Directed Reading Thinking Activity (DRTA) method and student’s critical thinking level in editing scientific articles

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**ABSTRAK**

Tujuan dari penelitian ini untuk menjelaskan metode DRTA dan tingkat berpikir kritis dalam meningkatkan kemampuan menyunting artikel ilmiah mahasiswa. Penelitian ini merupakan penelitian eksperimental. Berdasarkan analisis data, metode DRTA dapat memengaruhi kemampuan menyunting artikel ilmiah jika bersesuaian dengan tingkat berpikir kritis (tinggi dan rendah). Kemampuan menyunting artikel ilmiah mahasiswa yang memiliki tingkat berpikir kritis tinggi berbeda dengan kemampuan menyunting mahasiswa dengan tingkat berpikir kritis rendah. Mahasiswa dengan tingkat berpikir tinggi yang diberi perlakuan Metode DRTA memiliki perbedaan yang signifikan dengan kemampuan mahasiswa dengan tingkat berpikir kritis rendah. Dilihat dari perolehan nilai, rata-rata nilai kelompok mahasiswa yang belajar dengan metode DRTA dengan tingkat berpikir kritis tinggi sebesar 90,1 dan mahasiswa dengan tingkat berpikir kritis rendah sebesar 79,3.

**ABSTRACT**

The aim of this research is to explain the use of the DRTA method and the level of critical thinking in improving students' ability in editing scientific articles. The method used in this research is experimental research. The result shows that using the DRTA method affected the ability to edit scientific articles if it is in accordance to the students' level of critical thinking (high and low). Learning outcomes of editing scientific articles of students who have high critical thinking scales are different from learning outcomes of editing scientific articles of students who have low level of critical thinking. Students who were treated with the DRTA Method had higher level of critical thinking and had significant differences from those who had low levels of critical thinking. The acquisition of the average score showed the students who studied with the DRTA method and had a high critical thinking level are 90.1, while the score of the students who had a low critical thinking level are 79.3.

**Introduction**

Every scientific article that will be published must go through an editing process. When an article is edited, it is not immediately published. Not infrequently, an edited article must be returned to the author for changes. The purpose of editing scientific articles is that the ideas in the article can be understood by readers in accordance with what is intended by the author.

To be easily understood, it requires a consistent arrangement and use of language rules. Understanding of linguistic aspects is the main competency that an editor needs to have. Due to the lack of mastery of linguistic aspects, the editing of scientific articles is not optimal. Research conducted by Liah (2016) shows that some articles published in accredited journals such as the Journal of Accounting and Finance still found several spelling errors and sentences used in the article. Spelling mistakes include, (1) mistakes in the use of letters which are capital letters and italics, (2) errors in writing words, namely prepositions or, (3) mistakes in using punctuation, namely comma and dashes, and (4) mistakes use of sorption elements. The sentence errors include (1) the absence of subject elements, (2) the absence of subject elements and predicate elements, and (3) errors in the use of conjunctions. Sentence errors can be broken down into (a) errors in the use
of coordinative conjunctions, (b) errors in subordinate conjunctions, and (c) errors in the use of interalitic conjunctions.

In connection with linguistic errors in the edited text, Havid (2015) argues that these errors are influenced by interlingual and intralingual errors. Interlingual errors are related to the mastery of the editor in understanding aspects related to linguistic material, such as the rules of using words, sentences, and other language units. While intralingual errors are related to aspects outside the language, such as the lack of mastery of the editor in understanding the material discussed in the edited text, matters relating to systematic and style guide, and the time to edit the text. Some of these errors result in a text that has been edited. The text that has been edited still has an error that causes the message in the text cannot be understood by the reader optimally.

In editing text, it is not only a matter of language that is of concern to the editor. In addition to having competencies related to linguistic aspects, an editor is also required to have competencies outside the language, such as an understanding of the material aspects, style guide, and systematic writing. Related to that, Burrough-Boenisch, (2012) argues that text in any language can be edited, and correcting language errors is only part of editing.

