

ANALYSIS OF ABILITY OF BIOLOGICAL EDUCATION ALUMNI IN MANAGEMENT AND IMPLEMENTATION BIOLOGY PRACTICUM

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ABSTRAK

Penelitian ini dilatarbelakangi oleh adanya upaya untuk meningkatkan mutu lulusan Program Studi Pendidikan Biologi dalam pengelolaan dan pelaksanaan praktikum di sekolah. Tujuan penelitian adalah untuk menjabarkan kemampuan guru alumni dalam pengelolaan dan Pelaksanaan praktikum. Metode yang digunakan adalah deskriptif kualitatif dan kuantitatif yang memberi gambaran secara cermat tentang kemampuan alumni dalam mengelola dan melaksanakan praktikum. Langkah pengumpulan data adalah angket, observasi dan studi dokumentasi. Teknik yang digunakan untuk menganalisis data adalah teknik deskriptif dengan persentase. Hasil penelitian terhadap kemampuan alumni Program Studi Pendidikan Biologi dalam pengelolaan praktikum sekolah menunjukkan sebagai berikut : (1) Perencanaan program kerja laboratorium (53,33%) dinyatakan baik; (2) Pengorganisasian laboratorium dinyatakan sangat baik (33,33%) (3) Pelaksanaan program kerja laboratorium (46,66%) dinyatakan sangat baik; dan (4) Pengawasan dan evaluasi program kerja laboratorium (26,66%) dinyatakan sangat baik. Sedangkan kemampuan guru alumni dalam melaksanakan pelaksanaan praktikum masuk dalam kategori baik (75,3%). Guru berperan penting dalam pengelolaan dan pelaksanaan praktikum yang efektif.

Kata Kunci: Kemampuan alumni, Pengelolaan, Pelaksanaan, Praktikum.

ABSTRACT

This research is motivated by efforts to improve the quality of graduates of the Biology Education Departement in the management and implementation of practicum in schools. The purpose of this research is to describe the ability of alumni teachers in managing and implementing practicum. The method used is descriptive qualitative and quantitative which provides a careful description of the alumni's ability to manage and carry out practicum. The steps of data collection were questionnaires, observations and documentation studies. The technique used to analyze the data is a descriptive technique with percentages. The results of the study on the ability of the alumni of the Biology Education Study Program in managing practicum showed the following: (1) The planning of the laboratory

work program (53.33%) was declared good; (2) Laboratory organization was stated to be very good (33.33%) (3) The implementation of the laboratory work program (46.66%) was stated to be very good; and (4) the supervision and evaluation of the laboratory work program (26.66%) was stated to be very good. While the ability of alumni teachers in carrying out practicum is in the good category (75.3%). Teachers play an important role in the management and implementation of effective practicum.

Keywords: Alumni's ability, management, implementation, practicum.

INTRODUCTION

The vision of the Biology Education Study Program is to become an excellent Biology Education Study Program (in Indonesia) in research-based Biology learning that is integrated with Islamic values (BIOPERINTIS) by 2035. This study program also requires students and graduates to have the ability or proficiency in mastering a skill that is used to manage and carry out biology learning activities both concepts and practicum. Practicum activities are very important in learning science because practicum can increase motivation to study science.

Biology learning does not only focus on learning outcomes as part of the Natural Sciences subject student success in studying biology must also be based on processes and attitudes,. besides learning outcomes [1]

Because science is not only a product, but also a scientific process and attitude. Practicum can improve the basic skills of experimenting, then practicum can be a means of scientific learning, lastly practicum supports understanding of the subject matter. Based on the results of previous research on the ability of alumni of the biology education study program in the management and implementation of practicum in the western region of Aceh (Aceh Jaya, West Aceh, Southwest Aceh, Nagan Raya and South Aceh) it was found that the ability of the alumni of the Biology Education Study Program, Faculty of Tarbiyah UIN Ar- Raniry in the management of the practicum in the planning aspect of the laboratory work program is classified as good, the organization of the laboratory is classified as very good and good, the

implementation of the laboratory work program is classified as very good and the supervision and evaluation of the laboratory work program is classified as very good in the implementation of the practicum is included in the good category.

