Investigation of university students' critical thinking in debate: Justification for the "AREL" argumentation process

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This qualitative research investigated students' critical thinking in a debate group at a university level. It involved six students who performed a debate that used the Asian Parliamentary System. Data on students' critical thinking were collected by using field notes and video recording. Content analysis was employed to analyze the data focusing on the use of argument traits of the AREL model. The traits consist of Assertian, Reasoning, Evidence, and Link Back (AREL). Moreover, a self-evaluation questionnaire was distributed to triangulate the students' critical thinking levels. It was found that students' critical thinking level was mostly below average. Four out of six students did not meet the score which is the threshold level of a high-level debater. Most of their argument traits consist of Assertion (A), Reasoning (R), and Evidence (E), leaving Link back (L) traits untouched. Interestingly, this research revealed a new finding. Many of the students used a multi-layer structure of argumentation. In practice, they occasionally used Assertions with more than one Reasoning and more than one Evidence.

Keywords: AREL, argumentation process, argument trait, critical thinking, speaking, debate

INTRODUCTION

In the 21st century, the teaching of critical thinking is massively and frequently used, especially in English Language Teaching at universities (Bezanilla, et.al, 2019; Saleh, 2019; Pravita & Kuswandono, 2021). In accordance with the use of critical thinking at the university level, the implementation of critical thinking is used in the productive skill, namely speaking (Muhammadiyeva, et.al, 2020; Nangimah, 2020; Chen, 2021). One of the most effective and impactful activities of speaking to improve critical thinking is debating as it may cover multiple issues and the way students make arguments (Zhou, Zhang, & Yang, 2018; Wahyuni, et.al, 2019; Tao & Griffith, 2020; Tiasadi, 2020). The practice of debating to improve critical thinking is also conducted at Universitas Negeri Surabaya. It is reflected in one of the speaking courses, namely speaking for debate, and a student activity unit at the university level, namely UNESA debating union. In the informal class, a student activity unit plays a significant role in improving students' critical thinking as it has more sustainable schedule for practicing, invites an expert in debating, and allows the students to join multiple debating competitions. Thus, this study focuses more on the informal class of debate by investigating the critical thinking of the students through a debate activity they have.

In some studies, the way to improve critical thinking is explained, such as using debate-based learning which improved the post-test score of debating by 11.9 percent (Narmaditya & Omar, 2019).

This previous study focused on the treatment of how the students may fulfill criteria of critical thinking such as providing a solution, explaining an argument, stating problems, and giving relevant answers or ideas by giving several facts through debate activity. Another study conducted by Walker & Kettler (2020) examined that argument analysis in the debate can be an indicator of critical thinking levels, such as identifying components of arguments, namely Claims, Reasons, Evidence which is given by the teacher or instructor. The more students recognize the components, the more the critical thinking of the students increases. The next study used a method allowing the students to challenge the question of examination (Brown, Beeber, & Boylan, 2021). This previous study focused on the question raised by the students during the exam which leads to a constructive debate with the examiner. This allows them to be more critical with the standard of examination given. For the above reasons, those previous studies still have some drawbacks. Firstly, they do not give a complete analysis of what elements of the debate are related to critical thinking. Secondly, even though one of the studies mentioned the elements of argument, it does not give an example of how the argument components look like as well as it does not reflect the students work purely, but rather the teacher's or instructor's arguments. Thus, this study investigates what components of the debate are reflected to be the indicators of critical thinking.

In principle, critical thinking is a process that involves logical and structural thinking. Fisher (2001), Cottrell (2005), and Bassham, Irwin, Nardone, & Wallace (2007) explained that critical thinking involves identifying arguments, evaluating and weighing up the evidence, drawing conclusions, and presenting a point of view. By this definition, critical thinking can be reflected by the process of argumentation in a debate that mainly focuses on the fulfillment of argument traits. She identified that argument traits cover introduction of issues, description, explanation, and conclusion.

To implement critical thinking processes, argumentation is needed. Argumentation has a number of steps. The widely used steps of argumentation in debate context include Assertion, Reasoning, Evidence, and Link Back (AREL) (Nirwana & Kurniawati, 2018). These traits (AREL) are a parameter for an individual to fulfill when he/she is trying to imply his/her critical thinking. The logic built in each argument should fulfill those traits. Some research studies show that the use of AREL could improve students' speaking performance. For example, Nirwana and Kurniawati (2018) found that the use of AREL enhanced students' speaking performance. However, their research does not provide a clear explanation on the process of AREL in the students' speaking performance. More particularly, the analysis of AREL in each argument was not well exposed. Rahmawati and Syafiq (2017) also found that the use of AREL affected students' speaking performance; however, they did not explain clearly how AREL was implemented in argumentation process.