In editing text, in addition to linguistic aspects, an editor must pay attention to the material and systematic aspects of writing. Burrough-Boenisch (2012) argues, “It should be clear that a text in any language can be edited and that correcting errors of language is only a part of editing.” Text in any language can be edited, and correcting language errors is only part of editing activities.

Although editing does not only improve linguistic aspects, the editing process in this study only focuses on improving linguistic aspects. Students are provided with the text of scientific articles as study material. Then using a learning method, the scientific article edited its linguistic aspects. Therefore, the selection of scientific articles used has been considered in such a way, namely scientific articles that have no problems relating to material and systematic writing.

In the Indonesian Literature Study Program, Universitas Negeri Jakarta, every student gets a course in Editing Basics. The purpose of this course is to equip students with competencies in the field of editing so that they have the readiness to work as editors after they have obtained a bachelor's degree in literature.

In the course of Basic Editing, students are trained to edit various types of texts; one of the exercises is editing scientific articles. In this study, the text that will be the object of editing exercises is a scientific article.

Before doing research, the ability to edit students can be said to be not as expected. This can be seen in the results of observations on student edits collected at the end of the lecture. There are still mistakes in the linguistic aspects that were spared from the editing done by students. These aspects of language are spelling and punctuation errors, word choices, effective sentence construction, and paragraph development.

One of the causes of errors in these aspects of language escape from student editing is the reading method used by students when editing is not optimal. The main ability that must be owned by an editor is to identify mistakes in linguistic aspects and correct them according to the correct language rules. This ability can be used through the reading process.

Based on this, in the learning process of editing skills, the use of appropriate reading methods can optimize the learning outcomes of editing skills. If students have good reading comprehension, every linguistic error will be identified by students, and they will improve it to the fullest.

In addition to choosing reading methods, students' criticality can also maximize reading skills. Suwartini & Fujiastuti (2017) states that to obtain maximum learning outcomes, every student needs to maximize their critical thinking skills. To acquire and integrate knowledge, critical thinking skills are needed. Likewise in doing meaningful learning tasks, it can be done by maximizing critical thinking skills.

Based on the description above, the ability to edit text is largely determined by the ability to read and the level of critical thinking of students. Therefore, in learning editing skills, it is important to consider the selection of appropriate reading methods and the level of the students' critical thinking.

Several studies have shown that reading skills have a relevant relationship with critical thinking (Sariyem, 2016; Muttaqiin, 2015). Therefore, the selection of learning methods needs to pay attention to the level of the students' critical thinking.

Thinking is a natural process, but if the activity of thinking is left alone it will produce something that is biased, distorted, partial, uninformative, and potentially prejudiced. Duron, Limbach, & Waugh (2006) say “Thinking is a natural process, but left to itself, it is often biased, distorted, partial, uninformative, and potentially prejudiced; excellence in thought must be cultivated.” Therefore, thinking activities must be empowered to produce useful thoughts.

This is what distinguishes between thinking and critical thinking. Critical thinking is not just a natural
process, but critical thinking has stages, namely knowledge, understanding; application; analysis, and creating. Ennis (2011) states, “Critical thinking is reasonable and reflective thinking focused on deciding what to believe or do.” To decide what to believe and what to do, it is supported by a thought process that is reasonable and reflective. This process of thinking is called critical thinking.

Relating to critical thinking, Duron et al. (2006) say,

Critical thinking is, very simply stated, the ability to analyze and evaluate information. Critical thinkers raise vital questions and problems, formulate them clearly, gather and assess relevant information, use abstract ideas, think open-mindedly, and communicate effectively with others.

For someone who thinks critically, when dealing with a problem, he will overcome the problem by asking questions related to important issues, clarifying the problem formulation, assessing relevant information, using abstract ideas, thinking openly, and communicating effectively.