This result is very good for the development of the study program in the future, however, in order for this result to be balanced, it is necessary to look at the abilities of alumni in the Eastern Region of Aceh as well. Alumni of Biology Education Study Program are also scattered in the eastern region of Aceh, such as in Aceh Besar Pidie District, Pidie Jaya, Bireun, North Aceh, Lhoksemawe City, East Aceh, Langsa City and Aceh Tamiang, Central Aceh and Bener Meriah whose abilities have not been seen since they were born. completed his study in Biology Education Study Departement. Previous research conducted by Maknun et al., showed that lack of understanding was also found in prospective biology teacher students in ecological practicum activities, namely only 39% of prospective teacher students were able to recognize laboratory equipment and were skilled

at using them [2] Another research was also conducted by Darling -Hammond shows that teacher quality has a significant effect on student achievement. Therefore, it is important to know to what extent the teacher's skills in carrying out practicums are so that there are problems in their use. can be identified and solutions found. In this study it is concluded that this analysis triangulates data from state policy surveys, analysis of case studies on state policy making, and quantitative examination of the distribution of state achievement scores and resources, taking into account student characteristics. [3]. In addition, Dedi et al in their research stated that the problems in implementing practicum activities in schools were the lack of laboratory facilities and the lack of facilities and infrastructure to support laboratory activities, as well as the lack of readiness of teachers and laboratory assistants in mastering basic laboratory techniques [4]. Likewise, Fadli and Saat's research obtained results Teacher competence is a pillar for the safe and reliable implementation of practical lessons in biology. This study aims to determine

the proficiency of biology teachers in practical work to ensure mastery of their scientific skills. Three (3) main themes emerged during the data analysis in this study. These themes are the ability to effectively design and plan practical lessons, ensure proper preparation before conducting practicums and inappropriate evaluation of student achievement in biology lessons [4]. Based on this, this research wants to see and describe the ability of biology alumni in managing and carrying out practicals so that in the future they can prepare students to be better.

RESEARCH AND METHOD

A. Place and time of research

This research was conducted in SMP/MTs and SMA/MA with alumni of the Biology Education Study Program at UIN Ar-Raniry in the eastern region of Aceh province, namely Aceh Besar Pidie District, Pidie Jaya, Bireuen, North Aceh, and Lhoksemawe City.

B. Research procedure

1. Planning, the researcher determines the research sample, namely the alumni of the Biology Education

Study Program at UIN Ar-Raniry who teach in secondary schools/madrasas. At the planning stage, the researcher makes research instruments that will be used for research.

2. Implementation, researchers made observations, conducted interviews with research samples.
3. Evaluation, researchers analyze and process the data that has been collected with a predetermined method.
4. Report Preparation, at this stage, the activities carried out are compiling reports on research results and reporting research results.

C. Data collection techniques

Data collection techniques used in this study were observation, interviews and documentation. Observations are carried out by monitoring the implementation of the practicum, obtaining. Information on the state of the laboratory, the timing of the practicum, preparation and implementation of the practicum, as well as reports and practicum evaluation. Interviews in this study

were conducted with alumni to find out the factors that affect the alumni's ability to manage and carry out practicum [5]. Data Collection Instruments.

Data collection instruments are tools that are selected and used by researchers in their activities of collecting research data, so that these activities become systematic [6]. The data collection instrument that used are questionnaire sheets and observation sheets that have been prepared in advance before conducting research.

Measuring instruments for data collection are made, have criteria, namely validity criteria. Validity is a degree of accuracy of the instrument (measuring instrument), meaning whether the instrument used is really appropriate to measure what is to be measured [7]. This means that the questionnaire sheet as an instrument or measuring instrument in this study is made so that it is truly able to measure what will be measured so that the results can be said to be valid.

