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STUDENTS' PROFILE ON ABILITY TO EXPLAIN BASIC CONCEPTS ON BIOLOGY OF THE CELL COURSE

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Abstract

The low quality of students' understanding of basic concepts in cell biology courses is reflected in the quality of students when explaining these concepts in class. Therefore, there was a need for information regarding student profiles to explain basic concepts of cell biology. This research aimed to describe the student's profile. This quantitative descriptive research involved 41 students from the UMRAH Biology Education Study Program who took the Cell Biology course in the odd semester of 2023-2024. This research used observation sheets to observe explanation skills. Based on the results and discussion obtained, the student profile regarding skills in explaining basic concepts of cell biology is in the less skilled category.

Keywords: Ability; Explain; Concepts; Biology; Cell

Abstrak

Kualitas pemahaman mahasiswa yang rendah tentang konsep-konsep dasar pada mata kuliah biologi sel tercermin dari kualitas mahasiswa ketika menjelaskan konsep-konsep tersebut di dalam kelas. Oleh karena itu, perlu adanya informasi mengenai profil mahasiswa tentang keterampilan menjelaskan konsep-konsep dasar biologi sel. Penelitian ini bertujuan untuk mendeskripsikan profil mahasiswa tersebut. Penelitian deskriptif kuantitatif ini melibatkan mahasiswa Program Studi Pendidikan Biologi UMRAH yang mengikuti mata kuliah Biologi Sel di semester ganjil 2023-2024 sebanyak 41 orang. Penelitian ini menggunakan lembar observasi untuk mengamati keterampilan menjelaskan. Berdasarkan hasil dan pembahasan yang diperoleh, maka dapat disimpulkan bahwa profil mahasiswa tentang keterampilan menjelaskan konsep-konsep dasar biologi sel berada pada kategori kurang terampil.

Kata Kunci: Keterampilan; Menjelaskan; Konsep; Biologi Sel

INTRODUCTION

Education is a very important effort to build a nation. A person who has received education to a higher level is expected to become a competent human being to build a better nation and state. Students who are formed while studying at tertiary institutions are expected to be able to contribute through a series of skills that must be mastered to face current advances in technology and information. Through higher education, students are required to become professionals who can be useful to anyone in their respective fields, including students who are prospective biology teachers.

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Prospective biology teacher students are required to be able to demonstrate their qualities as future teacher candidates, including students in the Biology Education Study Program at Universitas Maritim Raja Ali Haji (UMRAH). According to Undang-undang Nomor 14/2005 concerning Teachers and Lecturers, a teacher must have professional competence. This competency requires student teachers, including prospective biology teachers, to master important basic knowledge in the field of biology, such as basic concepts in cell biology (Saipani et al., 2024).

However, based on the results of observations made on students in the UMRAH Biology Education Study Program, there are several facts. First, students experience difficulties in learning. For example, in the study of the Cell Biology course, it was observed that most students still needed help understanding the basic concepts required. Second, the results of this observation are supported by the average midterm exam score for UMRAH students in class 2022 in the July-December 2023 semester, only reaching 60.65. This result is also supported by research conducted by Rahma, et al. (2022) stating that there are difficulties in understanding the relationship between the structure of the cell components discussed and their function. Difficulties like this also cause students to find it difficult to explain and apply a comprehensive and broader understanding of various other subjects. As a result, the professional competence that has been required of prospective biology teacher students will not be achieved optimally. According to Gregers and Lunde (2021), this weak understanding impacts the ability to apply knowledge on a wider scale. Third, this professional competency is a profile that prospective teacher students must meet. However, the weaknesses found based on the observations and learning results indicate that further research is needed to improve the professional competence of prospective teachers so that lecturers can determine the extent of student's understanding of basic concepts in biology courses. This cell in particular. One thing that can be done to overcome this problem is to describe the student's profile regarding the skill of explaining the basic concepts of cell biology first to determine the next steps to improve the quality of the learning process in the future(Maulana et al., 2022).

Based on the explanation of the problems expressed, researchers are interested in studying student profiles regarding their skills in explaining basic concepts of cell biology. This research aims to describe student profiles regarding skills in explaining basic concepts of cell Biology(Julianti et al., 2022). The results of this research can help lecturers develop and apply a model, method or learning approach that is more effective and efficient, thereby increasing student understanding. Furthermore, these results can serve as a basis for the development of better higher education curricula in line with the demands of the times.

Explaining skills is one of the basic teaching skills that a teacher must master (Lisnawati, et al. 2022). This skill requires a teacher to clearly explain the material he wants to provide so that students can understand the knowledge being taught. Explaining skills also requires a teacher to be able to provide material in a systematic and organized manner to make it easier for students to understand the material being studied(Maulana et al., 2022).

