

PBWIKI ON-LINE LEARNING: THE EFFECTIVENESS OF PEDAGOGICAL ROLE ONLINE TEACHERS' ON STUDENTS WITH DIFFERENCE LEARNING STYLE IN THEIR CRITICAL THINKING

A MOHAN A/L RATHAKRISHNAN

Pusat Pengajian Umum, Universiti Utara Malaysia, 06100 Sintok, Kedah Darul Aman, Malaysia

*Corresponding author
drmohanratha@gmail.com

Abstract

PBwiki (Peanut Butter wiki) is an asynchronous online learning that integrates collaborative learning. By using this web-based software tool, students can create, add, remove and edit content in hypertext quickly and easily. In this paper, a study on the teachers' pedagogical roles on students' critical thinking skill in a PBwiki environment will be discussed. The students' learning style (active or reflective learning style) as a moderating variable was investigated to identify whether PBwiki online learning influence their critical thinking in essay writing. A total of 120 Form Six (Grade 12) students from two high schools in Penang were involved in this 2x2 factorial quasi-experimental study. These students have to write and edit their essays in General Study's subject with the assistance of pedagogical role online teachers (PROT). Felder and Soloman (2001) instrument were used to measure the moderating variable. Paul's (1993) model were used to analyze student's critical thinking in online General Studies essay writing. The findings shows that students who received the PROT treatment performed significantly better in critical thinking score and enhanced students' critical thinking in General Studies essay writing

Keywords : Pedagogical Role Online Teachers (PROT), Critical Thinking, Learning Style and General Studies

1.0 INTRODUCTION

E- Learning at the early stage in Malaysia was offered to working individuals who wanted to improve themselves in education (Othman, 2002). However, with a systematic change in education, Malaysia Education Ministry has introduce The National Education Blueprint 2006-2010 and 2015-2025 to promote the use of Information and communication technology (ICT) in education to the students of all level. Students are expected to integrate thinking skills to help students to understand cognitive strategies in problem solving by using ICT in education.

Paul (1993) mentioned that without self-directed thinking, a student cannot exemplify thinking appropriate to a particular mode or domain of thinking. Newman (1993) classified two way of student adopt learning from teachers teaching: (1) *surface learning* approach where students only memorize, skim and regurgitate for exams without

involving elements of reasoning and intellectual abilities.

Kanuka (2002) mentions that learning and teaching in asynchronous online environment will help student to understand better certain issues as it involves collaborative learning. One of online editable learning and teaching tools that is useful for student to learn collaboratively and effectively is PBwiki online learning.

For this education purpose, students were allowed to use PBwiki to create topics, edit, doing hyperlink, give comment, and study collaboratively. With its interesting features, PBwiki as an online learning tool allows the students to collaborate with their peers and consult their teacher (Mohan, 2010). By using PBwiki as an online web tool, every student can become a correspondent on the Internet.

There are four dimensions of a teacher's role in online learning (Berg, 1995): pedagogical, social (SROT), managerial (MROT), and technical (TROT). In this study one type of teachers' roles was applied: the Pedagogical role online teacher (PROT). The scope of this paper reveal only the PROT who play a role as an

e-moderator and as a facilitator to encourage the students to be critical thinker in conveying their ideas when writing essay. However as one of part from a full research, a comparison between PROT and SROT students were made in their critical thinking and learning style.

2.0 PROBLEM STATEMENT

In Malaysia, General Paper (GP) is a compulsory subject for Form Six students. Based on a previous authors' teaching experience and analyzing, it was found that Form Six students are relying too much on teachers notes and examples when writing essay in GP. Depending on teachers' materials has emerges students to remain mindful to the text given. They rarely practice finding new information from their own reading or discuss with their peers.

In order to develop the students' capability to compare and contrast ideas in actual writing, thinking critically and relate relevant fact, they are encouraged to understand the current issues both locally and globally. Lack of reading and exquisite design of analysis and critical thinking in essay writing is one of the reasons why Form Six students could not write a good essay (Mohan,2010).