Some literature reveals that a number of authors proposed models of argumentation process with different terms for the steps. The first model of argumentation consists only of "demand" and "support" (Johnson, 1968). This model is the simplest and earliest argument model. An assertion in this model is probably a statement that is not yet true. This statement may be considered personal and irrelevant. To make the claim more convincing, support is added to it. Support in this model includes examples or evidence to support a claim. In addition, one claim does not have to include only one supplement, but several can be added depending on the basis of the support. Another model used is A-R-E, which stands for Argument, Reasoning and Evidence (Meany and Shuster, 2003). An argument covers the belief of the arguer. This is similar to the previous argumentation pattern, which consists only of a statement that has not yet been proven. The statement is explained or developed later using reasoning. Arguments in this model include additional information about the claim. It can be cause and effect type, analogy, logical meaning and many more. In the previous model, there is no rationale to support the claim. However, both models have evidence or support to prove a statement or claim. The next is Toulmin (2003) who stated that the traits of argument consist of data, warrant, qualifiers, rebuttal, and claim. This model explains the steps on how to achieve complete and good logic so that critical thinking can be achieved. Data deals with the issue raised. It is the claim that the speaker makes. To elaborate the data, warrant is made. It deals with the reasons and further explanations needed to make the data clear and convincing. In this model, the qualifier is introduced. It is the external idea coming from those who try to counter the idea. Then, Toulmin (2003) introduced rebuttals to give a response to the counter statement. The final result of this process of argumentation is called claim. Besides, Quinn (2005) also proposes argument traits which consist of label, explanation, examples, and tie-back. The label in his model is a form of simple statement which is not essentially true. It is the title to be addressed and developed later. Explanation is the elaboration of the label. It consists of information which proves that the label is true. The label can be explained by answering how and why. The next step is to give examples. To convince the third party, example should be actual and true in real world. As the last step, tie-back should be made. Thus, it is not enough to say only about the elaboration and the examples. To logically link the label, explanation, and examples is the aim of this step.

The two basic argument traits are also supported by JDF (2014) that stated that both argument and rebuttal consist of Assertion, Reasoning, Evidence, and Link-back. Assertion is similar to that of label and data. Reasoning is similar to explanation and warrant. Evidence is also similar to example and the link-back is similar to tie-back. Even though AREL is similar to those two, it is more comprehensive. This is because AREL can cover both argument and response. In making argumentation, the main consideration is not only on the side proposed, but also on the counter argument.

Two basic responses are clarification and rebuttal. Quinn (2005) also provides response, yet it is separated. He explained about how to challenge a definition of a motion or topic, respond to an insignificant argument and to even if argument.

This model is also used in National University Debating Championship (NUDC). To implement the argumentation, a system of debate is used. It can be either British Parliamentary (BP) or Asian Parliamentary (AP) system. These two systems determine the role of the speakers whether they should bring argument only or with responses. In the BP system, there are two speakers in a team while in the AP system, there are three speakers. Rahmawati and Syafiq (2017) used the British Parliamentary system for their research due to the fact that their subjects were university students. Another research coming from Agustina and Bahrani (2016) also used British Parliamentary System in the university context.

From all the explanation above, there is still a gap. The gap is no certain model to represent the critical thinking of the students. Therefore, this research focuses on the argumentation process in depth. AREL which consists of Assertion (A), Reasoning (R), Evidence (E), and Link back (L) will be analyzed from the arguments. This research wants to find out (1) to what extent AREL is developed in the process of argumentation and (2) the students' critical thinking skill.

METHODS

The design used in this research was qualitative to figure out the element of critical thinking represented by Assertion, Reasoning, Evidence, and Link Back (AREL) in the argumentation process delivered during the debate. To investigate students' critical thinking, a content analysis was employed to find out the argument traits represented by the students during debate simulation. Moreover, to ensure the understanding of critical thinking represented by the argumentation process, the questionnaire adopted from Cottrell (2005) containing statements of understanding in critical thinking as self-evaluation was distributed to the debaters. This questionnaire is important as a triangulation of the argumentation process which represents critical thinking. The higher the score of self-evaluation, the better the critical thinking of the students is.

