidating task for some instructors. Backchannels utilize collaborative learning style and is considered as one of the most successful approaches to reinforce and enhance the interactions student-student and student-teacher interactions as well as improve the students' higher order thinking skills (Mohan *et al.*).

A research conducted by previous studied Mahalingam *et al.* (2008) emphasized the importance of collaborative learning style for graduate students by complementing the traditional lectures with presentation. The course was redesigned by reducing the hour of lecture to three and increase the hour of presentation to four. The presentation was made compulsory to the students. The research yield positive outcomes where there was an improvement in students' accountability towards learning and study routines as well as a decline in the average statistics of students with scores lower than 60% in examinations (McCormick *et al.*, 2015).

Collaborative learning style concerns with knowledge sharing and responsibility of the group members during the learning activities. Through collaborative learning, students are capable of motivating each other, leveraging on others' strengths, encouraging participation and sharing information in order to comprehend a topic being discussed in the class. The ideas or knowledge can be repeated and elucidated in more details as to ensure everyone in the group to achieve understanding of the topic (McCormick *et al.*, 2015).

Besides, previous research (Blanchette, 2001) 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 (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.

On line discussion can accommodate the aforementioned learning and communication activities. Recent study (Dork *et al.*, 2010) revealed that many students are interested in online communication as a mean of learning. Yardi (Yardi, 2006) 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. Previous author 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.

3. Methodology

There are seventy students from two classes (Class X and Class Z) involved as sample in this study. The samples for this research were chosen from Malaysian Management Foundation Programme students in Critical Thinking subject. An experimental research design applied in this 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. 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.

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.

Table-1. Macro Critical Thinking (MaCT) 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

Level	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:

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

F = Frequency

VRn = Value/ score for each items of micro/macro critical thinking

X = group average

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		
1	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
2	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
3	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
4	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
5	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
6	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 shown in Table 3, student 1 contributed two inputs, one input on Ma1 and one input on Ma2. Student 2 contributed only one input on Ma3. Student 4 contributed one input on Ma4. Anba, did not contribute any input on macro critical thinking but contributed two inputs on Mi2. Student 4 and student 5 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, student 1 contributed two inputs, one input on Ma2 and one input on Mi1. Student 2, contributed only one input on Ma5. Student 3 did not contribution any input on macro critical thinking; however she contributed one input on Mi1 and one input on Mi2. Student 4 contributed one input on Ma5, while did not contribute any input on micro critical thinking. Student 5 contributed three inputs, one input on Ma6, two input on Mi2. Student 6 contributed six inputs with one input on Ma2, two inputs on Ma3, one input on Mi2 and one input on Mi4.

Table-4. 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		
1	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
2	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
3	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
4	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
5	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
6	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

4. Findings

After the calculating of the critical thinking score for each participant, the researcher used t-test analysis using Statistical Package for the Social Science (SPSS) software. The t-test was applied to test the null hypotheses that the difference between the means of two groups was zero. Specifically, hypothesis 1 proposed that students who used BC have greater macro critical thinking level than students who do not use back channel. Whereas hypothesis 2 proposed that students who used BC have greater micro critical thinking level than students who do not use back channel.

Table 5 shows that on average, students who used BC showed greater macro critical thinking level than to those who did not use back channel communication. This difference was significant $t = -5.505$, $p < .05$. This result summarize that students are using BC have greater macro critical thinking level compared with students are not supposed to using BC. Therefore, hypothesis 1 was supported.

Table-5. Report on independent sample t-test of macro critical thinking

	Group	N	Mean	Std. Deviation	t	Sig.
Macro critical thinking	1	35.000	2.543	3.137	-5.505	.03
	2	35.000	7.857	4.772		

$p < .05$

From the independent samplet-test analysis, the result in Table 6 shows that students who used BC did not show greater micro critical thinking level than to those who did not use BC. There is no difference between students who used back channel and student are not using BC in micro critical thinking level. This difference was not significant $t = -1.818$, $p > .05$. Hence, hypothesis 2 was rejected.

Table-6. Report on t-test of micro critical thinking

	Group	N	Mean	Std. Deviation	t	Sig.
Micro critical thinking	1	35.000	1.029	1.839	-1.818	.07
	2	35.000	2.029	2.684		

$p < .05$

5. Discussion

5.1. Students Who Used Back Channel Have Greater Macro Critical Thinking Level than Students Who Do Not Use Back Channel

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. Most of the students in foundation studies could refine generally on topic given. By using BC, the students feel more comfortable to write their ideas. As the students in every group uses BC, they could see ideas posted by other group. BC 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.

