The Effectiveness of Pedagogical Role Online Teachers' on Students with Difference Learning Style in Their Critical Thinking Using Pbwiki On-Line Learning

Mohan Rathakrishnan

School of Language, Civilization and Philosophy
Universiti Utara Malaysia, Sintok, Kedah, Malaysia
*Corresponding Author Email: rmohan@uum.edu.my

Abstract

Online learning integrates collaborative learning among students of all level. By using Pbwiki web site, students can create, add, remove and edit content in hypertext quickly and easily. In this paper, a study on the students' different learning style and critical thinking skill conducted to examine the effectiveness of pedagogical roles online teachers' in General Paper essay writing. The students' learning style (active or reflective learning style) is the moderating variable that was investigated to identify whether PBwiki online learning influence their critical thinking in essay writing. A total of 80 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 Silverman (1988) instrument was used to measure the moderating variable [1]. Paul's (1993) model was used to analyze student's critical thinking in online General Studies essay writing [2]. The findings show 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. Introduction

The National Education Blueprint 2006-2010 and 2015-2025 in Malaysia, stated that students in all level are encouraged to use Information and communication technology (ICT) in education. Students have to integrate their thinking skills to understand cognitive strategies in solving education problem by using ICT or e-learning.

A student should have self-directed thinking to exemplify thinking appropriate to a particular mode or domain of thinking [3]. Learning online can be affective when the facilitator or moderator knows how to deal with the primary style of learning [4]. He has argued that the key effectiveness of certain learning depends on teachers when they teach using high quality material. Anderson [5] explains that learners can interact directly with the content that they learn through the web page. He also mentioned that in e-learning, interaction occurs within a community of inquiry using a variety on web based asynchronous [5]. In the process of learning online according to Anderson, social skills, collaborative learning content and learning styles become common instruments for students to use to engage in effective and effectual studies [5].

For this education purpose, students used Pbwiki to create topics, edit, doing hyperlink, give comment, and study collaboratively. As an online learning tool, Pbwiki allows students to collaborate with their peers and consult their teacher [6]. Every student can become a correspondent on the Internet by using PBwiki as an online web tool. The scope of this paper shows the progress of ICT in education, reveals the pedagogical role online teacher (PROT) who becomes an e-moderator and facilitator. The PROT encourage their students to be critical thinker in conveying their ideas when writing essay. Even though PROT was applied as one of part from a full research, there is a difference between PROT and control group students guided by social role facilitator in their critical thinking and learning style.

2. Objective

The purpose which has been concentrate in this paper is to investigate if there are any differences in students' macro and micro critical thinking skills between active and reflective students who received guidance from pedagogical role online teacher (PROT).

General Paper (GP) is a compulsory subject for Form Six students in Malaysia's education system. Mohan [16] mentioned that Form Six students are relying too much on teachers' notes and examples when writing essay in GP [6]. The desire to write essay in General Study using teachers' materials become a custom to the students without practicing to find out new information from their own reading , searching 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 in Malaysia and internationally. Lack of reading and to think critically in essay writing is one of the reasons why Form Six students could not write a good essay [6]. 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 Seberang Jaya, Penang

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
No. of Students	1	3	1	4	3	4	10	14	**0**	**0**	**0**
%	2.5	7.5	2.5	10	7.5	10	25	35	0	0	0

Total number of student: 40

GP teachers need to help their students to understand the related domain of cognitive, affective and psychomotor in their students' learning process [6]. Therefore Pbwiki online learning was used as predominant way to develop the students' capability to think critically and to write good essay.

3. Literature Review

Chris [7] in her research at Neumann College, United States, concluded that online learning has proved enormously useful in the education system [7]. The development of online learning enhance students' experience and eased the work of teachers. Xiaojing [8], in her research has categorized the PROT as a (i) course designer, (ii) profession-inspirer, (iii) feedback giver and (iv) interaction–facilitator [8]. As a course designer, the PROT designs learning materials, which expands on the information provided in the students online courses. Clark (2004) indicates that evaluative questions promote critical thinking in online discussion by giving opportunities to reflect deeply on the topic [9]. Evaluative questions require higher levels of cognitive thinking and well-prepared conditions to answer the questions [10].

4. 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) and a moderating variable (active or reflective learning style) on one dependent variable (students' critical thinking skills).

A total of 80 students from two high schools in Seberang Jaya, Penang, Malaysia participated in this study, with 40 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 in learning General Studies.

