THE ABILITY TO READ RESEARCH ARTICLES: PROFILE OF STUDENTS IN THE BIOLOGY EDUCATION PROGRAMS' OF UIN WALISONGO SEMARANG

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Abstract
This study aims to determine the profile of students of the undergraduate Biology Education program at UIN Walisongo Semarang. This study is descriptive qualitative with a survey method. The number of participants was 96 students of the Biology Education Program from different years. The instruments used were reading scientific articles and tests of the ability to read scientific articles. Data in the form of test answers, given a score and analyzed using the formula mean and percentage, then categorized. The results showed that the student’s ability to read research articles was categorized as very low (Counterargument (15.67%) and Refutation (1.8%)), low (Motive (35.62%), Support (23.85), and Implication (28.17)), moderate (Novelty, 52.92%), and high (Objective (75.59%) and Main Conclusion 76.55%). This research concludes that the ability to read scientific articles of undergraduate biology education students still needs improvement by applying learning methods/models or giving an assignment that can improve the ability to read scientific articles.

Keywords: Novelty, Reading, Research skills, Scientific article

INTRODUCTION
In Indonesia, higher education institutions have the same academic institutions that continuously develop science and technology. Ideally, academic culture in institutions is applied in all elements, both among lecturers and students. As the younger generation, students have great potential to be developed, especially in research (Dariyo, 2004). According to Sabri et al. (2009), research is a broad field and challenging for beginners to do without proper guidance.

Nawawi (2005) states that research must be carried out systematically, orderly, and regularly so that all processes carried out must be
following the problem under study to produce objective truth. Therefore, students need to read previous research articles to stay up to date, develop critical thinking skills (Liem et al., 2008), able to discriminate the important or valuable thing (Gallo & Rinaldo, 2012), and improve research skills (Chotitham et al., 2015). Being a researcher requires research skills, one of which is the ability to read scientific articles. 

Students' ability to read the article research is essential because most of the assignments given by lecturers are generally related to the exploration of knowledge and technology, which can easily be found in scientific articles. Besides, the ability to read articles is a provision for students to compile student scientific articles. Reading scientific articles for students should naturally become a primary activity that is important to familiarize and develop (Tenopir et al., 2009). Although Reading ability is essential, the level of reading literacy in Indonesia still needs to be improved. Based on data from the Ministry of Education and Culture (2019), it is known that the national index of level reading literacy activity was low, 37.32. The reading literacy activity index at the provincial level, especially in Central Java Province, was also classified as low, namely 33.30. This shows that people's reading habits were still lacking.

More specific research conducted by Rahmasiwi (2020) obtained data that the ability to read scientific articles of Biology Education graduate students of UM was still in the low category. Balan et al. (2019) stated that students' article reading skills were still low, so it needs more in-depth work to be done to improve students' reading skills (Lennox et al., 2020). Similar research has never been carried out in the Biology Education, Undergraduate Program at UIN Walisongo Semarang. As a research campus, at all levels, especially at the Biology Department level, it is better when the profile of the ability to read scientific articles of students is known about their progress over a particular time. So that conditions can be identified, then the appropriate policy or decision-making is enforced. The hope is that improvements from the Biology Department's level will be more targeted to realize the research campus's vision. So it is necessary to do research that aims to determine the profile of the ability to read the research article at undergraduate' students in the Biology Education Study Program, UIN Walisongo Semarang.

METHODS
This research is a quantitative descriptive study using a survey method. The research focuses on measuring the ability to read scientific articles by undergraduate students of Biology Education.

Procedure
The ability to read scientific articles is carried out by providing instruments in scientific papers and tests to read scientific articles. The time given to read the article and answer the test is a maximum of 40 minutes.

Participants
The study participants were 96 students of the Biology Education Program at the Walisongo State
Islamic University, Semarang. Participants came from different generations and were selected by the random sampling technique. The number of participants is 26 first-year students, 37 second-year students, 33 third-year students.

**Instrument**

Scientific article was used as an instrument and should be read by students. The title of the article was "Toxicity Test of *Bacillus thuringiensis* (Bt) Protein Crystals as an Integrated Pest Control Agent for Green Planthopper (*Nephotettix virescens*) Tungro Disease Vector as an Effort to Increase National Food Security" Suwarno et al. (2015). The test instrument for reading scientific articles refers to the tool developed by Lacum et al. (2014) with modifications.

