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ANALYSIS OF SCIENTIFIC LITERACY SKILLS AND LEARNING INTEREST OF FIRST YEAR BIOLOGY STUDENTS IN TOPIC OF FUNGI

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ABSTRACT

Science literacy has become increasingly important for individuals in carrying out their activities. Science education also strives to enhance students' interest in developing knowledge, skills, and thinking abilities. This research aims to determine the science literacy skills of students in the Low-Level Organism Taxonomy course, particularly in the topic of Fungi, and to assess students' learning interest in the same course. The study was conducted at the Department of Biology, Faculty of Mathematics and Natural Sciences, Medan State University. The population of this study consisted of all students from the 2021 Biology program, totaling 120 individuals. The research sample comprised 31 participants selected through purposive sampling technique. This study employed a descriptive research design. The results revealed that students demonstrated a level of science literacy skills in the Fungi topic categorized as Functional Scientific Literacy, with an average percentage of 67.4%. Additionally, the students exhibited high learning interest in the Fungi topic, with an average percentage of 70.72%.

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INTRODUCTION

The advancement of technology greatly influences the development of science and technology (ST). ST serves as a readiness center for the younger generation to thrive in a modern society. Science and technology can be learned by mastering literacy skills. Literacy is an individual's ability to acquire, learn, and utilize useful information for their life journey, as part of their quality and potential development. One aspect of literacy is science literacy (Permatasari & Fitriza, 2019).

Science literacy encompasses scientific knowledge and understanding, including the concepts and processes that enable individuals to make informed decisions. Furthermore, science literacy can be understood as the comprehension of science and its application for societal needs (Dewi, 2016). Along with the passage of time, science and technology have made significant contributions in helping humans face future challenges and issues (Fischhoff et al., 2014).

Higher education institutions play a role in introducing and enhancing science literacy in society by equipping students to apply basic scientific knowledge and technology in social life. One such institution is Medan State University (UNIMED), which is known for producing prospective educators. In their learning process, UNIMED implements the KKNI curriculum.

The Indonesian National Qualifications Framework (KKNI) is a statement of the quality of Indonesian human resources, with qualifications based on levels of proficiency expressed through learning outcomes (Setiawan, 2017). The implementation of the KKNI curriculum at Medan State University involves six assigned tasks: Routine Tasks (TR), Critical Book Review (CBR), Critical Journal Review (CJR), Mini Research (MR), Idea Engineering (RI), and projects. The science literacy skills of students can be observed through the completion of the Mini Research (MR) task.

Based on the assessment of students' scientific literacy indicators, it is evident that the activities in mini research not only elicit but also enhance various competencies of students. These competencies encompass not only cognitive skills but also affective and practical skills (Permari, 2016).

Science literacy can be applied in all courses for students (Pujiastutik, 2018), including the topic of fungi, which is a part of the Low-Level Organism Taxonomy course. Science education also aims to enhance students' interest in developing knowledge, skills, and thinking abilities. Interest is a manifestation of attraction towards something and reflects an individual's interest in a goal. This attraction is rooted in the needs and desires of students to be motivated to participate in learning activities, which ultimately influences academic achievement (Syardiansah, 2016). The researcher will also analyze students' learning interest during the implementation of the learning process regarding the topic of fungi.

Considering the importance of science literacy skills that students must possess, the researcher is motivated to further explore the science literacy skills and learning interest of students in the Biology program at UNIMED, specifically in the topic of fungi. The objectives of this research are to determine the science literacy skills of students in the Low-Level Organism Taxonomy course, particularly in the topic of fungi, and to assess students' learning interest in the same course.

METHOD

This research was conducted at the Department of Biology, Faculty of Mathematics and Natural Sciences, Medan State University, located at Jl. Willem Iskandar Medan Estate. The research was carried out from May until its completion.