According to (Sundari, et al. 2020), the aim of mastering these explanation skills is:

1. Helps improve students' understanding;

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2. Inviting students to think about solving the cases or problems presented;
3. As a way to provide feedback to students to avoid misunderstandings;
4. Helping students to reason and utilize evidence in solving the problems discussed;
5. Helping students objectively understand the principles, concepts, procedures or propositions the material discusses.

There are several benefits felt when a teacher has good explanation skills, namely:

1. Explaining skills can increase students' interest in learning (Annisa, 2021).
2. This explanation skill can also influence learning outcomes (Gumohung, et al. 2021).
3. Explaining skills can make communication between educators and students effective (Umar, 2009).
4. Good explanation skills help students who have difficulty finding information themselves through the references they have.
5. Good explanation skills can help teachers to provide clear and systematic information to students.
6. Explaining skills can also improve students' learning achievement(Dara, et al. 2015).

According to Jundi, et al. (2020), several indicators can be observed to measure the explaining skills of a teacher or prospective teacher, namely:

1. Planning the messages you want to convey;
2. Explain the material by providing examples that are relevant to everyday life;
3. Presenting explanations of the most important concepts according to learning objectives;
4. Explain material in simple and easy-to-understand language;
5. Carry out variations in explaining material to students;
6. Provide feedback to students.

RESEARCH METHODS

This research is a qualitative descriptive research. This research targeted 41 UMRAH Biology Education Study Program students who took the Cell Biology course in the odd semester of 2023-2024. This research uses observation sheets to observe students' explanation skills when presenting material in a cell biology course adapted from Jundi, et al. (2020), Saepudin (2019) and Widiarsari, et al. (2019). There are four indicators for assessing explanation skills that are observed, namely:

1. Clarity of concepts presented
2. Skills in using examples/illustrations
3. Provide emphasis
4. Use language that is easy to understand

The steps taken in analyzing the data obtained from this observation sheet can be explained as follows.

1. Students are asked to present material about cell biology that is being studied.
2. Researchers observed the skills in explaining cell biology concepts using the assessment rubric in the following table.

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Table 1. Explaining Skills Assessment Rubric

Indicator	Criteria
Clarity of concepts presented	5 = if the student can explain the concept with a correctness range of 80-100% 4 = if the student can explain the concept with a correctness range of 60-79% 3 = if the student can explain the concept with a correctness range of 40-59% 2 = if the student can explain the concept with a truth range of 20-39% 1 = if the student can explain the concept with a truth range of 0.1-19% 0 = if the student is unable to explain the concept correctly
Use examples/ illustrations	5 = If the student can use more than four examples/illustrations correctly 4 = If the student can use four examples/illustrations correctly 3 = If the student can use three examples/illustrations correctly 2 = If the student can use two examples/illustrations correctly 1 = If the student can use one example/illustration correctly 0 = if the student is unable to use examples/illustrations correctly
Provide emphasis	5 = if the student can emphasize more than four concepts that are explained correctly 4 = If the student can emphasize the four concepts that are explained correctly 3 = if the student can emphasize the three concepts that are explained correctly 2 = if the student can emphasize the two concepts that are explained correctly 1 = if the student can emphasize a concept that is explained correctly 0 = if the student is unable to emphasize the concept being explained correctly
Use language that is easy to understand	5 = If students can use language that is clear, straightforward, simple and not complicated 4 = if the student can use language that is clear, direct, simple, but complicated 3 = If the student can use language that is clear and straightforward but complicated and convoluted 2 = If the student can use clear language but is not straightforward, complicated and convoluted 1 = If the student uses language that is unclear, not straightforward, complicated or convoluted 0 = if the student is not able to use language that is easy to understand at all

3. Then, the researcher gives a score to each assessment indicator according to the assessment rubric that has been presented.
4. Researchers calculated the number of students based on the scores obtained on each assessment indicator to calculate the percentage.
5. After that, all the observation data obtained is calculated as the average score per student.
6. Then, the results are interpreted based on the categories of students' explanation skills, presented in the following table.

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Table 2. Student Explaining Skills Category

Average Interval	Category
0-0.9	Very Unskilled
1-1.9	Unskilled
2-2.9	Less Skilled
3-3.9	Quite Skilled
4,4,9	Skilled
5	Very Skilled

RESULTS AND DISCUSSION

Observing students' explanation skills was carried out during two meetings. Students are asked to present material without the help of notes or other tools. Two materials are used as references during the observation of skills in explaining basic concepts of cell biology, namely cell structure and function and cell membrane structure and function. The results of observing students' explaining skills for each aspect of the assessment can be explained in the following points.

