



CRITICAL THINKING IN WRITING SCIENTIFIC ARTICLES FOR STUDENTS

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ABSTRACT

This research is conceptual research which contains critical thinking about writing scientific papers for students. This research method uses qualitative-descriptive methods. This research approach uses a descriptive approach, which in this research is about describing thought patterns in writing scientific articles. This research is part of conceptual research that contains theories or understanding related to critical thinking in writing scientific papers for students. Data sources obtained through books and journal articles are appropriate to this research. The results and discussion contained in this research discuss understanding critical thinking towards writing scientific articles among students. Because writing scientific articles requires critical thinking to obtain a clear and appropriate topic to be discussed in this research. This writing activity was able to improve students' critical thinking. Higher education is part of a forum or place to improve the quality of education for students who will continue their education to a level one step higher than their previous level of education. However, in the aspect of change, students are encouraged to be active in helping this change by improving their critical thinking skills through writing skills. This writing skill can later help improve students' mindset in writing scientific work, namely scientific articles. Through scientific work in the form of scientific articles, the quality of education in higher education is more advanced.

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INTRODUCTION

It is important for every individual, especially students, to have critical thinking skills. Apart from changing times, students also demand that they have a more critical mindset in the 21st era. The current higher education system encourages the integration of advances in technology and science, which is very important in overcoming the challenges of life skills in the modern masses. This means that critical thinking not only helps students understand ideas (and problems), but also prepares them to make their own decisions.

Critical thinking skills can be understood as the process of interpreting meaning, analyzing problems, asking questions, and compiling analyses of new ideas about something. Critical thinking skills require students to think and analyze a problem, while also requiring them to express ideas, discuss problems, and discover solutions. Students must show a tolerant attitude towards higher education in terms of critical thinking. Students can further engage in critical thinking, which involves expressing ideas and criticism that can be applied to their daily lives while also expanding existing knowledge and experiences.

At the university level, students can make writing skills part of their writing abilities and apply critical thinking skills. Education is currently experiencing many changes and modifications are needed in learning, not only monodisciplinary but also implementing an interdisciplinary system because that is what enables students to improve their thinking power by studying various kinds of knowledge, not just one kind of knowledge.

With the advent of globalization and technology, information is now available and easy to obtain. This also raises new problems in information management. As a result, students may still not be able to filter and process the information obtained effectively. Therefore, universities have the authority to help students develop critical thinking and information-processing skills that will lead them to become good researchers and thinkers.

This also happens in the Indonesian Language Education study program at the State University of Malang, where at the end of each course the final assignment is implemented by giving the assignment of writing a scientific paper. This application is used to equip students with critical thinking skills through writing scientific papers in the form of articles in each course taken by students. This makes students learn to

express their critical ideas in various forms of scientific work, one of which is papers and articles.

In popular scientific works, this concept was put forward by Liang Gie (2002), who stated that scientific work involves presenting various facts carefully and honestly logically and systematically. The basic concept of writing scientific papers is the use of observation, review, and research in a particular field, arranged according to certain procedures, and documented systematically. Writing popular scientific works often results from adapting writing to other people's perspectives by conveying one's own thoughts, opinions, and statements (Suseno, 1980). As explained above, students consider writing academic papers as a crucial responsibility. In this way, it stimulates students' critical thinking skills and uncovers innovative ideas and concepts that they can integrate into their coursework. However, sometimes students underestimate the work of writing when writing.

The main goal, if they understand the meaning of writing, is to improve the accreditation of academic writing in higher education. Most important is how well students understand what the teacher explains in each subject. In every subject, the teacher's explanation is more important for students. Because students will be taught to read, listen, and write books continuously, which helps them change their way of thinking. Apart from that, brain performance is also used. The more you think, the more knowledge you will gain.

Therefore, students are often considered to be agents of change who can play an important role in advancing society, especially in the world of education and even in the world of work. That way, they will have a lot of knowledge, ideas, and skills that will enable them to become the main movers in moving toward a better direction. Being a student has a very important role in changes that are not limited to certain aspects, for example, social politics, but also in the world of education. In this context, students also have an important role in fighting for the interests of the people and conveying aspirations to the community and government agencies in fighting for human rights.

Therefore, in the educational context, students can become a locomotive with progress to encourage change and innovation in the curriculum and teaching methods. Not only that, it turns out that students can also help improve the quality of education through research and development of innovations in the world of education.