The population of this study consisted of all the students in the 2021 cohort of the Biology program, totaling 122 individuals. The research sample was selected using purposive sampling technique. Purposive sampling is a non-random sampling method in which the researcher selects specific individuals who align with the research objectives, with the expectation of obtaining relevant responses for the research case (Ika, 2021). In this study, the sample class chosen was PSB 21A, consisting of 31 students.

This study employed a descriptive research design, which aims to describe phenomena, interpret and explain data. The data collection techniques used in this research included observation sheets, questionnaires, and interviews.

Observation sheet

In the observation sheet, the obtained scores are calculated as percentages for each parameter. The formula used is as follows:

$$P = \frac{A}{B} \times 100\%$$

Note:

P = observation result (%)

A = total score observed

B = max score

Then, the percentage results are interpreted using sentences based on a table of percentage criteria for each parameter, categorized into 5 categories.

Table 1. Observation Sheet Parameter Criteria

Interval	Criteria
81% - 100%	*Multidimensional Scientific literacy*
68% - 80%	*Conceptual Scientific literacy*
52% - 67%	*Functional Scientific literacy*
36% - 51%	*Nominal Scientific literacy*
20% - 35%	*Scientific illiteracy*

Learning Interest Questionnaire

For the questionnaire section, scoring was carried out so that the data could be analyzed further by giving a numerical score in each of the selected statements. Furthermore, the calculation of the frequency in each category of answers in each variable is performed. The score that has been calculated can then be entered into the following formula:

$$P = \frac{A}{B} \times 100\%$$

Note:

P = Interest score

A = questionnaire score

B = max score

After conducting a descriptive analysis, the results obtained from the research results are categorized based on the following percentage criteria scale:

Table 2. Questionnaire Response Criteria

Interval	Kriteria
81% - 100%	Very high
61% - 80,0%	High
41% - 60,0%	Moderate
20% - 40,0%	Low

RESULTS AND DISCUSSION

Level of Student Science Literacy Ability

The results of the observational analysis of mini research reports (practicum reports) on scientific literacy skills in the Fungi material are based on three aspects of competency that are measured in scientific literacy. These aspects include identifying scientific issues (problems), explaining scientific phenomena, and using scientific evidence. The data, presented in Table 3, illustrates the average scientific literacy ability in the Fungi material among students in the Biology study program at Medan State University, class of 2021, as observed from the mini research reports (practicum reports). The findings indicate that students exhibit Functional Scientific literacy (possessing functional scientific literacy), with the highest percentage, 79.13%, observed in the aspect of identifying scientific issues within the Conceptual Scientific literacy category (possessing conceptual scientific literacy). On the other hand, the lowest percentage, 58.24%, is observed in the aspect of explaining scientific phenomena within the Functional Scientific literacy category. For a more detailed depiction of these results, refer to Figure 1.

Table 3. Recapitulation of Observation Results of Scientific Literacy Skills Based on Measured Aspects

No	Aspect	Percentages	Category
1.	Identifying scientific issues	79,13%	*Conceptual Scientific literacy*
2.	Explaining scientific phenomena	58,24%	*Functional Scientific literacy*
3.	Utilizing scientific evidence	64,83%	*Functional Scientific literacy*
	Rata-rata	**67,4%**	***Functional Scientific literacy***

Identifying scientific issues

Overall, it is evident that in this aspect, students fall into the category of Conceptual Scientific literacy. The analysis results indicate that students do not encounter significant difficulties in mastering the aspect of identifying scientific issues in the Fungi material. This is indicated by their ability to identify and develop their understanding of various phenomena or issues, such as the characteristics of Ascomycota and Zygomycota, in

a detailed, clear, sequential, and coherent manner based on literature. According to the assessment of scientific literacy by Shwartz, as cited by Jufri (2017), individuals at this category or level are able to develop an understanding of the conceptual framework within a scientific discipline and connect it to broader general understanding in the field of science. In this case, it refers to students' understanding of Ascomycota and Zygomycota. Additionally, at this level, individuals are capable of understanding and implementing scientific inquiry and integrating relevant technology to solve problems.