The ability to read scientific articles tests consists of eight questions representing eight indicators. Indicators and questions on the ability to read scientific articles are presented in Table 1.

**RESULT AND DISCUSSION**

A survey of the ability to read scientific articles of undergraduate students of the Biology Education Program at UIN Walisongo Semarang is presented in Graph 1. Based on Graph 1. It is known that first-year students get the highest score on the Main Conclusion indicator, which is 75.64%, and the lowest score is on the Refutation indicator, which is 0%.

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motive</td>
<td>What is the reason for the researchers doing the research?</td>
</tr>
<tr>
<td>Objective</td>
<td>What do researchers want to know through this research?</td>
</tr>
<tr>
<td>Novelty</td>
<td>What newness does this researcher have compared to previous studies?</td>
</tr>
<tr>
<td>Main Conclusion</td>
<td>What are the results obtained from the research?</td>
</tr>
<tr>
<td>Support</td>
<td>Are there any statements in the article based on data or other research that support the main research results? If there is, write it down!</td>
</tr>
<tr>
<td>Counterargument</td>
<td>Are there any statements in the article that undermine the main research results? If there is, write it down!</td>
</tr>
<tr>
<td>Refutation</td>
<td>Is there a statement that weakens the counterargument? If there is, write it down!</td>
</tr>
<tr>
<td>Implication</td>
<td>How is the researcher's research (application to society or suggestions for further research?)</td>
</tr>
</tbody>
</table>

Second-year students get the highest score on the Main Conclusion indicator, 71.17%, and the lowest score on the Refutation indicator, which is 5.40%. Third-year students get the highest score on the Objective indicator, which is 89.39%, and the lowest score on the Refutation indicator, which is 0%.

The categories of students' ability to read scientific articles at each level are presented in Table 1. Based on Table 1 it is known that the Counterargument and Refutation indicators are in the very low category,
namely 15.67% and 1.8%, respectively. Counterarguments are statements that weaken the main conclusion, usually in the form of research limitations (Lacum, 2014). According to Olufowote (2017), research limitations typically consist of one to two paragraphs after the discussion and before the conclusion. Research limitations are essential in research articles because research limitations indicate researchers’ openness and can reference other researchers to continue the research (Trilogi University, 2018). The low number of counterarguments among students is also related to the low refutation rate.

Graph 1. Survey results of students' reading ability

Rebuttal is a statement that weakens the counterargument (Lacum, 2014). According to Gentry (2015), rebuttal is essential for a scientific article. In the rebuttal section, the researcher presents a statement with another point of view to be a consideration for the next reader or researcher. When students experience difficulty in determining rebuttal, students also tend to have difficulty deciding counterarguments. The low aspect of Counterargument and Refutation is because students are not trained to read or write scientific articles. Educators often give assignments to students to make resumes rather than critical analyses of scientific papers (Ulrich, 2020). Lacum (2014) the low counterargument and refutation are because students read textbooks more often than scientific articles, even though these aspects are rarely found in textbooks.

Based on Table 1, it is known that the ability to read scientific articles by students who are classified as low in the category of Motive is 35.62%, Support is 23.85%, and Implication is 28.17%. Motive is a statement that shows why a study is conducted like a research gap. Support is a statement that the author uses to justify the author’s main conclusions. In comparison, Implication is a statement that shows the consequences of the research that has been done, usually in the form of practical recommendations or suggestions for further research (Lacum, 2014). These three aspects are more accessible for students to identify than counterarguments and refutation. However, students need accuracy and accuracy as well as good analytical