In the world of education, the skills mentioned above are used as a form of

developing a mindset, this event becomes something in itself. Because these skills are used to create notes or information in a medium using an article or scientific work. According to Tarigan (1986), writing is a form of activity to express ideas or thoughts using written language as a medium of delivery. Ideas or thoughts in writing are also known as the main issue, which allows the writer to convey his thoughts to other people through the medium of writing. However, at this time, many students experience difficulties in writing. One of the causes is a lack of motivation in writing. Many students only copy and paste from other websites without developing their ideas. According to Ratna K, and Prastikawati (2012), many students think writing is difficult, less motivated, and not important. This lack of motivation also has an impact on a lack of interest in writing, as said by Musaffak et.al (2015).

Several previous studies provide an overview of the results regarding the need for critical thinking in producing writing. Nejmaui (2019) researched improving the critical thinking skills of Moroccan students in producing argumentative texts. The results of this research show that the aim of developing students with critical thinking skills is to guide them to think about a topic critically by selecting, receiving, and checking the information they get from credible sources. Apart from that, they were also asked to evaluate the facts about the topic. They showed positive results during one semester in producing argumentative texts using critical thinking skills.

To overcome this problem, universities need to introduce a culture of writing from the start and provide adequate training and guidance for students in writing scientific papers. So that the results of student research can be read and utilized by the wider community and contribute to the development of science. Research on writing scientific papers as a way to improve critical thinking skills is also important. The aim is to find out how much influence writing scientific papers has on improving students' critical thinking skills, as well as to encourage students to be more active in writing scientific papers as part of their self-development.

RESULT AND DISCUSSIONS

Critical Thinking Skills for Students

Thinking according to Plato is speaking in the heart. Thinking is putting into relationships between parts of our knowledge (Sumadi, 2006). In the KBBI, thinking means using reason as a form of considering and deciding something. From the

thinking process, there are three steps, namely: forming understanding, opinions, and concluding.

The ability to think critically is an ability that is very essential in life, work, and functioning effectively in all other aspects of life. Critical thinking ability is a thinking ability that is initiated and processed by the left brain. Critical thinking has long been a main goal in education since 1942. In this research, there are various opinions about it, and it has become a topic of discussion in the last ten years (Arief, 2013). According to Alec Fisher (2008), critical thinking is reasonable and reflective thinking that focuses on deciding what to believe and do. From this, the reasoning required for critical thinking skills or in other words the ability to think critically is part of the reasoning.

Critical thinking means thinking well and reflecting on or studying other people's thought processes. John Dewey (2004) said that schools or other educational institutions must teach children the correct way of thinking. Then he will define critical thinking, namely: "Active, persistent, in carefully considering a belief or any form of knowledge that is accepted and viewed from various angles of reasons that support it by concluding those reasons.

Meanwhile, Vincent Ruggiero defines thinking as any form of mental activity that helps in formulating or solving problems, making decisions, or fulfilling the desire to understand thought patterns as a form of searching for answers, an achievement of meaning. In this way, thinking is defined as an active process that is orderly and full of meaning that we can use to understand the world. Chaffee stated that critical thinking is a form of systematically investigating the thinking process itself.

From several expert opinions that have defined critical thinking above, it can be concluded that critical thinking is a mental process for analyzing or evaluating information. Understanding information in depth can form a belief in the truth of the information received or the opinion expressed. This process shows that there is a desire or motivation to find answers and achieve understanding. By thinking critically, critical thinkers can examine other people's thought processes to find out whether the thought processes used are correct. Implicitly, critical thinking can evaluate the thoughts implied by what they hear, read, and research their thinking process when writing solving problems, and making decisions.

Critical thinking components. Brookfield that there are five aspects and four

components of critical thinking. In his statement, critical thinking consists of aspects, namely critical thinking as a productive and positive activity, critical thinking which depends on the context, and critical thinking can take the form of positive or negative events, and critical thinking can be emotional and rational. Components of critical thinking, namely: (1) identifying and drawing assumptions is the center of critical thinking, (2) drawing on the importance of context is important in critical thinking, (3) critical thinkers try to imagine and explore alternatives, and (4) imagine and explore alternatives will leading to reflective skepticism.

The characteristics of critical thinking include the entire critical thinking process, namely: obtaining, comparing, analyzing, evaluating, internalizing, and acting beyond knowledge and values. Critical thinking is not just about thinking logically because critical thinking must have confidence in the basic values of thought and belief before a logical reason can be obtained from it. Characteristics, namely: character, criteria, arguments, considerations or thoughts, and point of view.