For those who think critically do not arbitrarily decide or solve problems. He will consider many things related to the problem with the aim of producing the best decision. Fact according to Pujiono (2012), a person who thinks critically always doubts the truth of the information he gets. Based on the description above, the method of learning to read that can be used to improve the ability to edit scientific articles is a method that can maximize students' critical thinking activities.

Reading learning has many methods depending on the purpose, likewise the method of reading for the purpose of editing text. When reading text, an editor doesn't just want to get information from the text he reads. However, through reading activities, an editor must be able to find and correct errors in all aspects that disturb the text so that it is difficult for readers to understand.

Language errors in published texts such as in some of the studies above may also be caused by the lack of maximum reading process at the time of editing. Prasetyo (2016) says that one of the main activities in editing text is reading critically. Therefore, if the reading activity carried out by the editor is not optimal, the likelihood of his luck is also not optimal.

Among the methods that can maximize critical thinking activities are Directed Reading Thinking Activity (DRTA). The DRTA method is designed to provide opportunities for students to be more involved in learning and education in terms of placing themselves as facilitators and motivators. In this case, Stauffer (2007) says that the DRTA method requires more student involvement. Student involvement must dominate learning, while the role of the lecturer in this method is to motivate students.

According to Stauffer (1969), in using the DRTA method, there are four main activities that need to be considered education, namely predicting, reading, and proving. All these activities must involve students prominently. Students must be fully involved with the text as a whole, while educators need to facilitate students in preparing the appropriate text and motivate students to do every activity in this method.

Walker (2012) argues that the DRTA method is a method of reading learning that has several steps, namely making predictions about the writer's mind, revising what is predicted, and collaborating on several opinions. By predicting what the author thinks in the text to be read, students can confirm and revise their predictions.

Stuffer (1969) called the activity of confirming and revising prediction as an activity of proving. Stuffer ended this method by proving predictions. This final activity is what distinguishes it from Walker's opinion which ends this method with the activity of collaborating opinions.

According to Walker, in the DRTA method, the activity of collaborating opinions can be done by maximizing student involvement through a brainstorming process or group discussion among students. Brainstorming can be used by educators to collect as many opinions from students as possible to clarify the topics that are the subject of discussion in the text they are reading. While group discussion can be used to explore the opinions of students in depth about the subject matter in the text students read.

Related to editing activities, the DRTA method is very suitable for use in editing learning. An editor is required to have good reading comprehension skills if he wants to produce good edits. So with the use of the DRTA method, students' reading comprehension skills can be improved so that their editing skills will be good.

Tierney, et al. (1995) suggested that with the DRTA method, to understand the text being read, students were equipped with the ability to determine the purpose of reading, absorbing information, and understanding the information. This method is effective learning methods that can help students understand the text they are reading.

Stauffer (2007) created the DRTA method so that it can be used to improve critical thinking skills. This method is used as a method of learning to read with a number of assumptions, namely learners can
think, act, investigate; use his knowledge in thinking; use facts in drawing conclusions; and make a decision. Andrian (2017) concludes,

DRTA is a comprehension strategy that guides students in asking questions about a text, making predictions, and then reading to confirm or refute their predictions.

DRTA is an understanding method that guides students to do several activities, namely asking questions and making predictions about the text being read; read the text and confirm the prediction made before.

There are several reasons for DRTA to be implemented, namely language has many advantages in teaching and learning to read. As a method, one of the abilities that can be developed through the DRTA method is critical reading skills and strategies that can encourage students to become active readers.

The DRTA method is used in reading by emphasizing thinking activities. Some skills that can be trained to students through this method are examining the text read, making hypotheses related to the text, finding evidence in the text, and making decisions based on the experience and knowledge gained in the text.

Stauffe’s DRTA suggests three stages in reading, namely (1) predicting, reading, and proving. In each stage, this method involves interaction between students and lecturers in understanding the text as a whole.

The use of methods in accordance with the characteristics of the material and students can improve learning outcomes to the maximum. The ability to edit the text is closely related to the ability to read, because the quality of edits depends very much on the reading comprehension of the editor. Therefore, to improve the ability to edit, it is necessary to use appropriate reading learning methods.