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Table 2. Ability to read scientific articles (%)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1st Year Students</th>
<th>2nd Year Students</th>
<th>3rd Year Student</th>
<th>Mean</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motive</td>
<td>29.81</td>
<td>33.10</td>
<td>43.94</td>
<td>35.62</td>
<td>Low</td>
</tr>
<tr>
<td>Objective</td>
<td>71.15</td>
<td>66.22</td>
<td>89.39</td>
<td>75.59</td>
<td>Hight</td>
</tr>
<tr>
<td>Novelty</td>
<td>47.44</td>
<td>56.76</td>
<td>54.55</td>
<td>52.92</td>
<td>Moderate</td>
</tr>
<tr>
<td>Main Conclusion</td>
<td>75.64</td>
<td>71.17</td>
<td>82.83</td>
<td>76.55</td>
<td>High</td>
</tr>
<tr>
<td>Support</td>
<td>25</td>
<td>24.32</td>
<td>22.24</td>
<td>23.85</td>
<td>Low</td>
</tr>
<tr>
<td>Counterargument</td>
<td>3.85</td>
<td>18.91</td>
<td>24.24</td>
<td>15.67</td>
<td>Very Low</td>
</tr>
<tr>
<td>Refutation</td>
<td>0</td>
<td>5.40</td>
<td>0</td>
<td>1.8</td>
<td>Very Low</td>
</tr>
<tr>
<td>Implication</td>
<td>25</td>
<td>21.62</td>
<td>37.88</td>
<td>28.17</td>
<td>Low</td>
</tr>
</tbody>
</table>

The high category is in the Objective aspect of 75.59% and the Main Conclusion of 76.55%, presented in Table 1. An objective statement is what the author wants to know or be thorough, usually in a research problem formulation, research objective, or hypothesis. The main conclusion is a statement about the main results of the research (Zamani, 2016). This aspect answers what is in the objective (Lacum, 2014). Students most easily identify these two aspects because, in general, they are presented directly in the article. Trigueros (2018) states that objectives must be formulated and presented clearly to make it easier for readers to understand the researcher's study. The main conclusion in the systematic writing of scientific articles is generally after the results and discussion (Soegianto, 2018).

The survey results on the ability to read scientific articles of Biology Education undergraduate students at UIN Walisongo Semarang showed mixed results. There are six aspects of reading scientific articles that still need to be improved because reading scientific articles is crucial.

According to O'Reilly et al. (2007) and Winharti et al. (2014), reading helps students understand learning material well and significantly impacts their learning outcomes. Reading scientific articles also makes it easier for students to become reliable.
researchers. When conducting research, researchers need sharp thinking in conducting analysis, starting from exploration and problem formulation to formulating conclusions and compiling research reports. The sharpness of the analysis dramatically affects the quality of a study (Nawawi et al., 2005). Therefore, a solution is needed to improve students' ability to read scientific articles.

One of the solutions that can be applied is the assignment of critical analysis of scientific articles. When analyzing scientific articles, the activities carried out by students are that students read scientific articles then identify and rewrite aspects contained in the article such as research methods, research objectives, advantages, and disadvantages of the article. Susilo (2018) states that critical analysis of scientific articles can add insights and references for students writing papers, practicum reports, or preparing research proposals. Reviewing scientific articles can improve student understanding in making research proposals (Atmojo et al., 2020). Raimondi et al (2020) also stated that the most important thing to develop scientific article reading skill are to conduct early intervention and exposure to critical journal article reading.

Besides, improving the reading skill in the research article is applied to model learning suitable for the student's condition. Tauhidah's (2018) research obtained information that the Project-Based Learning Model affects the ability to read research articles of undergraduate Biology students at Universitas Negeri Malang. The learning models that can be used in biology learning to empower students' reading literacy are Consider, Read, Elucidate hypotheses, Analyze and interpret data, Think of the next Experiment (CREATE) (Hoskins et al., 2011), Socio Biological Case Base Learning (Suwono, 2017), and Cooperative Integrated Reading and Composition (CIRC) (Ristanto & Darmawan, 2020). However, the solutions still need to be carried out further research when applied to biology education students at UIN Walisongo Semarang because it must be adjusted to the character and condition of the student. Therefore, further research is needed on learning strategies or methods that can empower the ability to read scientific articles.

**CONCLUSION**

The ability to read scientific articles of biology education undergraduate students at Walisongo Semarang is in the low to high category with very low (Counterargument (15.67%) and Refutation (1.8%)), low (Motive (35.62%), Support (23.85), and Implication (28.17)), moderate (Novelty, 52.92%), and high (Objective (75.59%) and Main Conclusion 76.55%)). The student's ability to read research articles still needs to be improved by applying learning methods/models or giving an assignment that can improve the ability to read scientific articles.

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