BC also enhance non outspoken students' to convey their ideas without shy and fear when it comes to group discussion. They become self – directed thinking by exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. BC requires the students to post their ideas online. The non-outspoken shows their macro critical thinking skill by giving multi discipline factor in their writing. They improve their ability to prepare evaluating from credibility of sources information and clarify issues using them existing knowledge. The treatment group also able to give their feedback when discuss online. They could compare analog and each student takes on roles representing different points of views on the issues given and presents them by suggesting, analyzing, evaluating and giving explanations. This helps the learners to compare their reasoning's with their peers critically. Every finding and ideas in the online learning will be summarized and presented for feedback.

Therefore, in this new paradigm of education, the students' macro critical thinking skill should learn to ask appropriate questions, gather relevant information, efficiently and creatively sort out and sieve through this information, reason logically from this information, and come to reliable and trustworthy conclusions.

5.2. Students Who Used Back Channel Have Greater Micro Critical Thinking Level than Students Who Do Not Use Back Channel

Critical thinking defines as "skillful, responsible thinking that facilitates good judgment because it (i) relies upon criteria, (ii) is self-correcting, and (iii) is sensitive to context." From this definition, the first criterion for critical thinking is that it relies on external criteria and standards for judging the reasonableness of one's own, and others' claim of certain beliefs and actions. Second, it demands the thinker's responsibility to self-correct when a certain part of his or her reasoning is found failing to meet the criteria and standards of reasonableness. Third, the criteria and standards employed for facilitating judgment of reasonableness must have the universal normative force but at the same time must be sensitive to the specific context where the judgment is made.

Without meeting the first requirement, the judgment of the merits of certain beliefs and actions produced by the thinking process will be arbitrary, undisciplined, unreliable, and hence, cannot be justified. A thinking process that may involve problem solving, decision making, reflective thinking, meta cognition, or higher order thinking cannot be qualified as critical thinking if it does not employ external criteria and standards to facilitate judgment of the merits of certain beliefs and action. Some of researcher argues that responsible critical thinking requires one not merely to be engaged in the mental processes but demands that one "do these mental processes well, that is, in accord with the appropriate standards and criteria."

Without meeting the second requirement, the judgment of the merits of certain beliefs and actions produced by the thinking process will not be accurate. When errors are identified but not rectified in thinking process, the judgment generated from the thinking process will inevitably be faulty. Further, it can only be called weak sense critical thinking, if the thinker only self-corrects those neutral, procedural, or technical errors, but not those arising from his or her deep-seated egocentric thinking, feelings, and desires. Strong sense critical thinkers aim to identify and self-correct both types of thinking errors.

Without meeting the third requirement, the judgment of the merits of certain beliefs and actions resulting from the thinking process cannot be a good one because the criteria and standards employed are treated as absolute, without regard to whether they are appropriate and responsive to the purpose and needs of a particular context. By including the requirement that criteria and standards that have universal normative force and are sensitive to the specific context be employed, the judgment made can avoid dogmatic, absolutist thinking errors as well as subjective, relativist thinking errors. The person who wants to make a reasoned judgment of beliefs and actions has a practical problem to solve in a specific social context in which the person is related to other persons. The person needs to make sense, to be fair to alternative points of view, to be careful and prudent in the taking important stances, as well as to be willing to admit when he or she has made a mistake.

These three criteria characteristics make critical thinking unique because it both employs criteria and can be assessed by appeal to criteria. Failing to meet any one of the three requirements, means a thinking process would not be adequate enough to be qualified as critical thinking. By using these three criteria characteristics in addition to the functional characteristic, teachers and students should be more able to distinguish critical thinking from a cluster of other types of thinking that are closely related to it. They should also become more able to tell whether they are, in fact, teaching and learning critical thinking.

6. Implications

Findings from this study include implications for practice by higher education instructors addressing critical thinking skills. The results of this study indicate a need for further research and training in content delivery accompanied by critical thinking. Mapping the higher education curriculum in order to adjust course content to reduce the amount of replicated information taught in courses is highly recommended. A focus on problem-based learning, active learning, and a constructivist approach is recommended to facilitate critical thinking skills and learning that is meaningful and lasting. It is recommended that faculty be instructed in effective teaching methods that include:

1. Sharing videotaped classroom instruction where critical thinking is demonstrated.
2. Incorporating critical thinking skills in appropriate topics in classroom instruction.
3. Training higher education instructors in active learning strategies that facilitate critical thinking skills.
4. Designing course content around themes applicable to a variety of situations to encourage active learning activities and critical thinking.
5. Sharing results from the establish a baseline and determine goals for improvement.
6. Implementing strategies of individual colleges, schools, and departments that score well on.
7. Courses in critical thinking skills within every major.
8. Implementing a rubric for critical thinking skills within every course.
9. Mapping the higher education curriculum within each college to circumvent content.

