Students Critical Thinking Toward Environmental Issues: An Analysis on Students' Arguments

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Abstract. Environmental issues have attracted many attentions of the scholars and practitioners. One of the urgencies is incorporating environmental issues in education to raise the young generation awareness. One of the skills that is vital to raise student's awareness on environmental issues is the critical thinking, it helps the students to evaluate argument and propose an innovating solution to overcome environmental challenges. This research reported the quality of students' arguments on environmental topic in small group discussion. Content analysis applied to analyze the students' argument quality based on 10 critical thinking quality namely relevance, importance, novelty, bringing outside knowledge, justification, critical assessment, linking ideas, resolving ambiguity, practical utility and focus of the discussion. Among 10 categories, novelty quality is less found in the students' arguments. This research discusses the possible link and potential of each category to cater students critical thinking in relation to the environmental issues.

Keywords: critical thinking · arguments · environmental issues

1 Introduction

Environmental conditions across the globe continue to deteriorate at an alarming pace due to a complex web of social-ecological challenges including, but not limited to, climate change, air and water pollution, ocean acidification, land degradation, and biodiversity loss [1]. Environmental issue has attracted educator to take action as the issues of environmental devastation become more visible and apparent. The environmental awareness needs to be infiltered as early as possible to teach the young generation to care the environment better than us. Nature-based early childhood programs, for example, can provide direct, nature-rich experiences with a range of objectives, including developing basic appreciation for the natural world [2]. Environmental education is then viewed as the favorable pathway to preserve our environment by educating children as early as possible to appreciate and care for nature.

In promoting environmental awareness, writing is a tool to giving the perceptions of the conditions. Writing gives expression to stimulates the learners, in hoping those who are reading that they trying to critical thinking and without hesitation to deliver

their written argument [3]. Responding the environmental issues lead to the pedagogical important, such as: apply, analysis, syntheses and evaluate the conceptual [4].Through the writing process, the learners are able to generate the potential of environmental issues. Many researchers have shown the potential writing as supporting the environmental fields. Meyer and Munson [5] gives some evidences that their participants were persuaded to be more expressions when they were deeply enjoyed the assignment, personalized the content, and also believes on participant's knowledge by conducting the writing as projects. Taffs and Holt [6] investigated the students by using ICT to supporting academic writing incorporating in environmental studies. The results show that students were enjoyed the writing tasks using e-learning and also had experienced in science discipline. Moreover, the study also gives others perspectives on how the students had sequences resources in writing and using their understanding within emerged to literature review. Ahmed and Asraf [7] elaborated between critical thinking and writing for engineering field. The results have shown that the participants were active throughout the condition or workshop writing. In teaching writing, there is no boundaries to be addressed of written area [8] instead some transformations in learning are scaled the sociocognitive approach. Yamin, Palupi and Aulia [9] has shown critical thinking in supporting the ecological education. They showed that awareness of environment issues improved the student's ability and more adaptable for ecological contribution.

In prior to writing, critical thinking supports the way author made perception. Mehta and Al-Mahrooqi [10] proved critical thinking can be taught. As the result, the participants have significantly to have revising skill and find a chance upgrading in order to respond class discussion. Kumar and Refaei [11] studied between critical thinking and project-based learning in written area. The respond among the students were negative, even though their writing had been improved by assisting the PBL.

One of the ways to cater the awareness of environmental issues is raising the critical thinking of the young generation. Critical thinking is the ability of someone to evaluate a judgment critically and scientifically. The critical thinking helps the students to evaluate the environmental issues critically and innovatively. Therefore, incorporating critical thinking to raise the awareness of the students toward the environmental issues is crucial in order to equip young generation with environmental awareness as an effort to keep the life more sustainable. This research highlights the stance of the students critical thinking toward the environmental issues.

2   Method

The research conducted qualitative strategies to analyze the argumentative writing. The participants of this research are the Indonesian English learners who attended English Critical Reading classes. There is total 77 students participated in the class that consists of 17 males and 60 females (as seen in Table 2). The students were asked to listen to a speech by Greta Thunberg speech entitled *the disarming case to act right now on climate change* and they are asked to respond the speech. The discussion was led by 1 facilitator and the students implemented Nominal Group Techniques to finally map the most agreed arguments by the students (Table 1).