E. Data analysis techniques

Data analysis techniques were obtained from questionnaires,

interviews and documentation. The type of data in this study is quantitative data. Data on the implementation of the practicum analyzed were obtained from observation sheets to be analyzed using statistical analysis using the percentage formula as follows:

$$P = \frac{F}{N} \times 100$$

Description:

P = Percentage

F = Respondent's answer score

N = Total score

100 = Fixed number

The results of the percentage of the questionnaire to determine student responses in the implementation of the practicum will be categorized. The category of the results of this study refers to the categorization of Guttman [9].

Table 1. Guttman Questionnaire Score

No	Score Interval	Interval Category
1	81%-100%	Very Good
2	61%-80%	Good
3	41%-60%	Enough
4	21%-40%	Poor
5	0%-21%	Not Good

As for answering the third problem formulation, it was seen from the results of interviews with alumni of the biology education study program and then analyzed descriptively in the form of narration.

RESULTS AND DISCUSSION

a. Ability of Alumni of Biology Education Study Program in Managing Laboratory

The ability of the alumni of the Biology Education Study Program in laboratory management and practicum implementation is analyzed based on the trend category. Alumni who become respondents in this study are biology teachers by profession as many as 15 people. Alumni involved in this study came from 5 regencies, namely Pidie Regency, Pidie Jaya Regency, Bireuen Regency, North Aceh Regency and Lhokseumawe City.

b. Laboratory Work Program Planning

Planning is an important part of laboratory management. The planning factor in this study is divided into two aspects studies, namely planning laboratory work programs and planning practical activities. In the aspect of planning the laboratory work program, information was collected by asking 14 questions. Information related to the planning of practicum activities was obtained through 2 questions. The total number of questions to obtain information related to the planning of the laboratory work program was 16 questions. The following Table 2 is the frequency distribution of management based on the work program planning factors.

Tabel 2. Frequency Distribution Of Laboratory Management Categories Based on Work Program Planning Factors

No	Score Interval	Interval Category	Frequency	Percentage
1.	81% - 100%	Very Good	5	33,33%
2.	61% - 80%	Good	8	53,33%
3.	41% - 60%	Enough	0	0%
4.	21% - 40%	Poor	0	0%
5.	0% - 20%	Not Good	2	13,33%
Jumlah			15	100%

Base on table 2 above, it can be seen that the planning of the laboratory at the school/madrasah where the alumni of the Biology Education Study Program are in charge includes several categories. A total of 5 respondents stated that the laboratory work planning was very good (33.33%), 8 respondents said it was good (53.33%), 0 respondents said it was sufficient (0%), 0 respondents said it was not good (0%) and there were 2 respondents stated not good (13.33%).

Based on the frequency distribution, it can be seen that most laboratory work plans are found in the good category. This can be seen from the indicators that cover various aspects, such as the planning set at the beginning of each semester and the evaluation of the previous year's laboratory work planning. However, there are still obstacles faced, such as the absence of laboratory staff so that teachers must prepare all the needs for practical activities. This causes less effective laboratory management activities. The statement to the respondent is at least in the bad category (13.33%). Respondents who stated that the laboratory work

planning was in the bad category because the laboratory conditions at the school / madrasah were inadequate, such as the unavailability of the tools and practicum materials needed and the allocation of funds that was not in accordance with the laboratory work program planning.

b. Laboratory Organizing

Organizing is one of the factors in laboratory management. Organizing includes two aspects, namely aspects of organizational structure and laboratory administration. The principal of the school/madrasah is the main component in the organizational structure of the laboratory. The principal of the school/madrasah also really needs support from the vice principal for facilities and infrastructure, administration, laboratory coordinator and technical person in charge of managing the laboratory. The following is the distribution of the frequency of laboratory management based on the organizing factor.

Table 3. Frequency Distribution of Laboratory Management Categories Based on Organizing Factors.

No	Score Interval	Interval Category	Frequency	Percentage
1.	81% - 100%	Very Good	5	33,33%
2.	61% - 80%	Good	5	33,33%
3.	41% - 60%	Enough	2	13,33%
4.	21% - 40%	Poor	0	0%
5.	0% - 20%	Not Good	3	20%
Jumlah			15	100%

Based on the data in Table 3, it can be seen that the respondents who stated that the organization was very good were 5 people (33.33%), 5 respondents said it was good (33.33%), 2 respondents said it was sufficient (13.33) and 3 respondents said it was not good (20 %). In general all the schools/madrasahs that became the research sample already had a written organizational structure. However, there are some schools/madrasahs whose organizational structures are not yet systematic, such as the absence of clear job descriptions, and who have not fully carried out general and special administration.