Upon a deeper analysis based on the observation results of the indicator of identifying valid scientific opinions, it is evident that students in the Biology study program fall into the category of Multidimensional Scientific literacy. This indicates that students can recognize scientific issues to be investigated, as outlined in the theoretical framework. In the theoretical framework, students provide a general explanation of fungi and then delve into the specific characteristics of Ascomycota and Zygomycota. They also relate these characteristics to relevant facts or the topic of the research problem. According to the assessment of scientific literacy, students at this level are capable of integrating broader scientific understanding by considering the philosophical, historical, and social aspects of science and technology. Students at this level are able to develop multiple understandings and appreciate the role of science and technology in everyday life (Jufri, 2017).

It can be understood that students do not encounter significant difficulties, as indicated by their achievement scores. This finding aligns with the research conducted by Novitasari (2018), which explains that students' high ability to identify valid scientific opinions is closely related to their understanding of scientific knowledge. This enables students to identify and recognize key characteristics of each occurrence or issue relevant to the Fungi material, allowing for scientific investigation.

Explaining scientific phenomena

Based on the observation results of the mini research reports (practicum reports), it can be concluded that students, as a whole, fall under the category of Functional Scientific literacy. This indicates that students still face various challenges or difficulties in conducting effective literature searches, understanding elements of research design, and applying quantitative skills, including basic statistics, in completing tasks required by the KKNI, especially in the Fungi material. According to the assessment of scientific literacy by Shwartz (as cited in Jufri, 2017), individuals with functional scientific literacy are able to describe a concept accurately, but their understanding is still limited.

The observation results reveal that students' understanding of effective literature searches is limited, which can be attributed to internal factors of students and the difficulty in accessing relevant sources on the subject matter. This finding aligns with a study conducted by Fuadi et al. (2020), which identified factors such as limited access to literature, particularly in remote areas, and poor reading and research traditions as reasons for the lack of meaningful interpretation of readings or literature. Another example is the minimal use of citations from literature in the mini research reports. Some students only cited from one book and one journal, while others used journals with incomplete identities, which were included in the reference list but not actually cited. Additionally, many students relied on secondary references, such as module materials, without making an effort to find other relevant references. This finding is consistent with a study by Daniel and Taneo (2019) that highlighted students' difficulties in finding literature due to their lack of effort in searching for appropriate journal articles or books.

The observation results also indicate that students' scientific literacy skills are still at the level of Functional Scientific literacy, particularly in understanding the elements of research design. This is due to students' lack of understanding of research design, and many students have limited experience in creating a good and proper scientific work. Another reason is the lack of precision among students in completing the KKNI tasks, especially in the mini research report. It was found that some students did not follow the given format and had a casual attitude towards writing the mini research report. Furthermore, students' understanding of presenting data and interpreting basic statistics in the mini research tasks is still lacking. This can be seen from the quality of students' observations and tables. While students are capable of making observations, they still struggle to present data accurately, for example, many students incorrectly identify parts of Ascomycota and Zygomycota fungi under the microscope. In addition, some students fail to follow the given format in the observation tables.

Therefore, it is necessary to improve this situation and provide optimal reinforcement by

providing exercises to strengthen students' analysis and interpretation skills using statistical literacy learning media. This will manifest in their ability to analyze graphs, tables, and interpret statistical information presented in texts (Takaria & Talakua, 2018). Ultimately, students will become accustomed to using statistical analysis in various research and scientific activities.

Utilizing scientific evidence

The last aspect of scientific literacy competence measured is related to students' ability to use scientific evidence in making inferences, predictions, and drawing conclusions. The analysis results indicate that students' ability in this aspect still falls within the category or level of Functional Scientific literacy (possessing functional scientific literacy). As mentioned earlier, students at this level are capable of accurately describing a concept, but their understanding is still limited. In this case, most students still have a limited understanding, particularly in making conclusions. Students' conclusions are often based on theories or general assumptions.