Table 1. Participants Demographic

Categories	Frequency	Percentages (%)
Classes		
A	25	32,467
B	27	35,064
D	25	32.467
Gender		
Males	17	22,077
Females	60	77,922
Total	77	100.0

Table 2. The Category of Critical Thinking

Category	Coding	Definition
Relevance (R)	R+	Relevant Statements
	R−	Irrelevant Statements
Importance (I)	I+	Important Points/Issues
	I−	Unimportant, trivial points/issues
Novelty (N)	NP+	New problem-related information
	NP−	Repeating what has been said
	NI+	New ideas for discussion
	NI−	False or trivial leads
	NS+	New solutions to problems
	NS−	Accepting first offered solution
	NQ+	Welcoming new ideas
	NQ−	Squashing, putting down new idea
Bringing Outside Knowledge (BoK)	OE+	Drawing on personal experience
	OC+	Refer to course material
	OM+	Use relevant outside material
	OK+	Evidence of using previous knowledge
	OP+	Course-related problems brought in
	OQ+	Welcoming outside knowledge
	OQ−	Squashing attempts to bring in outside knowledge

Table 2. (*continued*)

Category	Coding	Definition
	O−	Sticking to prejudice or assumptions
Justification (J)	JP+	Providing proof or examples
	JS+	Justifying solutions or judgments
	JSA+	Setting out advantages or disadvantages of situation or solution
	JP−	Irrelevant or obscuring questions or examples
	JS−	Offering judgments or solutions without explanations or justification
	JSA−	Offering several solutions without suggestion which is the most appropriate
Critical Assessment (CA)	C+	Critical assessment/evaluation of own or others' contributions
	C−	Uncritical acceptance or unreasoned rejection
Linking Ideas (LI)	LI+	Linking facts, ideas and notions
	LI−	Repeating information without making inferences or offering an interpretation
	LO+	Generating new data from information collected
	LO−	Stating that one shares the ideas or opinions stated, without taking these further or adding personal comments
Resolving Ambiguity (RA)	AC+	Clear, unambiguous statements
	AC−	Confused statements
	A+	Discuss ambiguities to clear them up
	A−	Continue to ignore ambiguities
Practical Utility (PU)	P+	Relate possible solutions to familiar situations
	PA+	Discuss practical utility of new ideas
	P−	Discuss in a vacuum
	PA−	Suggest practical implications
Focus of the discussion (FD)	F+	Focused, in-depth contribution
	F−	Open, general contribution

Content analysis was applied based on the critical thinking framework proposed by Umar and Ahmad [10] that consist of 10 categories of Critical Thinking namely relevance, importance, novelty, outside knowledge, ambiguities, linking ideas, justification, critical assessment, practical utility and width of the discussion. The data analysis was done by assessing the students' arguments based on the 10 categories of Critical thinking as shown in Table 2 by marking (+) if the argument meets the category and (−) for the otherwise. After coding the data based on the rubric developed from 10 category of critical thinking [12] the scored arguments is calculated to see the emerging critical categories in students arguments.

3   Results and Discussion

Based on the calculation, there are 158 arguments found in the students' discussion results. All of the arguments were assessed by the 10 categories of critical thinking, whether they have the quality of the critical thinking category or not. The arguments that have the critical thinking categories were marked positive (+) while the otherwise were marked negative (−). As shown by Table 3, the two most found category found in students' argument are relevance and importance with the number of positive arguments reached 158 argument, it means that all of the argument contain the relevance and importance quality. Meanwhile, the least quality found in student argument is novelty with positive argument amounted only 68 compared to negative one amounted 90. The critical assessment and resolving category were also found as the second most with the number of 155 positive arguments followed by focus of discussion category amounted 142 positive arguments. The next critical thinking quality found in students' argument was bringing outside knowledge with 139 positive arguments. Argument with justification quality was also found amounted 130 arguments followed by linking ideas category amounted to 111 positive arguments. Last but not least, the students' positive arguments on practical utility reach 109.

Table 3. The Critical Thinking Category found in Students Arguments

Critical Thinking Categories	Total Arguments	
	158	
	(+)	(−)
Relevance	158	0
Importance	158	0
Novelty	**68**	**90**
Bringing Outside Knowledge	139	19
Justification	130	28
Critical Assessment	155	3
Linking Ideas (LI)	111	47
Resolving Ambiguity (RA)	155	3
Practical Utility (PU)	109	49
Focus of the Discussion (FD)	142	16

4 Conclusion

One of the qualities of the critical thinking that should be encouraged to be mastered by the students is novelty. As the young generation that hold the future life, the students should be able to propose novel way in approaching environmental issues, therefore they need to develop the novelty quality of critical thinking to be able to address the environmental challenges. This research suggests to instil the critical environmental materials in the educational practices to attract students' awareness and commitment in supporting environmental sustainability. Some proposed ways to invites students critical thinking in terms of novelty in environmental issues is exposing them with the cases and situation that requires a multidiscipline solution, by having perspectives on various disciplines, it would invite students' ability to think critically on novel ways solving environmental problems.

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