Based on the description above, it is interesting to study the use of the DRTA method in learning scientific articles editing by paying attention to the level of critical thinking of students. The DRTA method as a free variable affects the ability to edit scientific articles as the dependent variable by paying attention to the other influences of the moderator variable, namely the level of critical thinking of students.

The DRTA method was chosen as the treatment in this study because one of the characteristics of this method is to maximize student thinking activities. This method is considered appropriate if it is used to improve the ability to edit scientific articles in students who have a clear level of critical thinking.

The purpose of this study is to explain 1) the effect of the interaction between learning methods and the level of critical thinking on the ability to edit scientific articles of students; 2) differences in the ability to edit scientific articles in groups of students who study with the DRTA method and have high levels of critical thinking different from those who have low levels of critical thinking; and 3) differences in the ability to edit Indonesian-language scientific articles for students who have high and low levels of critical thinking.

The difference between this study and previous studies is that there are other influences which are also observed in this study. The DRTA method in previous studies was only associated with the ability to read certain texts' understanding. The DRTA method as an independent variable, while the ability to read certain text comprehension as the dependent variable. While in this study, the independent variable is the DRTA method while the dependent variable is the ability to edit scientific articles by considering other variables as moderator variables, namely the level of critical thinking students have.

**Methodology**

The method used in this research is experimental research. This research is designed in all the processes that take place in the planning and implementation of research. Data collection techniques in this study used test instruments to edit scientific articles and the level of critical thinking. The students' ability to edit Indonesian scientific articles is the ability of students to edit scientific articles by paying attention to the linguistic aspects of the articles.

Critical thinking is the ability of humans to process information at the cognitive level. Based on the characteristics of quantitative research, there are two types of data collected, namely discrete data and continuum data. Discrete data comes from moderating variables, namely the level of critical thinking (noun data); continuum data comes from the dependent variable, namely the ability to edit Indonesian scientific articles (interval data); and independent variables, namely the method of learning to read (nominal data).

**Findings and Discussion**

I. Effect of Interaction between Learning Methods and Levels of Critical Thinking on Students' Ability to Edit Scientific Articles

Between the learning methods used and the level of the students' critical thinking, there is interaction and influence on the ability to edit scientific articles. That is, the DRTA method used by the lecturer will affect the ability to edit scientific articles if it matches...
the level of critical thinking (high and low) the students have.

Every student has a difference in understanding lecture material. The difference is influenced by internal and external factors. The internal factor referred to in this study is the level of critical thinking, while the external factor is the learning method. In this study, the learning method used is the DRTA method.

In the group of students who were treated with the DRTA method, there was an interaction between the DRTA method and the level of critical thinking. This interaction affects the ability to edit scientific articles as the ability resulting from the process. The DRTA method interacts with two groups of students, namely students with high critical thinking levels and those who have low critical thinking levels. Facts in the field show that in this treatment group, the ability to edit scientific articles is higher in groups of students with higher critical thinking levels than students who have low critical thinking levels.

In the DRTA method there is one activity that requires a high level of critical thinking, namely the questioning experience. Students are asked to arrange questions related to the text to be edited. These questions relate to previous activities, namely predicting the text to be edited. How to arrange questions continuously and coherently to illustrate the prediction of the text to be edited is determined by the level of students' critical thinking.

This is in line with Browne & M. Keeley's (2007) opinion which says that critical thinking skills refer to three abilities that a person has. First, awareness of a series of critical questions that is interrelated. The linkages between questions prepared by students who have high critical thinking levels are indeed better than students who have low critical thinking levels. The difference can be seen in the following two examples.