Therefore, the lack of understanding among students in identifying facts and making predictions can lead to incorrect decision-making or drawing inaccurate conclusions. According to a study by Rismen (2015), one of the challenges faced by students in scientific writing is formulating hypotheses. Students are not proficient in formulating research hypotheses, resulting in research going in the wrong direction due to incorrect conclusions. Students should be able to understand the purpose of each statistical formulation. With a good understanding of this, there will be no mistakes in data processing during research.

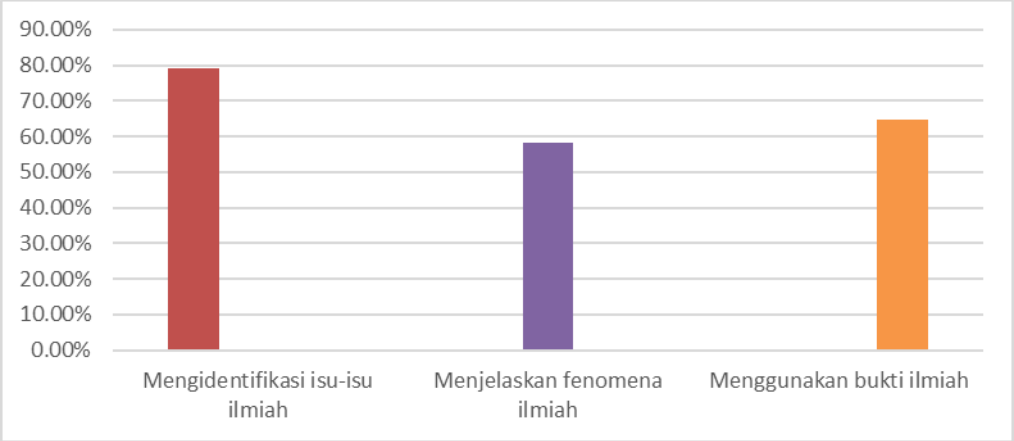

Figure 1. Percentage Comparison Diagram of Competency Aspects Measured in Scientific Literacy

Learning Interest Questionnaire Results

The results of the questionnaire analysis based on indicators of interest in learning can be seen in the following table.

Table 4. Results of Questionnaire Analysis on Learning Interest

No	Indicator	Percentage	Category
1	Feeling enjoyment	77,21%	High
2	Attention during learning	73,72%	High
3	Interest	68,00%	High
4	Engagement	63,97%	High
	Average	**70,72%**	**High**

Indicator: feeling of enjoyment

Based on the results of the questionnaire analysis, it is known that the percentage obtained for the indicator of feeling happy is 77.21%, categorized as high. The high interest in learning is indicated by the high level of happiness. The enthusiasm for learning can be influenced by the feeling of happiness. This is evident when students

feel happy while discussing the Zygomycota and Ascomycota materials in the TOTR course, and they never complain when given assignments by the lecturer. When a person feels happy about something, they will not feel burdened when doing it; instead, they will continue to work on it. In line with the research conducted by Erna (2018), a student who feels happy about Science subjects will continue to study the subject without any sense of obligation. Similarly, if a student feels happy about the Fungi material, they will study it without complaining, without being told, and without being forced to do so.

Attention during learning

Based on the questionnaire analysis, it can be determined that the percentage obtained for the indicator of attention while studying is 73.72%, categorized as high. The high level of interest is indicated by the high level of attention. In this case, Biology students show high levels of attention while studying, as evidenced by their lack of difficulty in understanding the characteristics of Zygomycota and Ascomycota species when the fungi material is explained. If there is any material that they do not understand, the students make an effort to study it carefully and remain concentrated during the learning process.

This aligns with the findings of Nurlia & Anggo (2020), who stated that a person's interest in a particular subject is demonstrated through their attention during the learning process. Attention plays a crucial role in ensuring that learners achieve good and optimal learning outcomes. Another viewpoint states that attention is the concentration or mental activity directed towards observation, understanding, and so on, while disregarding all other distractions. It means that if learners pay attention during the learning process, they will naturally focus on the subject matter (Nurlia & Anggo, 2020). This indicates that Biology students have a higher level of attention when studying the Fungi material.