Assessment of Clarity of Concepts Presented

The results of observations regarding the clarity of concepts presented by students in the cell biology course can be seen in the following table.

Table 3 . Percentage of Assessment of Aspects of Clarity of Concepts Presented

Score	Number of Students	Percentage
5	1	2.44
4	4	9.76
3	17	41.46
2	14	34.15
1	5	12.20
0	0	0.00
Total	**41**	**100**

Based on Table 3, the highest score regarding students' skills in providing clear concepts is at score 3 at 41.46%. It shows that the student's mastery of the material still needs improvement. The concepts in the cell biology material studied are systematically contained in the semester learning plan (RPS). The RPS that has been distributed contains basic material, especially on the structure and function of cells as well as the structure and function of cell membranes. This main material is then translated into learning objectives and included in teaching materials distributed to students. Mulyatun (2016)explains that the ability to explain is the ability to organize the main material that participants need to master systematically to make it easier for students to understand the material being discussed. Based on the results of these observations, students are still unable to organize their understanding of the material which has been prepared in the RPS but has not yet been absorbed properly.

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Assessment of Using Examples/Illustrations

The results of observations on aspects using several examples or illustrations in the material contained in the cell biology course can be seen in the following table.

Table 4 . Percentage of Aspect Assessment Using Examples/Illustrations

Score	Number of Students	Percentage
5	**1**	**2.44**
4	**1**	**2.44**
3	**6**	**14.63**
2	**12**	**29.27**
1	**21**	**51.22**
0	**0**	**0.00**
Total	**41**	**100.00**

Table 4 shows that the highest score for the skill aspect of providing examples or illustrations by the highest students was score 1 at 51.22%. It shows that students need to be more skilled in giving examples related to the structure and function of cells, as well as the structure and function of cell membranes. For example, you can explain the semi-permeable properties of cell membranes by making an analogy like a filter used when taking coconut milk. This semi-permeable concept can be strengthened through such contextual examples. However, not everyone can explain it with relevant examples. This aligns with the finding (Deswita, 2017) that students still need to be able to provide relevant examples in everyday life. According to him, Hu, et al. (2021), one of the attributes that a person needs to have to be able to explain natural phenomena is using *facts.* The facts discovered by students in everyday life should be the main capital for explaining the phenomena or functions of the cell parts they study. However, this did not happen to the students observed. Therefore, to improve students' ability to provide examples relevant to everyday life, lecturers can provide a more contextual learning approach so that students can better understand the material they are studying.

Assessment of Provides Emphasis

The results of observations on the aspect of emphasizing when explaining material in the cell biology course can be seen in the following table.

Table 5. Percentage of Assessment of Aspects Providing Emphasis

Score	Number of Students	Percentage
5	**0**	**0.00**
4	**2**	**4.88**
3	**9**	**21.95**
2	**19**	**46.34**
1	**11**	**26.83**
0	**0**	**0.00**
Total	**41**	**100.00**

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Based on Table 5, the quality of students in giving emphasis is highest at score 2 at 46.34%. It shows that students still need to be more skilled in emphasizing explaining the concepts being studied. This emphasis should be placed on providing the right expression or intonation so other listening students can understand it well. Students' expressions and intonation when explaining the material can also increase their activeness, so they want to be involved during the learning process, even though the learning is done online (Marpaung, et al., 2020). During the presentation activity, the researcher observed that there was still no visible student activity due to the lack of emphasis on certain concepts, making it even more difficult for students to understand the material.

Assessment of Using Language that is Easy to Understand

The results of observations on aspects of using language that is easily understood by students when explaining material in cell biology courses can be seen in the following table.

Table 6. Percentage of Aspect Assessment Using Language that is Easy to Understand

Score	Number of Students	Percentage
5	**0**	**0.00**
4	**3**	**7.32**
3	**14**	**34.15**
2	**17**	**41.46**
1	**7**	**17.07**
0	**0**	**0.00**
Total	**41**	**100.00**

Based on Table 6, the highest score for assessing this aspect is 2, with a percentage of 41.46%. It means that many students still need to be able to explain the concepts studied in cell biology courses in simple and easy-to-understand language. If we examine the opinion of Harley (2013), the use of language that is easy to understand needs to be trained because the explanation of cell biology material concepts depends on this. Someone who can use language that can be clearly understood allows other people to make connections between existing knowledge and their new knowledge. Apart from that, Quillin and Thomas (2015) also explained that using easy language can help students understand visual cell biology material concepts. The material studied in cell biology courses generally uses many visualizations of images that are difficult to find in everyday life. For example, the structure of cell membranes. Students' difficulties were also observed when explaining the process of transporting substances across cell membranes. This material is a form of mechanism or process that students must understand. However, this was not visible at the time of observation. According to Ross (2021), the use of language that is easy to understand can improve students' understanding, including when understanding material regarding complex mechanisms or biological processes in cells. Apart from that, Vijapurkar, et al. (2014) provides recommendations that to gain a better understanding of this mechanical material, visual explanations in language that are easy to understand can

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also be helpful. Therefore, students must practice applying sentences that can better explain a topic or material.