Example 1:

Table 1. List of questions for students who have a low level of thinking

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of spelling and punctuation</td>
<td>1) What is the correct punctuation?</td>
</tr>
<tr>
<td></td>
<td>2) What is good punctuation in text?</td>
</tr>
<tr>
<td></td>
<td>3) How to use the correct spaces in the text?</td>
</tr>
<tr>
<td>Diction</td>
<td>1) How do you choose words in the text?</td>
</tr>
<tr>
<td></td>
<td>2) How do you use diction in the text?</td>
</tr>
</tbody>
</table>

Example 1 is a question compiled by one of the students with low critical thinking levels who in the group treated with the DRTA method. The related questions are not directly related to the aspects that should be asked. Three questions on aspects of the use of spelling and punctuation do not ask the aspect in question. While the two questions on the aspect of word choice are no longer related to the aspect that should be asked and do not indicate a good level of critical thinking. This can be compared with the questions in the following example 2.

Example 2:

Table 2. List of questions for students who have a high level of thinking

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>The use of spelling and punctuation</td>
<td>1) Is the use of spaces completely correct?</td>
</tr>
<tr>
<td></td>
<td>2) Are there spelling mistakes?</td>
</tr>
<tr>
<td></td>
<td>3) How do you adjust the terms used?</td>
</tr>
<tr>
<td></td>
<td>4) Is there any use of punctuation in the text?</td>
</tr>
<tr>
<td></td>
<td>5) Is the use of capital letters appropriate?</td>
</tr>
<tr>
<td>Diction</td>
<td>1) How to write absorption words?</td>
</tr>
<tr>
<td></td>
<td>2) How accurate is the abbreviation writing?</td>
</tr>
<tr>
<td></td>
<td>3) How do you use prepositions at the beginning of a sentence?</td>
</tr>
<tr>
<td></td>
<td>4) Is the use of capital letters appropriate?</td>
</tr>
</tbody>
</table>

Example 2 is a question compiled by one student with a high level of critical thinking in a group studying with the DRTA method. From the questions arranged, both in the aspects of the use of spelling and punctuation and choice of words, it appears that the questions are directly assembled with aspects that must be asked and show a good level of critical thinking.

Second, critical thinking skills refer to the ability to ask and answer critical questions in a timely manner. The questions compiled by students are then answered at the next activity stage in the DRTA method, which is when proving predictions after they explore the text through reading and editing the text. Students who have high levels of critical thinking seem that they can find answers more precisely than previously prepared questions, so they can edit scientific articles better than students who have low levels of critical thinking.

Third, the desire to actively use critical questions. One of the activities of the DRTA method
is to give students the experience to ask questions. This activity is very suitable with the characteristics of students who have a high level of critical thinking; they have the desire to actively use critical questions in the learning process. Therefore, the average value of the students' ability in editing in this treatment group shows the highest value.

2. Differences in the students’ ability to edit Indonesian scientific articles and students who have high and low levels of critical thinking

Based on hypothesis testing, it was concluded that the results of learning to edit students who have high critical thinking levels are different from the learning outcomes of editing students who have low critical thinking levels. This is in line with the opinions expressed by Westwood (2008), which emphasizes that reading comprehension can be interpreted as an active thought process. A reader will interpret deeply the concepts and information in the text.

Thinking activities have a role in achieving optimal students' learning outcomes. Several studies have shown results that can strengthen these assumptions. Two of the researchers have been done by Suhartono and Masitah. Suhartono (2014) has examined the effect of critical thinking on the ability to write scientific articles. The results of the study indicate that critical thinking skills affect the quality of scientific writing skills of students. The better the ability to think critically, the better the quality of scientific writing skills.

Other studies conducted by Masitah (2014) who have examined the effect of critical thinking on learning outcomes in human anatomy courses. The results showed that if a person has a high level of critical thinking, the learning outcomes obtained can be achieved to the maximum. However, if students have a low level of thinking, the learning outcomes achieved are not optimal.

The two studies above are studies that make critical thinking an independent variable. Researchers manipulate these variables to influence the dependent variable, namely learning outcomes. The dependent variable of the two studies is different. The dependent variable in the research conducted by Suhartono was the ability to write scientifically, while the dependent variable in the research conducted by Masitah was the understanding of human anatomy material. Although with different dependent variables, the results of both studies show the same thing, namely critical thinking can affect learning outcomes. The higher the level of critical thinking, the more the maximum learning outcomes.