Interest

Based on the questionnaire analysis, it can be determined that the percentage obtained for the indicator of interest is 68%, categorized as high. The high level of interest is indicated by the strong interest shown. A strong interest in learning a subject enables learners to be more diligent in studying to achieve desired achievements (Syah, 2010). Learners cannot effectively learn if there is no interest, which also signifies a lack of engagement. In this case, the interest of Biology students in the fungi material is demonstrated by their revisiting the topics on reproduction in the Zygomycota and Ascomycota phyla, reading the materials provided by the lecturer before the start of the learning session, and independently completing assignments without copying from their peers.

This aligns with the findings of Berutu & Tambunan (2018), who stated that learning satisfaction is achieved when learners have a genuine interest in the subject matter. In this context, Biology students demonstrate a high level of interest when studying the Fungi material. It means that they have a greater desire to learn and understand the Fungi material, particularly regarding Ascomycota and Zygomycota. This is in line with Djamarah (2011), who stated that learners' interest in learning is demonstrated by their increased curiosity about the topics being studied. This interest is expressed through active listening, paying attention to explanations, and being more attentive to the objects of their interest.

Engagement

Based on the questionnaire analysis, it can be determined that the percentage obtained for the indicator of engagement is 63.97%, categorized as high. The high level of interest in learning is demonstrated by the very high level of engagement. Biology students show a high level of engagement during the learning process of the fungi material. For example, they ask questions to the lecturer about the reproduction process of Ascomycota and Zygomycota that they don't yet understand, and they provide their opinions on the fungi material during the lessons.

This aligns with Djamarah's (2011) viewpoint, stating that interest can be expressed through active participation in specific activities. It is also in line with the perspective of Hala et al. (2017), who stated that high interest can be demonstrated by learners' activities and involvement in the learning process that they enjoy.

The results of the questionnaire analysis based on the indicators can be depicted in a diagram, as shown in Figure 2 below.

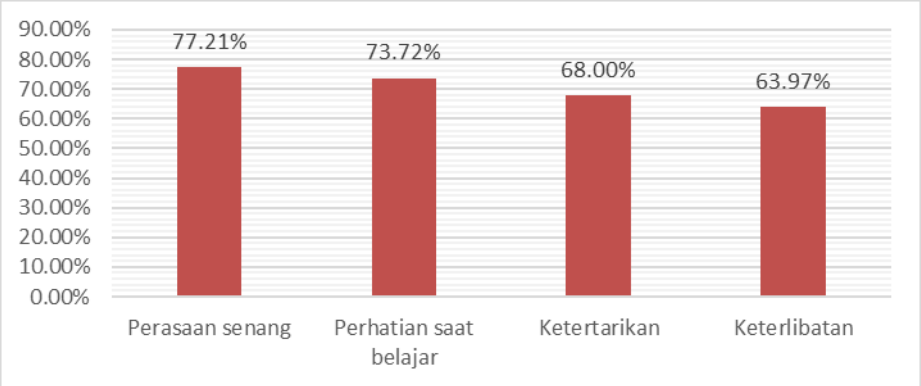

Figure 2. Distribution Diagram of Learning Interest Indicators

CONCLUSION

Based on the research findings and discussions presented above, it can be concluded that the scientific literacy skills of Biology students in the Fungi subject at the State University of Medan are categorized as Functional Scientific Literacy, based on the data obtained from the observation of mini research reports (laboratory reports). The average percentage of scientific literacy skills is 67.4%. Secondly, the interest in learning among Biology students in the Fungi subject at the State University of Medan, based on the data obtained from the questionnaire, indicates that students have a high interest in learning the fungi material, with an average percentage of 70.72%.