7. Conclusions

Our basic concept of critical thinking is, at root, simple. We could define it as the art of taking charge of your own mind. Its value is also at root simple: if we can take charge of our own minds, we can take charge of our lives; we can improve them, bringing them under our self-command and direction. Of course, this requires that we learn self-discipline and the art of self-examination. This involves becoming interested in how our minds work, how we can monitor, fine tune, and modify their operations for the better. It involves getting into the habit of reflectively examining our impulsive and accustomed ways of thinking and acting in every dimension of our lives.

On this view, as you can see, critical thinking is an eminently practical goal and value. It is focused on an ancient Greek ideal of "living an examined life". It is based on the skills, the insights, and the values essential to that end. It is a way of going about living and learning that empowers us and our students in quite practical ways. When taken seriously, it can transform every dimension of school life: how we formulate and promulgate rules; how we relate to our students; how we encourage them to relate to each other; how we cultivate their reading, writing, speaking, and listening; what we model for them in and outside the classroom, and how we do each of these things.

Of course, we are likely to make critical thinking a basic value in school only insofar as we make it a basic value in our own lives. Therefore, to become adept at teaching so as to foster critical thinking, we must become committed to thinking critically and reflectively about our own lives and the lives of those around us. We must become active, daily, practitioners of critical thought. We must regularly model for our students what it is to reflectively examine, critically assess, and effectively improve the way we live.

Critical thinking is that mode of thinking about any subject, content, or problem in which the thinker improves the quality of his or her thinking by skillfully analyzing, assessing, and reconstructing it. Critical thinking is self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, as well as a commitment to overcome our native egocentrism and socio-centrism.

References

- Blanchette, J. (2001). Questions in the online learning environment. *Journal of Distance Education*, 16(2): 13-49.
- Bolliger, D. U. and Halupa, C. (2012). Student perceptions of satisfaction and anxiety in an online doctoral program. *Distance Education*, 33(1): 81-98.
- Dork, M., Gruen, D., Williamson, C. and Carpendale, S. (2010). A visual backchannel for large-scale events. *IEEE transactions on Visualization and Computer Graphics*, 16(6): 1129-38.
- Khandaghi, A. M. and Pakmehr, H. (2012). Critical thinking disposition, A neglected loop of humanities curriculum in higher education. *Cypriot Journal of Educational Sciences*: 7.
- Mahalingam, M., Schaefer, F. and Morlino, E. (2008). Promoting student learning through group problem solving in general chemistry recitations. *Journal of Chemical Education*, 85(11): 1577-81.
- McCormick, N. J., Clark, L. M. and Raines, J. M. (2015). Engaging students in critical thinking and problem solving, A brief review of the literature. *Journal of Studies in Education*, 5(4): 100-13.
- Mohan, R., Rahayu, A. and Lee, J. C. Padlet online discussion in enhancing students' macro critical thinking skills. *International Journal of Latest Research in Humanities and Social Science IJLRHSS*, 1(3): 121-26. Available: www.ijlrhss.com
- Paul, R. (1993). *Critical thinking – What every person needs to survive in a rapidly changing world*. 3rd edn: Foundation for Critical Thinking: Santa Rosa, CA.
- Paul, R. and Elder, L. (2004). Critical thinking... And the art of close reading, part iii.. *Journal of Developmental Education*, 28(1): 36-37.
- Phalen, K. (2003). Taking a minus and making it a plus, Info. Technology & communication. 7(1).
- Schwartz, J. (2003). *Professors vie with Web for class's attention*. New York Times:
- Umar, I. N. and Rathakrishnan, M. (2012). The effects of online teachers' social role and learning style on students' essay writing performance and critical thinking in a wiki environment. *Procedia-Social and Behavioral Sciences*, 46(1): 5730-35.
- Wilson, L. O. (2002). *Newer views of learning- types of questions. Theories of learning index*. FTP:<http://www.uwsp.edu/education/lwilson/learning/quest2.htm>
- Yardi, S., 2006. "The role of the backchannel in collaborative learning environments." In *in Proceedings of 7th International Conference on Learning Sciences*. pp. 852-58.