Students are identified as active student or reflective student after they were given the Index of Learning Style Questionnaire (ILSQ) instrument prior to the treatment. A pretest was conducted before the treatment was carried out. It serves to investigate whether there are significant differences in General Study's knowledge among the students prior to the treatment.

The treatment group under PROT used Pbwiki to write essay for four weeks. After four weeks of the treatment, a post-test was given. The students were instructed to write two GS essays within 80-minutes which have similarity with the topic discussed in the Pbwiki. Two judges were appointed to analyzed students' idea and sentences after they have posted in Pbwiki using two types of scoring rubrics micro critical thinking rubric (MiCT) and the macro

critical thinking rubric (MaCT)) as shown in Table 2 and Table 3 respectively. 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.

Table 2. 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 3. Micro Critical Thinking (MiCT) Rubric

Level	MiCT	Score
M_{i1}	Giving reasons and evaluating evidence	4
M_{i2}	Exploring implication and consequences	3
M_{i3}	Comparing and contrasting ideas	2
M_{i4}	Thinking precisely about thinking	1

5. Findings and Discussion

The students pretest score was conducted by using an analysis of variance (ANOVA) to conform the homogeneity in term of their prior knowledge and learning style in GP subjects for the PROT group. The students' critical thinking skills (score) was examine by using multivariate analysis of variance (MANOVA).

In this study, Table 4 shows the mean for PROT group in CT total is 25.53 with a standard deviation of 6.82. For the MaCT score, the treatment group scored a mean of 18.25 (SD = 6.44) and for the MiCT score, the mean score was 5.30 (SD = 2.37).

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

		N	Mean	SD
MaCT	**PROT**	40	18.25	6.44
MiCT		40	5.30	2.37
CT TOTAL		40	25.53	6.82

Table 5. Summary of MANOVA on CT skills among active And Reflective Students in PROT groups

	N	Mean	SD	F-value	p-value
PROT ACTIVE	22	22.70	7.07	6.40	.000*
CONTROL GROUP ACTIVE	21	16.40	3.97		

Table 5 shows the mean score for the active students under PROT (N=22) 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. 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 that there is no significant difference between active and reflective students, however the active students in PROT group

has indicated a slightly better CT skills than the reflective students from the same group.

Table 6 shows that active students in PROT group (N=22) scored a mean of 22.70 with a standard deviation of 7.07, while the active students in the control group (N= 21) 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 control group in their CT skills (the mean difference = 6.40, p = .000). The descriptive statistic shows that the active students in PROT group have indicated higher CT skills than the active students in control group.

Table 6. Summary of MANOVA on CT skills among PROT ACTIVE Students and Control Group students

Group	N	Mean	SD	F-value	p-value
ACTIVE	22	22.70	7.07	-1.66	.268
REFLECTIVE	18	24.50	6.52		

Note: * denotes significance at p < 0.05 level

Table 7. Summary of MANOVA on CT skills among PROT   and Control group REFLECTIVE Students

	N	Mean	SD	F-value	p-value
PROT REFLECTIVE	18	24.50	6.52	7.86	.000*
CONTROL GROUP REFLECTIVE	19	16.60	4.66		

Note: * denotes significance at p < 0.05 level

Table 7 indicate that the reflective students in PROT group (N=18) scored a mean of 24.50 with a standard deviation 6.52. Meanwhile the reflective students in control group (N=19) scored a mean of 16.60 with a standard deviation 4.66. The MANOVA result revealed that there is significant difference between reflective students in PROT group and those in control group in CT skills (the mean difference = 7.86, p= .000). However, the reflective students in PROT group have indicated significantly higher CT skills (scores) compare to the reflective students in control group.

This study found that students under the guidance of PROT have contributed slightly more inputs in the wiki environment, exposed in knowledge sharing through discussion and providing feedback compare to students under social role facilitator. The students under PROT were devoted their efforts to give reasons and evaluating evidence, think precisely about thinking [11]. This research finding supported Xiaojing [8] and Christine [12] who expressed that students under PROT are exposed in knowledge sharing through discussion, providing feedback and does as many references from relevant resource for writing performance [12]. This result also supports the findings by Walker [17] and Lipman [14], who mentioned that critical thinking student would have sensitivity to the context of learning, reliance on criteria and indulge in self-correction [13][14].

6. 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 [15].

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