REFERENCES

Berutu, M. H. A., & Tambunan, M. I. H. (2018). Pengaruh Minat Dan Kebiasaan Belajar Terhadap Hasil Belajar Biologi Siswa Sma Se-Kota Stabat. Jurnal Biolokus, 1(2), 109. https://doi.org/10.30821/biolokus.v1i2.351

Daniel, F., & Taneo, P. N. L. (2019). Analisis Kesulitan Mahasiswa Dalam Penyusunan Proposal Penelitian Pendidikan Matematika. JPMI (Jurnal Pendidikan Matematika Indonesia), 4(2), 79. https://doi.org/10.26737/jpmi.v4i2.956

Dewi. (2016). Kemampuan Literasi Sains Mahasiswa Pgsd. Journal Universitas Almuslim, 3(2), 22–28.

Djamarah, S.B. (2011). Psikologi Belajar. Jakarta : Rineka Cipta.

Erna, Y. (2018). Analisis Penggunaan Media Internet Terhadap Minat Belajar Biologi Peserta Didik Kelas XII SMA Negeri Se-Kota Bandar Lampung. UIn Raden Intan Lampung, 1–177.

Fischhoff, B., Wong-Parodi, G., & Davies, A. L. (2013). Communicating scientific uncertainty. Proceedings of the National Academy of Sciences, 110(Supplement 3), 14077-14084.

Fuadi, H., Robbia, A. Z., & Jufri, A. W. (2020). Analisis faktor penyebab rendahnya kemampuan literasi sains peserta didik. 5, 108–116.

Hala, Y., Muchtar, R., Jumadi, O., & Taiyeb, A. M. (2017). 6552-13102-1-Sm. Jurnal Pendidikan Biologi, 6(2), 321–328.

Ika, L. (2021). Teknik pengambilan sampel purposive dan snowball sampling. Jurnal Kajian, Penelitian & Pengambilan Pendidikan Sejarah, 6(1), 33–39. http://journal.ummat.ac.id/index.php/historis/article/download/4075/pdf

Jufri, A. W. (2017). Belajar Dan Pembelajaran Sains Konstruktivistik. 176.

Novitasari, N. (2018). Profil Kemampuan Literasi Sains Mahasiswa Calon Guru Biologi. Biosfer : Jurnal Tadris Biologi, 9(1), 36. https://doi.org/10.24042/biosf.v9i1.2877

NURLIA, N., & ANGGO, S. (2020). Hubungan Kecerdasan Naturalistik Dan Minat Belajar Dengan Hasil Belajar Biologi Siswa Sma Di Kota Luwuk. Jurnal Pendidikan Glasser, 4(2). https://doi.org/10.32529/glasser.v4i2.687

Permari, N. (2016). Pengaruh Mini Riset terhadap Keterampilan Proses Sains Terintegrasi Siswa pada Materi Pencemaran Lingkungan. Seminar Biologi, 13(1), 312–317. http://www.jurnal.fkip.uns.ac.id/index.php/prosbio/article/view/9515

Permatasari, P., & Fitriza, Z. (2019). Analisis Literasi Sains Siswa Madrasah Aliyah pada Aspek Konten, Konteks, dan Kompetensi Materi Larutan Penyangga. EduKimia, 1(1). https://doi.org/10.24036/ekj.v1i1.104087

Pujiastutik, H. (2018). Peningkatan Sikap Literasi Sains Mahasiswa Melalui Model Pembelajaran Problem Based Learning Pada Mata Kuliah Parasitologi. Jurnal Biogenesis, 14(2), 61–66.

Setiawan, D. (2017). Pengembangan Model Kurikulum Berorientasi KKNI di Fakultas Ilmu Sosial Universitas Negeri Medan. Jupiis: Jurnal Pendidikan Ilmu-Ilmu Sosial, 9(2), 112. https://doi.org/10.24114/jupiis.v9i2.8239

Syardiansah. (2016). Hubungan motivasi belajar dan minat belajar terhadap prestasi belajar mahasiswa mata kuliah pengaturan