Organizing in question is a clear organizational structure. However, the administration of practicum services such as archiving practicum implementation is not yet

good and complete. This aspect is in the bad category, because the statements made in general are that the organization is not clear, the lack of participation of the principal/madrasah in organizing the laboratory so that the use of the laboratory does not work well.

According Emda result of her research ‘The laboratory is a place to carry out activities experiment or practice. Students will understand the subject matter better if they are actively involved in the learning process. Students will know, understand and also master the material well by observing activities and conduct experiments or experiments. Students will be trained to work independently scientific as a scientist. Thus the knowledge that obtained will last longer on him. In addition, students can

master scientific work steps as determined. [10]. Therefore, it is necessary to conduct training and re-monitoring to alumni in the regions so that the utilization of the laboratory is better in the future.

c. Laboratory Work Implementation

Laboratory management is an effort to implement optimal practicum implementation. Information on

implementation factors that were explored included returning and providing tools and materials, storage of practical tools, work comfort and safety, utilization of practical tools, cleanliness of tools and materials and efficiency of tool use. The following is the distribution of the frequency of laboratory management based on work implementation factors.

Table 4. Frequency Distribution of Laboratory Management Categories Based on Practicum Implementation Factors

No	Score Interval	Interval Category	Frequency	Percentage
1.	81% - 100%	Very Good	7	46,66%
2.	61% - 80%	Good	4	26,66%
3.	41% - 60%	Enough	1	6,66%
4.	21% - 40%	Poor	2	13,33%
5.	0% - 20%	Not Good	1	6,66%
Jumlah			15	100%

Table 3 shows the highest frequency obtained in the very good category as many as 7 respondents (46.66%), the good category as many as 4 respondents (26.66%), the sufficient category as many as 1 respondent (6.66%), the poor category as many as 2 respondents (13.33%) and 1 person in the bad category (6.66%).

Information obtained from the alumni of the Biology Education Departement that there are still difficulties in operating laboratory equipment so that the equipment is never used. Many laboratory equipment has been damaged so that the implementation of the practicum is not carried out. The safety and comfort of the laboratory space is not sufficient,

such as the absence of fire extinguishers and the laboratory room that has been converted into a classroom.

1. Ability of alumni teachers of Biology Education Study Program in implementing practicum

Analysis of the alumni's ability in the process of implementing the practicum has been carried out in Pidie Regency, Pidie Jaya Regency, Bireuen Regency, North Aceh Regency and

Lhokseumawe City. to 15 alumni. Aspects observed include teacher readiness to carry out practicum, skills and accuracy in assembling and using practical tools and materials, ability in experimental improvisation (if needed), systematics or skills in conducting experiments, Accuracy in conducting observations and experiments, accuracy of observational data, cleanliness, neatness and work safety. The results can be seen in Table 5.

Table 5. Assessment of the Practicum Implementation Process

Teacher Code	Practicum Title	Aspect							Average	Practicum Process Value
		A	B	C	D	E	F	G		
T1	Excretory System Organs	3	3	3	2	2	2	3	2,6	62
T2	Introduction of Bacterial Cultivation Tool	3	3	3	3	2	3	3	3,0	75
T3	Mitosis	4	2	2	2	2	1	4	2,4	60
T4	Passive Transport	3	2	2	2	2	2	3	2,3	57
T5	Photosynthesis Process in Plants	2	1	1	1	1	1	3	1,4	35
T6	Microscope Introduction	4	3	2	3	2	3	4	3,0	75
T7	Structure and Function of Plant Tissue	4	3	2	3	3	2	2	2,7	67