This research aimed to examine the critical thinking in the argumentation process made by students of the English Debate Society in the Debating Union of Universitas Negeri Surabaya (UNESA), Indonesia. The participants consisted of six students coming from different majors who were already exposed to debating practices. They understand the concept of motion, the role of speakers, and the debating system. For the purpose of the research, the six students were assigned to perform a debate simulation. The motion given to them was "This House, as mental health activists, would actively oppose the rising trend of the medicalization of mental health problems". The students were given 30 minutes of case-building before the debate performance.

Data on critical thinking were derived from the debate that the students perform. The debate used the Asian Parliamentary system and the students were divided into two teams: the government and the opposition teams. Each speaker played the role as Prime Minister (the first speaker), Deputy Prime Minister (the second speaker), and Government Whip (the third speaker) in government team. The other speakers played as Leader of Opposition (the first speaker), Deputy Leader of Opposition (the second speaker), and Opposition Whip (the third speaker) in opposition team. The role of the speakers is shown in Figure 1.
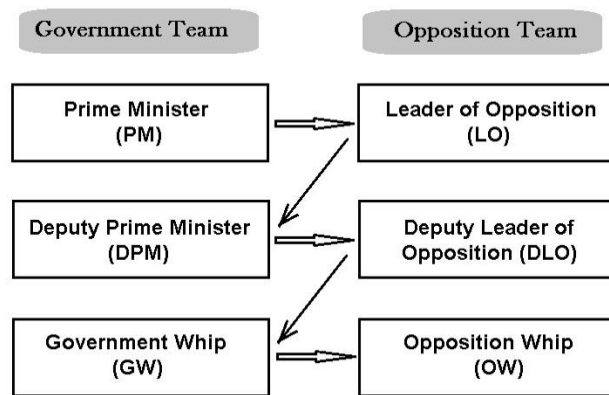
FIGURE 1 | Role of Speakers in Debate

As illustrated in the figure, the debate started from the first speaker of the government team or the Prime Minister (PM). Then, it was continued to the first speaker of the opposition team or the Leader of Opposition (LO). After that, the debate was continued by the second speaker of the government team or DPM, the second speaker of the opposition team or DLO, and the third speaker of the government team (GW). The last speaker performing the debate was the third speaker of the opposition team or the Opposition Whip. The duration for the speech for each speaker was 7 minutes.

Data of the argumentation process which shows the students' critical thinking were collected by using two different instruments. The first instrument was a camera which was used to record the debate performance. Before beginning the performance, a motion was decided. The motion had been given right before the debate performance began. In other words, the motion was an impromptu motion. Due to the fact that the students were not allowed to use any electronic devices to search for information and purely use their prior knowledge, the type of motion used was usually in a form of philosophical motion. This type of motion emphasizes the basic principles that are commonly used and the examples are relatively a lot.

The other instrument was a self-evaluation questionnaire of critical thinking which was used to measure the students' level of critical thinking. For this purpose, a self-evaluation questionnaire proposed by Cottrell (2005) was adopted in this research (see Appendix A). The questionnaire has 25 statements that the students have to respond by choosing four options varying from strongly agree, agree, disagree to

strongly disagree. The options in the Likert-scale items were given scores according to the level of agreement, namely 4 for strongly agree, 3 for agree, 3 for disagree, and 1 for strongly disagree. Thus, the maximum possible score is 100 while the minimum possible score is 25. The questionnaire was distributed after the debate was conducted.

After all of the data were collected, the data were analyzed. The first data was in the form of a video with the transcription of the argumentation process. The content of the transcript was broken down into AREL structure. The analysis was based on the criterion that the more the participants use argument traits of AREL, the better their critical thinking is. A high level of critical thinking is reflected in the achievement of the score of 75 or more, while a low level of critical thinking is indicated by the score below 75.

RESULTS AND DISCUSSION

The results of the study are presented on the basis of the order of the issues raised in the research questions, which include: The level of students' critical thinking, the extent AREL is developed in the argumentation process, and how AREL achieved the goal of critical thinking.

The Extent AREL is Developed in the Argumentation Process

There were two kinds of argumentation in the debate. The first is the argument supporting the current position and the second one is refuting the opponent's argument. The total number of the arguments delivered by the debaters varied from two to three main arguments. The number of the argument for each role of the debaters is shown in Table 1.