Table 1 shows only 40% of students who writes GP essay have obtained (A to C+).

Table 1 Students' achievement in a GP essay writing in a school in Bukit Mertajam, Penang

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
No. of Students	1	3	1	4	3	4	1	14	0	0	0
%	2.5	7.5	2.5	10	7.5	10	2.5	35	0	0	0

Total number of student: 40

As GP is an ill-structured subject, teachers need to develop their students' understanding to remedy learning deficiencies related to domain complexity in the learning process (Spiro et al., 1991) Therefore one of the predominant way for the GP teachers develop the students' capability to think critical and remedy the learning deficiencies are by using PBwiki online learning.

3.0 METHODOLOGY

In this study, quasi-experimental study applied a 2 x 2 factorial design to measure the effects of an independent variable (teacher's the pedagogical role online teacher, PROT) or social role online teacher, SROT) and a moderating variable (active or

reflective learning style) on one dependent variable (students' critical thinking skills).

A total of 120 students from two high schools in Bukit Mertajam, Penang, Malaysia participated in this study, with 60 students randomly selected from each school. The two schools were randomly selected for the two treatment groups, in which one school was selected as the experimental group (PROT approach) while the other school became the control group (SROT approach) in learning General Studies.

Prior to the treatment, the *Index of Learning Style Questionnaire* (ILSQ) instrument was administered to the research participants. A total of 11 items of the active-reflective dimension of this learning style instrument was used to classify whether the students are active or reflective learners. Those who responded mostly to option "a" on the learning styles preference measured by the ILSQ instrument are classified as active students and those who responded mostly to option "b" are identified as reflective students. Then, a pretest was conducted before the treatment was carried out. It serves to investigate whether there are significant differences in General Studies knowledge among the students prior to the treatment.

The research participants were then treated with either the PROT or SROT approach. A wiki site (named pbwiki) was developed to be used by each treatment group. An e-moderator was assigned to each treatment group. In specific, an e-moderator with pedagogical role was assigned to the PROT group.

To identify the students' levels of critical thinking, all the students' input posted in pbwiki were analyzed by two judges. They evaluated the idea and sentences using the scoring rubrics Two types of scoring rubrics were used for this purpose, and they are the micro critical thinking rubric (MiCT) and the macro critical thinking rubric (MaCT) as shown in Table 2 and Table 3 respectively.

Table 2 Macro Critical Thinking Rubric

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

Table 3 *Micro Critical Thinking (MiCT) Rubric*

Level	MaCT	Score
Ma ₁	Evaluating Arguments	6
Ma ₂	Analyzing Arguments	5
Ma ₃	Making interdisciplinary connection (giving logical sequence)	4
Ma ₄	Clarifying Issues (elaborate issues discussed)	3
Ma ₅	Generating Solutions	2
Ma ₆	Refining Generalizations (remove defects / identify mistakes)	1

To identify and examine the students' MiCT and MaCT Two ratters were identified. The inter-rater agreement for the MaCT scores was 0.97 and the value for the MiCT was 0.69 - both indicating a high correlation in terms of agreement between the two ratters. The PROT group sat for the post-test after four weeks of treatment. The students were instructed to write two GS essays within 80-minutes which have similarity with the topic discussed in the wiki environment. However, the analysis of their essay performance was not the scope of this article.

4.0 FINDING AND DISCUSSIONS

An analysis of variance (ANOVA) was conducted on the pretest score of the student in the two treatment groups and different learning style. This analysis was conducted to ascertain the homogeneity in term of prior knowledge and learning style in GP subjects for the PROT group. The data were compiled and analyzed using the *Statistical Package for the Social Science (SPSS)* software. A multivariate analysis of variance (MANOVA) was carried out to examine if there were statistically significant differences in students critical thinking skills (score) from two different groups.