Based on the explanation of critical thinking indicators above. Aspects of critical thinking skills used in this research are as follows. 1) Skills in providing simple explanations, with indicators: formulating questions and limiting problems. 2) Skills in providing further explanations, with indicators: testing data and analyzing various opinions with bias. 3) Skills in managing strategy and tactics, with indicators: avoiding very emotional considerations and avoiding oversimplification.

1) Understanding critical thinking

Critical thinking is part of the ability that every person has in higher thinking which requires practice in learning. Using argument analysis to give birth to new insights from the results of the interpretation of facts, situations, problems, and circumstances through deductive and inductive reasoning which is the basis for critical thinking. In critical thinking, a person's thinking must be open in determining decisions taken based on the facts they have. Emily (2011) said that critical thinking is part of determining what to do and believe through reflection. In line with Facione in his book Emily, Ennis also gave his response that critical thinking is a focus on reflection to determine something to do and believe. So, critical thinking or critical thinking can also be interpreted as the art of analyzing and evaluating to improve it (Richard, 2008).

This critical thinking is not only done by people who have worked but critical

thinking has been done when exploring the world of education. Because in the world of education, critical thinking is also required in dealing with various problems both in school and outside school. This means that students or students must have an open mind to be able to make decisions without being influenced by people around them. Students and students who think critically will be able to think clearly and rationally. Don't assume that any information you receive can be similar without having to question it again. However, this will be able to analyze and evaluate the acquisition of known information as a form of solving the problems faced. Scriven and Paul (2012) say that critical thinking is a form of intellectual activation to conceptualize, apply, examine, compile, conclude and evaluate data that is already owned, it is used to guide one's beliefs and actions. From this activity, it is necessary to reflect on various problems faced with full reflection, keeping the mind open so that it can accept other perspectives.

Critical thinking is also referred to as metacognition or the process of thinking about thinking about this ability which is very important for the lives of students and students because by having thoughts like that, students and students can solve the problems they face by making effective decisions (Snyder, 2008). Kamarulzaman (2015) said that critical thinking is part of the ability to make choices and solve problems. The key to this component is the ability to evaluate other people's statements and being able to understand and explore a problem to determine a solution.

3) Characteristics of Critical Thinkers

So that students and students can have critical thinking skills, students must not be passive when learning takes place. Because this will increase the active mind. Santrock (2006) said about the characteristics of students who are intellectually active in thinking, including: 1) listening with concentration, 2) composing and studying various questions, 3) processing and organizing their thought patterns, 4) observing the same and different things, 5) concluding inductively, and looking for differences between valid conclusions and those that are not. Apart from that, another characteristic of students who are active in critical thinking was also stated by Glaser (2009) who said that more detailed abilities as a basis for critical thinking have the following characteristics: 1) knowing the existence of problems, 2) having methods in solving problems, 3) search for and store the information that has been obtained, 4) find out opinions about various values that are not mentioned, 5)

understand the language used, precisely and distinctively, 6) analyze information, 7) provide an assessment of the facts and re-evaluating various statements, 8) knowing the logical relationships between problems, 9) composing various conclusions and similarities that are needed, 10) testing the various conclusions that have been obtained, 11) reconstructing various patterns that other people believe based on more experience. broad, and 12) assess appropriately based on certain qualities.

Writing Scientific Works for Students

1) Understanding scientific writing

Writing skills are a process of expressing thoughts, ideas, and thoughts in writing. These language skills are active-productive through encoding activities as a form of producing written language for readers. Tarigan (2008) said that writing is a very productive and expressive activity, with this language activity it is possible to convey ideas, thoughts, and feelings by the speaker through written means. It is said to be active because an activity that goes through several stages to put ideas into writing is more difficult to master even for language speakers.

Scientific writing is a scientific activity of a product carried out by a person or team. The activities carried out to produce scientific novelties are research. It is not only scientific research that is the only scientific writing, but according to scientific principles, values, and norms, scientific findings are carried out through research. According to Rahmiati (2013), a written report about the results of scientific activity is a scientific paper. In this case, scientific journal articles created by students are research findings on certain problems or topics through the results of thinking in the form of critical analysis based on facts and data obtained in the field. The systematics of scientific journal articles consists of an abstract, title page, introduction, methods, results, discussion, and conclusions (PPKI UM, 2018).