TABLE 1 | The number of arguments of each role of the debaters

No	Role of the Debaters	Number of Argument
1	The Prime Minister (PM)	2
2	The Deputy Prime Minister (DPM)	3
3	The Government Whip (GW)	3
4	The Leader of Opposition (LO)	2
5	The Deputy Leader of Opposition (DLO)	2
6	The Opposition Whip (OW)	2

The result of the research showed that the PM's arguments have ARE and AR traits. The argument trains are shown in Table 2.

In these two arguments, mostly the assertion or the title of the arguments used is in a form of questions. This informative question is believed as a trigger for them to answer and elaborate on many perspectives. The first argument is quite unique. It is due to the fact that under the same assertion, the debater can give two different reasonings and evidence. The first reason and evidence are to prove that mental health people have psychological problems so the approach needed should be in a form of psychology.

However, the second reason and evidence talk about the current condition which is not effective while giving medical treatment. One assertion with multiple reasoning and evidence can be classified into multi-layer argument types. This is a derived model from AREL traits which normally consist of one assertion, reasoning, and evidence. This finding shows that one assertion can be followed by two or more different reasoning.

The second argument consists of assertion and reasoning only. Unlike the first argument, the second argument only has one assertion and one reasoning without any evidence. The air time to explain this argument during the performance is relatively short since the debater is running out of time. In conclusion, the arguments from PM indicate that AREL traits are not well fulfilled. The Link Back is not used by the debater.

TABLE 2 | The Argument Traits of the PM

Argument No	Trait	Utterance
1	A	*Why is it justifiable to give non-medicalization for mental health people?*
	R^1	*The problem of mental health people is in their psychology. They are traumatic and depressed. The best accommodation for them is behavioral or psychological treatment.*
	E^1	*Psychologists and religious figures will give advice and suggestion.*
	R^2	*Status Quo does not work. Giving medicine will only give a temporary benefit, but it does not solve the main reason why the person gets such problem. Sometimes, the problem is rooted and unable to forget.*
	E^2	*NSC does not provide medicalization.*
2	A	*What is the impact of giving non-medicalization?*
	R	*They will get much advice for living and solving their life problems.*

Another result of the research showed that the LO delivered two arguments during the debate performance. LO's arguments are shown in Table 3.

The LO has two main arguments with different traits. The first one is an argument to respond to the PM. This is called rebuttal. Unlike an ordinary argument, a rebuttal starts with the assertion by addressing and concluding the point of the opponent team. The form, therefore, is in a form of a statement. The reasoning given by the debater is in the form of negation. In other words, the LO negates the statement of the PM. Unfortunately, the LO does not provide further traits. The evidence is not clearly explained.

The second argument of the LO is quite unique and similar to what the PM has in one of his arguments. This argument has one assertion and three reasonings. However, there is only one of them which is followed by evidence. It is

the first reasoning followed by evidence and the rest of the reasonings are just not elaborated and supported with strong evidence. It can be concluded that the LO has a similar problem as the PM. Some traits are not well elaborated, such as evidence and link back. There are some rooms for improvement that can be filled due to the time provided for the performance is still available.

TABLE 3 | The Argument Traits of the LO

Argument No	Trait	Utterance
1 (Rebuttal)	A	*The government team says that medicine won't help mental health patients.*
	R	*No, the medicine helps the patients psychologically. They have peace of mind after consuming the medicine. Moreover, not all people are able to identify the reasons why they are depressed, but at least medicine can help.*
2	A	*Why is it okay to do medicalization?*
	R^1	*the characteristic of mental health patients is they need support in form of medicine.*
	E	*Bipolar, schizophrenia, and insomnia cannot be handled by using psychological treatment. Medicine will calm them down.*
	R^2	*as mental health activists, they are willing to show the best way to cure mental health problems. If they limit the medicalization, the probability to cure the patients is also limited.*
	R^3	*The medicine will not make them addicted since the dose is correctly given.*

The third arguments were provided by the DPM. There were three arguments one of which is a rebuttal and the rests are the arguments supporting the government bench. The arguments are shown in Table 4.

The DPM is the first debater providing more than two arguments in the debate. She provides one rebuttal as it counters the opponent's case and two extensions as it expands the team she defends. Her rebuttal consists of multi-layer argument which can be identified as ARE (Assertion, Reasoning, and Evidence) traits in the first layer and AR (Assertion and Reasoning) traits in the second layer.