This study also makes critical thinking a variable, but there is a slight difference. Both of the above studies make critical thinking an independent variable, while this study makes critical thinking an attribute variable, which is an internal factor that is assumed to influence the ability to edit students' scientific articles (dependent variable) with the treatment of reading learning methods (independent variables).

In editing scientific articles, students who have a high level of critical thinking tend to try to relate the facts associated with the text being read. If necessary, they will use books or references that can be referred to in building understanding of the text being read. Especially in the DRTA method, there is one step that can be utilized correctly by students who have a high level of critical thinking, namely exploring. At this stage students can utilize various references and internet networks. Through exploration activities, they can gather information needed to edit text.

The ability to edit scientific articles of students who are given the DRTA method and have a high level of critical thinking has a pretty fantastic value. This is caused by the characteristics of the DRTA methodology and the level of critical thinking of students, so that both of them work together in increasing the ability to edit scientific articles of students.

3. The ability to edit scientific articles in groups of students who study with the DRTA method and have high levels of critical thinking is different from those who have low levels of critical thinking

Judging from the acquisition of the average value, a group of students who study with the DRTA method and have a high critical thinking level of 90.1 and who have a low critical thinking level of 79.3. This difference in value is influenced by different levels of critical thinking. This is in line with Limbach, & Waugh's (2006) opinion who argue that in dealing with problems, critical thinkers tend to overcome them by gathering information and evaluating it relevantly, using abstract ideas, being open-minded, and communicating effectively with others.

The DRTA method has staged in accordance with the characteristics of students who have a high level of critical thinking. The DRTA method is carried out through five stages, namely observing, predicting, exploring, associating, and communicating. In the prediction stage, students can maximize their ability to collect and assess relevant information in editing scientific articles. In the
communicating stage, students can maximize their ability to use abstract ideas in explaining various matters related to the process and the results of editing. This stage is carried out in two-way communication, so students can maximize their ability to communicate effectively and think openly in considering the input submitted by other students.

Conversely, for students who have low levels of thinking, they tend to have limited views. When answering questions, they tend to give short and simple answers. When discussing, they are less willing to be open to the opinions of others. Students in this group have the view that their perspectives are the only ones that will enter and their facts are the only ones that make sense. This was stated by Duron et al. (2006).

*Passive thinkers suffer a limited and ego-centric view of the world; they answer questions with yes or no and view their perspective as the only sensible one and their facts as the only ones relevant.*

Although the group of students who have a low level of thinking has an average value of ability to edit scientific articles smaller than students who have a high level of thinking, it does not mean their ability to edit scientific articles is bad. When compared with the initial value (60.4), the average value of students who have a low critical thinking level (79.3) experienced an increase. This increase is caused by the DRTA method used in the treatment group has characteristics in maximizing student thinking activities.

The DRTA method is proven to be effective and produces maximum learning outcomes if used by students with high levels of critical thinking to study scientific articles. In learning, the DRTA method greatly maximizes student thinking activities. This method is suitable for teaching material that requires high critical thinking activities, namely editing scientific articles. With such conditions, students with high levels of critical thinking will certainly easily adjust to conditions of study like this.

**Conclusion**

Between the learning methods used and the level of critical thinking students interact and influence the ability to edit scientific articles. That is, the DRTA method used by the lecturer will affect the ability to edit scientific articles if it matches the level of critical thinking (high and low) possessed by students.

The results of learning to edit students who have high levels of critical thinking are different from the results of learning to edit students with low critical thinking levels. Students who were treated with the DRTA Method with high critical thinking levels had significant differences from those who had low critical thinking levels. Judging from the acquisition of the average value, a group of students who study with the DRTA method and have a high critical thinking level of 90.1 and who have a low critical thinking level of 79.3.

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