Writing scientific papers is an activity that requires writers to produce writing with scientific conventions (Suyono, et al. 2015). The scientific conventions in question include logical thinking, systematics, and the style of language used. There are various forms of scientific work, namely papers, articles, research reports, and reference books. Scientific writing is a problem in writing that must be discussed based on direct research such as data collection, observations, and investigations in the field. According to Susilo (1995), research, review and

observation must pay attention to the systematics of writing and be accountable for the correctness of the content. When writing scientific work, it must be in accordance with the guidelines that have been established and agreed upon which cover the fields of science, technology, and art, namely writing scientific work that is carried out following scientific procedures (Saukuh, et al. 2010).

The ability to write in compiling scientific work is very important because it contains knowledge that will be passed on by other researchers, so there is a need to understand what will be written in the scientific work. One of them is the ability to write ineffective language. This also means using language that is precise, concise, clear, orderly, and official, which constitutes effective scientific writing (Turistiani, 2013). Therefore, mastering spelling, word formation, diction, good and correct sentence structure, and mastery of writing complete paragraphs requires skills in writing scientific work (Yulianto, 2003).

2) The role of writing scientific papers in higher education

The role of writing scientific papers in the world of higher education is very important because scientific works can improve the quality of education, enrich knowledge, and provide benefits to society. Apart from that, it can also be used as a form of indicator in assessing the quality of student writing at an educational institution (Zulkifli, 2022). Higher education has the aim of producing graduates who have the ability and skills to carry out research by producing quality scientific work. By writing scientific papers, students can develop their abilities in analysis and synthesis as well as their abilities in critical and creative thinking. And through writing scientific papers it is also possible to improve students' ability to write by presenting ideas clearly and systematically (Fauzi, 2022).

3) Problems in writing scientific papers

This section deals with the obstacles faced by students regarding aspects of writing scientific papers, including students' talent and motivation in writing, students' insights that will be expressed in written form, and obstacles related to written language skills in students.

a. Not talented, writing is one of the basic skills that anyone, including students, has. This is why many people think that writing is easy. However, the fact cannot be denied that not everyone can produce written work that is worthy of being published. This often happens to students. Some students are not able to produce even the simplest scientific writing.

b. Lack of motivation, laziness, and lack of self-confidence, all actions carried out by humans begin with intention. In this case, it can be said that if someone does something it must start from the intention and because of the motivation in starting something. In this way, every activity carried out by a person is sometimes inseparable from the motivation that arises both from within himself and from other people. Likewise with writing activities. A writer must find an idea which will then be processed to produce a piece of writing. However, from this process, sometimes someone needs motivation because with motivation someone is enthusiastic about writing.

Not only that, the low number of written works produced by students is also caused by a lack of motivation within them. This is a big obstacle for students in producing written work, especially scientific papers. This is because they do not have a strong desire to start and develop their writing skills. This is because students write because of demands from the lecturer to get grades. With these demands, students started writing. Therefore, the first thing students do when starting writing activities is to build motivation within themselves to do it. That way, they will have a strong motivation for every challenge they face.

c. Having difficulty getting started and not focusing, many students want to write. But sometimes this desire arises when seeing or admiring other people's work. This admiration for other people's work can trigger motivation within him. However, unfortunately, this desire sometimes becomes an obstacle for them because they don't know where to start. Not only is it difficult to get started, but there are many external influences such as many relaxing activities, environmental influences, entertainment, and so on. This causes students to become unfocused or unable to concentrate. As a result, these students have difficulty finding ideas, starting to write, and do not focus on expressing their ideas in the form of scientific writing.

d. narrow insight, of the three above, there is the most crucial one, namely lack of insight due to laziness in reading literary sources. This becomes an obstacle for students who are lazy about reading and results in them being less able to produce writing, as well as making them less creative, without experience, and giving rise to feelings of laziness and unmotivated.

e. Linguistic barriers are also often experienced by students when carrying out writing activities due to difficulties in arranging words into effective sentences.

This is a big obstacle in writing activities because the content of scientific writing must have unity and connection between sentences to produce a message that is easily conveyed to the reader.

CONCLUSIONS

Based on the research discussion above, critical thinking in writing scientific essays for students is very important. So it can be concluded that critical thinking is an important element in writing scientific essays for students. In its context, critical thinking involves the ability to analyze and evaluate information objectively, identify the assumptions underlying arguments, and organize and convey thoughts logically and coherently. In this way, students who can think critically can develop strong arguments, avoid bias, and provide in-depth and relevant analysis of the topic to be discussed. In addition, it can help in identifying weaknesses in research and finding better alternative solutions. Thus, critical thinking not only improves the quality of scientific writing but also supports the development of essential academic skills for students.

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