The second and third arguments stand as normal argument traits since the second argument consists of ARE traits and the last one AR traits. The rebuttal in her speech is different from the previous debater. She uses a multi-layer argument as it usually appears in the normal argument. However, she still has inconsistencies similar to the previous speakers. Some arguments show ARE traits and other shows

AR traits only. However, the term she mentions to address arguments supporting her team's case is an extension. It shows her tendency to expand and the way she provided the argument differed from the PM.

TABLE 4 | The Argument Traits of the DPM

Argument No	Trait	Utterance
1 (Rebuttal)	A	*The opposition may say that medicine can help to cure the issue.*
	R^1	*Medicine is not the best. It only helps the patients temporarily but does not erase the main reasons why they get depressed or have such problems. Psychological treatment is better since we will identify the root or source of the problem. The psychologist will give them advice on how to reduce it.*
	E	*Friends will be willing to accompany. They will talk more often.*
	R^2	*Each patient has different symptoms and sources of the problem. Thus, they need different suggestions and treatment from the psychologist.*
2	A	*Medicine will label mental health patients*
	R	*They are labeled as someone who is different as they are mentally unstable so people reject them.*
	E	*They are not accepted or fired from their job.*
3	A	*This is the responsibility of mental health activists*
	R	*There will be more progressive campaigns from them. They will socialize on how to handle a mental health issue or problem. They will send a narrative that people's contribution can be significant as they care to mental health patients. Their fear is due to a lack of awareness on how to treat mental health patients*

The next speaker is the Deputy Leader of Opposition (DLO). The role of DLO is similar to the DPM. This speaker ideally should bring rebuttals and extensions. However, the argument provided by the DLO did not provide rebuttal as she intended to integrate the response toward the opponent's case in her two main arguments. The argument traits of the DLO are shown in Table 5.

The first and second arguments provided by the DLO were in the forms of ARE. This speaker provided better argument traits and she could be consistent in making the arguments. However, unlike the DPM, the DLO had a similar content of argument as what has been explained by the LO although the explanation shares different sentences or utterances.

TABLE 5 | The Argument Traits of the DLO

Argument No	Trait	Utterance
1	A	*why should we use medicine?*
	R	*They are unstable due to chemical instability in their brain.*
	E	*Marshanda has bipolar syndrome. She took medication to calm her down. It is so much helping.*
2	A	*Why psychological treatment cannot solve the issue?*
	R	*Stigma of mental health problem which cannot be cured will be more dominant as the psychological treatment takes a long time. People will still be afraid and avoid them.*
	E	*Those who are depressed should be given anti-depressant in order to control their thought and behavior.*

The last speaker in the government team was the whip speaker whose role was to provide rebuttal without presenting new arguments. The GW provided three consistent argument traits. The three arguments constitute ARE traits and are packed in the forms of rebuttal. The GW's argument traits are shown in Table 6.

TABLE 6 | The Argument Traits of the GW

Argument No	Trait	Utterance
1 (Rebuttal)	A	*Opposition says that medicine is important*
	R	*No, it is bad. They will put the patients in a difficult situation and make their conditions worse. Moreover, they will be addicted to the drugs given. In our case, they will be treated normally like other people.*
	E	*They will be screaming if they are not given the drugs. They will think that psychological treatment will not work as they quickly get the impact of the medicine.*
2 (Rebuttal)	A	*Which proposal can heal the patients?*
	R	*psychological treatment is better for healing the patients. It is because they need attention from their surroundings. If the trauma is caused by their surroundings, then people around them should be aware and start caring.*

	E	*There will be an internal discussion between the patients and their surroundings to solve the issue*
3 (Rebuttal)	A	*Which benefit is better?*
	R	*We are better at providing the benefit. Long-term benefits will permanently heal the patients. Short-term benefits will not merely heal the patients entirely.*
	E	*The patients will learn how to control their emotions. They are not afraid of admitting that they are in trouble. As a result, the narrative of frightening mental health patients can be minimized*

The speaker in the opposition team was the OW. Like the GW, OW had rebuttal model of argument to counter the case of the opponent. However, the OW provided two arguments with inconsistent model of argument traits. The first rebuttal consists of ARE traits while the other has AR traits. The argument traits of the OW are shown in Table 7.