Assessment Recapitulation

The results of the recapitulation of observations on all aspects of assessing students' explanation skills during the two meetings can be seen in the following table.

Table 7. Student Observation Results Regarding Skills in Explaining Basic Concepts of Cell Biology

Student	Assessment Indicator Score				Average	Category
	1	2	3	4		
1	3	1	2	3	2.25	Less Skilled
2	3	1	2	3	2.25	Less Skilled
3	3	1	2	3	2.25	Less Skilled
4	5	5	4	4	4.50	Skilled
5	4	4	4	3	3.75	Quite Skilled
6	2	1	1	2	1.50	Unskilled
7	2	1	2	2	1.75	Unskilled
8	2	1	2	2	1.75	Unskilled
9	1	1	1	1	1.00	Unskilled
10	2	1	1	2	1.50	Unskilled
11	2	1	1	2	1.50	Unskilled
12	1	1	1	1	1.00	Unskilled
13	2	1	2	2	1.75	Unskilled
14	4	3	3	4	3.50	Quite Skilled
15	1	1	2	1	1.25	Unskilled
16	3	2	2	3	2.50	Less Skilled
17	2	2	3	3	2.50	Less Skilled
18	3	2	2	3	2.50	Less Skilled
19	4	1	3	3	2.75	Less Skilled
20	3	1	3	3	2.50	Less Skilled
21	3	1	3	3	2.50	Less Skilled
22	2	1	2	2	1.75	Unskilled
23	3	1	2	2	2.00	Less Skilled
24	3	2	2	2	2.25	Less Skilled
25	2	3	3	2	2.50	Less Skilled
26	1	2	1	1	1.25	Unskilled
27	3	3	3	3	3.00	Quite Skilled
28	2	3	2	1	2.00	Less Skilled
29	2	2	2	2	2.00	Less Skilled
30	2	2	1	2	1.75	Unskilled
31	2	1	1	1	1.25	Unskilled

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Student	Assessment Indicator Score				Average	Category
	1	2	3	4		
32	3	2	2	2	2.25	Less Skilled
33	2	2	2	2	2.00	Less Skilled
34	1	1	1	1	1.00	Unskilled
35	4	3	3	3	3.25	Quite Skilled
36	3	1	1	2	1.75	Unskilled
37	3	1	1	2	1.75	Unskilled
38	3	3	3	4	3.25	Quite Skilled
39	3	2	2	2	2.25	Less Skilled
40	3	2	2	3	2.50	Less Skilled
41	3	2	2	3	2.50	Less Skilled
Average					**2.17**	**Less** Skilled

Description of Assessment Indicators:

1 = clarity of the concept conveyed

2 = Using examples/illustrations

3 = Provides emphasis

4 = Use language that is easy to understand

Based on Table 7, the average obtained is in the less skilled category. It shows that skills in explaining basic cell biology concepts still need improvement. However, only one person has the skill to explain in the skilled category. These results provide a general picture that student teachers in the Biology Education Department need help conveying basic concepts in cell biology courses. This could impact other skills that are demanded in the 21st century today. For example, critical thinking skills. According to Utami, et al. (2021), one component of critical thinking skills is explanation skills. When someone is explaining something to someone else, they will try to find effective ways and solutions so that other people can easily understand the messages they want to convey. Therefore, student teachers must master the ability to convey concepts clearly to others.

Then, based on Table 7, the students observed can also be grouped based on their skills in explaining basic concepts in cell biology courses. The grouping results can be seen in the following table.

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Table 8 . Number of Students Based on Explaining Skills Category

Category	Number of Students
Very Unskilled	0
Unskilled	16
Less Skilled	19
Quite Skilled	5
Skilled	1
Very Skilled	0
Total	**41**

Based on Table 8, it can be seen that the largest group of students in terms of explanation skills are in the "Less Skilled" category. It shows that there is a need for further research to improve students' professional competence in the future.

CONCLUSION

Based on the results and discussion presented, it can be concluded that the student profile regarding skills in explaining basic concepts of cell biology is in the less skilled category. These results can be used as a basis for improving the quality of the learning process in the classroom to be even better in order to increase student competence.

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