In this study, students' micro critical thinking (MiCT) and macro (MaCT) critical thinking for the PROT group shows the total CT score are the combination of both MiCT and MaCT scores. For the MaCT score, the PROT group scored a mean of 18.25 (SD = 6.44) and for the MiCT score, the PROT group scored a mean of 5.30 (SD = 2.37). Table 4 shows mean for PROT group in CT total is 25.53 with a standard deviation of 6.82

Table 4 Descriptive Statistic of CT skills (combination of MaCT and MiCT) Score in PROT oup

		N	Mean	SD
MaCT	PROT	60	18.25	6.44
MiCT		60	5.30	2.37
CT total		60	25.53	6.82

Table 5 shows that mean score showed for the active students in PROT group (N=32) is 22.70 with a standard deviation of 7.07. The reflective students in the same group scored a mean of 24.50 with a standard deviation of 6.52. Table 6 also shows the MANOVA result on the CT skill (scores) of active students and reflective students in PROT group. It reveals that there is no significant difference between active and reflective students in PROT group in their CT skills (the mean difference = -1.66, p=.268). Therefore, the finding has accepted H₀₁. Although there is no significant difference, the active students in PROT group has indicated a slightly better CT skills than the reflective students from the same group.

Table 5 Summary of MANOVA on CT skills among PROT ACTIVE Students and PROT REFLECTIVE students

	N	Mean	SD	F-value	p-value
PROT REFLECTIVE	28	24.50	6.52	7.86	.000*
SROT REFLECTIVE	29	16.60	4.66		

Table 6 shows that active students in PROT group (N=32) scored a mean of 22.70 with a standard deviation of 7.07, while the active students in the SROT group (N= 31) scored a mean of 16.40 with a standard deviation of 3.97. The MANOVA result indicate that there is a significant difference between active students in the PROT group and active students in the SROT group in their CT skills (the mean difference = 6.40, p = .000). Thus, the finding has rejected H₀₂. The descriptive statistic shows that the active students in PROT group have indicated higher CT skills than the active students in SROT group.

Table 6 Summary of MANOVA on CT skills among active Students in PROT and SROT groups

Group	N	Mean	SD	F-value	p-value
ACTIVE	32	22.70	7.07	-1.66	.268
REFLECTIVE	28	24.50	6.52		

Note: * denotes significance at $p < 0.05$ level

Table 7 Summary of MANOVA on CT skills among PROT REFLECTIVE Students and SROT REFLECTIVE students

	N	Mean	SD	F-value	p-value
PROTACTIVE	32	22.70	7.07	6.40	.000*
SROTACTIVE	31	16.40	3.97		

Note: * denotes significance at $p < 0.05$ level

Table 7 indicate that the reflective students in PROT group (N=28) scored a mean of 24.50 with a standard deviation 6.52. Meanwhile the reflective students in SROT group (N=29) scored a mean of 16.60 with a standard deviation 4.66. As illustrated in Table 4.19, the MANOVA result revealed that there is significant difference between reflective students in PROT group and those in SROT group in CT skills (the mean difference = 7.86, $p = .000$). Therefore, the third hypothesis of this study was rejected. The reflective students in PROT group have indicated significantly higher CT skills (scores) compare to the reflective students in SROT group.

This study found that students under the guidance of PROT have contributed slightly more inputs in the wiki environment compare to students' under SROT . Consequently, due to this intensity, students under PROT were devoted their efforts to give reasons and evaluating evidence, exploring implication and consequences, compare and contrast ideas and think precisely about thinking. They evaluate issues by arguments, analyzing arguments, making interdisciplinary connection (giving logical sequence), clarify issues (elaborate issues discussed), and generate solutions, refining generalizations (remove defects / identify mistakes).

5.0 CONCLUSION

Online learning now days is being widely used in our education system. As General Study's subject is an ill-structured domain in that it includes a wide range of knowledge disciplines, students are encouraged to collaborate and cooperate among themselves to learn this subject in a meaningful manner. Pbwiki online learning environment is one such platform whereby the learners can work together to resolve the assigned task in General Studies.

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