TABLE 7 | The Argument Traits of the OW

Argument No	Trait	Utterance
1 (Rebuttal)	A	*Which proposal gives better treatment?*
	R	*Medicine will help them more on stabilizing their emotion. At least, they will be temporarily stable and able to continue their activities*
	E	*They can go to job*
2 (Rebuttal)	A	*Which benefit is better?*
	R	*These people will be treated well by society. In our side, we convey society that we completely cure them. As mental health activist, we consistently do our job.*

From above results, it can be interpreted as follows. There are three speakers that share similar characteristics in their argumentation model. Firstly, Prime Minister's argumentation model does not fully represent AREL model promoted by Quinn (2005) and JDF (2014), but rather closed Meany and Shuster model (2003). From the speech delivered by the debater, PM focuses on one perspective which is why non-medicalization is good for people with mental health issues. He is able to elaborate on the extent of ARE. Quinn (2005) and JDF (2014) suggest in order to diversify the argumentation model, a debater needs to keep asking why and how so that the Reasoning becomes more varied. This first argument is in line with the argumentation model from Meany and Shuster (2003). However, in the context of PM's speech, he is still lacking in the Link Back to give a conclusive statement. Besides the lacking of argument traits, he is able to provide another model of argumentation by adding more layers (Reasoning and Evidence) under the same Assertion.

Secondly, LO's arguments also do not reflect the argumentation model promoted by Quinn (2005) and JDF (2014). However, it is still in line with Meany and Shuster (2003) model. Firstly, it consists of the rebuttal or response which can be categorized into an argument, but it does not fulfill the minimum traits of ARE. Secondly, LO provides multiple layers of argument (Reasoning and Evidence) even though ARE is only fulfilled in the first layer and the rests are not. It can be concluded that the speaker does not reflect the minimum argumentation model, but he is able to add new argument traits. Lastly, DPM also does not reflect the argumentation model of Quinn (2005) and JDF (2014). It is because firstly, the argumentation model is incomplete. The argument traits only fulfill the model from Meany and Shuster (2003). Secondly, the argument traits are not consistently made even though one of the arguments consists of multi-layer type of argument. In all previous model, there is still an argument that consists of AR and does not elaborate the Evidence.

Unlike the previous three speakers who share characteristics of the inconsistent model of argumentation and multi-layer argument traits, the next two speakers share different characteristics. DLO has a complete and consistent argument trait based on Meany and Shuster's (2003) model. Two arguments are perfectly delivered by using ARE model. GW also shares the same characteristics. The argumentation model uses ARE. However, the type of argument is different. While DLO's argument is considered as an extension, GW's argument belongs to rebuttal.

The last speaker is OW who does share both characteristics. The first is the argument is inconsistent. The first argument traits are ARE while the second one is AR. Moreover, those two arguments do not contain multiple layers of arguments so it seems simpler than the other two previous characteristics of the argumentation model.

Students' Critical Thinking Skill
Analysis of the students' critical thinking skill showed that some students reached a high critical thinking level. From six students who responded to the questionnaire, two students had scores above 75. They were the second speaker of the opposition team (87) and the third speaker of the government team (81). The scores of the other four students were below 75. Their scores are 74 (the third speaker of the opposition team), 73 (the first speaker of the government team), 69 (the first speaker of the opposition team), and 59 (the second speaker of the government team) (see Appendix B). Cottrell (2005) mentioned that the lower the score is, the more likely debates need to develop critical thinking skills. A score over 75 suggests that debaters are very confident about their critical thinking ability.

The critical thinking performed through the argumentation model by the debaters shows two facts. The first fact is that those who meet the criteria of understanding critical thinking in the first result can consistently make arguments with assertion, reasoning, and evidence (ARE) traits. The Deputy Leader of Opposition and the Government Whip performed the ARE traits. It can be proven by the performance of the debaters. Those who have a higher score than 75 are the Deputy Leader of Opposition (DLO) and Government Whip (GW). It is because they have

complete argument traits under Meany and Shuster (2003) model. The sequence of ARE traits is the highest argumentation model since the argument's complexity can be fulfilled comprehensively. Evidence can be very significant to give further and clearer explanations as it can illustrate the logic of the argument.

The second fact is that the four debaters who have lower scores in the critical thinking self-evaluation questionnaire were unable to be consistent in making argumentation model. They are Prime Minister (PM), Leader of Opposition (LO), Deputy Prime Minister (DPM), and Opposition Whip. Mostly, they cannot provide evidence in some parts of their argument. It does not support the model of Meany and Shuster (2003) or even Quinn (2005) and JDF (2014). Even though they are able to provide more than one argument or multi-layer argument, the argument traits are still incomplete. The model of argumentation was likely to consist of assertion (A) and reasoning (R) traits. Thus, those four debaters need to develop their critical thinking to improve their argumentation.