Teacher Code	Practicum Title	Aspect							Average	Practicum Process Value
		A	B	C	D	E	F	G		
T8	Using and Knowing the Components of the Microscope	4	4	4	4	4	4	4	4,0	100
	Demonstrating the Use of the Microscope	4	4	4	4	4	4	4	4,0	
	Know the Diversity of Genes, Types and Ecosystems	4	4	4	4	4	4	4	4,0	
T9	Identifying the characteristics of living things	4	4	4	4	4	4	4	4,0	100
	Observation of Biodiversity in the School Environment	4	4	4	4	4	4	4	4,0	
T10	Observing various organs in plants and their constituent tissues	4	3	4	4	4	4	3	3,7	96
	Observing the Comparative Networks in the Roots of Monocots and Dicots	4	4	4	4	4	3	3	3,7	
T11	Introduction to the World of Invertebrates and Vertebrates Animals	4	4	4	4	4	4	4	4,0	96
	Characteristics of Invertebrates and Vertebrates	4	4	4	4	4	4	3	3,9	

Teacher Code	Practicum Title	Aspect							Average	Practicum Process Value	
		A	B	C	D	E	F	G			
T12	Introduction to Microscope	4	3	3	3	3	3	3	3,1	78	
	Introduction to Laboratory Tools	4	3	3	3	3	3	3	3,1		
T13	Animal Cells and Plant Cells	4	4	4	3	2	2	3	3,1	79	
T14	Cells, Tissues and Organs	4	4	4	2	2	3	2	3,0	75	
T15	Reproduction In Plants	4	3	4	3	2	3	2	3,0	75	
		3,8	3,3	3,3	3,1	3,0	3,0	3,2	3,2	75,3	
		95,0	82,5	82,5	79,9	76,3	76,2	81,2			

Description

- A. Readiness of alumni to carry out practicum
- B. Skills and thoroughness in assembling and using practical tools/material
- C. Ability in experimental improvisation (if needed).
- D. Systematics or Skills in conducting experiments.
- E. Accuracy in conducting observations and experiments.
- F. Accuracy of observational data
- G. Cleanliness, tidiness and work safety.

category with a percentage figure of 75.3%. The ability of alumni is best seen in the aspect of teacher readiness to carry out practicum with a figure of 95% or is included in the very good category. Aspects of skills and accuracy in assembling and using practical tools and materials, as well as the ability to improvise experiments (if needed) are also included in the very good category with a score of 82.5. systematics or skills in conducting experiments of 79.9 and aspects of accuracy in conducting observations and experiments 76.3, the accuracy of the observation data is 76.2%.

Table 5 shows that the ability of alumni is broadly included in the good

Meanwhile, cleanliness, tidiness and

work safety were better with a figure of 81.2%.

Although in general, the alumni's abilities are included in the good category, there are some alumni who are not good in terms of managing and implementing practicum. This is due to limited tools so that it needs special attention from related parties. The results of this study are in line with the results of research conducted by Ramadhan and Slamet the preparation of laboratory equipment needs to be taken into consideration for the school and the education office because limited laboratory equipment is a major obstacle in organizing practicum in various schools [10]. Another research conducted by Maksun, et al. also shows that the level of mastery of essential lab skills for prospective biology teacher students is still low. Learning essential lab skills for students has not been maximally given on every topic of ecology practicum [11].

In addition, research from interviews also obtained data on mastery of pedagogical abilities which also affected their ability to manage and carry out practicals. In line with

what was conveyed by JÖRG Großschedl curricular knowledge is only weakly related to this particular biological content. Therefore, further research is necessary to explore how curricular knowledge is related to content knowledge and pedagogical content knowledge when curricular knowledge refers to the same topic. [12]. However, this needs to be studied further by using the test method to get more accurate results.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that:

1. The ability of the alumni of the Biology Education Study Program Faculty of Tarbiyah UIN Ar-Raniry in managing practicum in the planning aspect of the laboratory work program is classified as good, the organization of the laboratory is classified as very good and good, the implementation of the laboratory work program is classified as very good and the supervision and evaluation of the

laboratory work program is classified as very good.

2. The ability of the alumni of the Biology Education Study Program

at the Tarbiyah Faculty of UIN Ar-Raniry in carrying out the practicum is in the good category.

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