CONCLUSION

The research has shown two main things. Firstly, critical thinking is measurable and one of the ways to measure it is by conducting a debate to see their argumentation model. The argumentation process reflects the critical thinking skill possessed by the students. Some of them may manifest critical thinking skill in a form of a good argumentation process so that the AREL traits are achieved. However, some of them still find some difficulties to fulfill AREL traits in the argumentation process as a reflection of critical thinking skills. Moreover, the students who are aware of critical thinking show good consistency in the argumentation process. This is a good indication that critical thinking can make students more consistent and structured in thinking. Secondly, self-assessment of critical thinking done after the debate can give a general evaluation on which part of critical thinking reflected by the argumentation model is not understood yet. Furthermore, it is found that the critical thinking of the students is mostly below average due to the fact they are not exposed to the terms related to critical thinking. Besides, there is a limitation of this study. It did not observe the teaching process of using argumentation model. Further research needs to be conducted to see the process of teaching argumentation model in the formal classroom, either for senior high or for university.

This study provides useful information about argumentation process through AREL model to measure and train students" critical thinking in speaking classroom, especially for debate. This can be a source for teachers in implementing critical thinking in their classroom. As the model is flexible to modify, it opens a chance for teachers to create their own model of argumentation. There should be further research on how to implement AREL argumentation process in different context of speaking or any research related to argumentation process, such as in argumentative writing.

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APPENDICES
Appendix A
QUESTIONNAIRE OF CRITICAL THINKING

Instruction: Read each of the statements carefully. Then, give your response by choosing one of the four options: Strongly Agree (SA), Agree (A), Disagree (D), or Strongly Disagree (SD). Put a tick (V) in the provided space.

(Adopted from Cottrell, 2005)

No.	Statements	SA	A	D	SD
1	I feel comfortable pointing out potential weaknesses in the work of experts				
2	I can remain focused on the exact requirements of an activity				
3	I know the different meanings of the word 'argument' in critical thinking				
4	I can analyze the structure of an argument				
5	I can offer criticism without feeling this makes me a bad person				
6	I know what is meant by a line of reasoning				
7	I am aware of how my current beliefs might prejudice fair consideration of an issue				
8	I am patient in identifying the line of reasoning in an argument				
9	I am good at recognizing the signals used to indicate stages in an argument				
10	I find it easy to separate key points from other material				
11	I am very patient in going over the facts in order to reach an accurate view				
12	I am good at identifying unfair techniques used to persuade readers				
13	I am good at reading between the lines				
14	I find it easy to evaluate the evidence to support a point of view				
15	I usually pay attention to small details				
16	I find it easy to weigh up different points of view fairly				
17	If I am not sure about something, I will research to find out more				
18	I can present my own arguments clearly				
19	I understand how to structure an argument				
20	I can tell descriptive writing from analytical writing				
21	I can spot inconsistencies in an argument easily				
22	I am good at identifying patterns				
23	I am aware of how my own up-bringing might prejudice fair consideration of an issue				
24	I know how to evaluate source materials				
25	I understand why ambiguous language is often used in research papers				

Appendix B

SCORES OF THE STUDENTS' CRITICAL THINKING

Statement No.	PM	DPM	GW	LO	DLO	OW
1	3	3	3	1	1	2
2	3	3	3	4	3	3
3	4	3	4	2	4	3
4	3	3	4	2	4	3
5	4	1	4	2	4	3
6	2	3	4	4	4	4
7	3	3	4	3	3	3
8	3	2	3	3	4	3
9	3	3	3	2	2	3
10	4	2	3	3	3	3
11	3	4	3	4	4	3
12	2	2	3	2	4	4
13	4	3	3	2	4	3
14	3	2	3	2	4	2
15	4	2	3	2	4	3
16	1	2	3	2	2	3
17	3	3	2	4	4	4
18	3	2	3	4	3	2
19	4	2	4	3	4	3
20	2	2	3	3	4	3
21	3	2	3	3	4	3
22	3	2	3	3	4	2
23	1	2	3	2	2	3
24	2	2	4	3	4	3
25	3	1	3	4	4	3
TOTAL	**73**	**59**	**81**	**69**	**87**	**74**