

# Understanding Students Characteristics of Graduates in Biological Education Department (A Case Study Done in Muhammadiyah University Prof. Dr. Hamka)

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**ABSTRACT** --The main purpose of this study was to understand the ability of students to conduct experiments in Biology education programs with different educational backgrounds. Descriptive method with quantitative approach was used to analyze data inductively. Determination of the sample with a purposive technique, namely as many as 37 students who took the general Biology course in the 2018/2019 academic year. The results showed that the ability to carry out experimental studies of Biology teacher candidates was 97.6% with an excellent category. There are four aspects of carrying out the experimental study skills analyzed, namely: 1) determining the tools and materials, 2) grouping the data, 3) drawing conclusions, and 4) describing the results of the study. Rating with the lowest score is the skill to describe the results of the study. The ability to carry out experiments is an important part of the scientific method, which in the learning process is used to find concepts, theories or scientific facts through a series of stages of the scientific method such as a scientist in Biology education.

**Keywords**-- Characteristics of Graduates, Biology Teacher Education; Ability of Scientific Method; and Experiment Studies

## I. INTRODUCTION

The role of higher education institutions in Indonesia is inseparable from the course of its history. Indeed, its history begins with the establishment of educational institutions which are limited to the houses where the Koran teachers are taught various sciences, both Islamic religion and other sciences to the community before the founding of this republic. It is through the role of Middle Eastern traders that higher education begins. (Lapidus, 1991); (Azra, 2013); (Azra, 2013); (Hasnida, 2017); (Abbas, 2018); (Satrio, 2018).

According to various literatures, higher education efforts illustrated the development of Islamic educational institutions starting from the mosque, the mushalla, the home of the teacher's newspaper, the mosque, to the boarding school. (Steenbrink, 1994). Differences of opinion about the entry of Islam in Indonesia, although there are differences of opinion from Muslim intellectuals is not a problem. (Sabarudin, 2015). The important thing is the development of Islamic educational institutions that provide nuances of thought patterns of the learning system that is carried out.

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The learning system at Islamic educational institutions initially only used halaqahs in the form of learning circles. (Khoiriyah, 2017). When the Dutch came to Indonesia, the Dutch taught the classical system established by the Dutch. In order not to compete with the Dutch education system, Indonesian intellectuals studying in the Middle East introduced a new school to rival the Dutch school, the Madrasa. (M. Shabir U, 2013); (Aslan, 2018); (Rahmat, 2014); (Hafsah, 2014). However, the development of Islamic educational institutions in Indonesia experienced a new nuance when the Dutch were defeated by Japan. Japan closed everything schools established by the Dutch and Japan made a new policy for indigenous people in terms of education.

The difference in Dutch and Japanese leadership patterns turned out to bring a positive side to education in Indonesia. Japan is more open to the people of Indonesia, so Japan established Islamic organizations led by the Indonesian people themselves, such as Muhammadiyah and Nahdathul Ulama. (Tendi, 2018); (Rohman, 2018); (St. Hadidjah, 2007). Muhammadiyah was founded by KH Ahmad Dahlan in Yogyakarta on November 18, 1912. (Biyanto, 2010). Japan also gave permission to establish a tertiary education institution in Jakarta on July 8, 1945, under the name of the Islamic High School which was pioneered by KH Wahid Hasyim, Kahar Muzakkar, and Bung Hatta. (Zuhairini, 2011). The higher education system established by Islamic leaders in Indonesia based on Japanese policy, the development of Islamic educational institutions is only in the realm of Japanese desires, so that all policies are in accordance with Japanese procedures.

After Indonesia's independence, higher education institutions play an important role for the progress of the nation, especially in improving the quality of higher education. But in the early realms of independence, universities experienced a dualism of difference felt as a colonial inheritance. (Tirolian, 2016), noted that colonialism and dicotomy of Islamic education ini Indonesia has made many stake holders to take this as a positive thoughts. This inheritance also makes a difference not only in higher education institutions or in secondary primary education, both in the graduates of the lecturers and in the department of study programs that have begun to be opened in the country. Each leader of the two universities also wants lecturer graduates who have different scholarships so they are not out of date.

Along with these demands for change, the institution of being a university was announced publicly by the Chairman of PP Muhammadiyah, Dr. HM Amien Rais, MA during the graduation ceremony of graduates and Diploma Program graduates, as well as inaugurating Uhamka's first Rector, Drs. H. Qomari Anwar, MA (Majelis Diktilitbang Muhammadiyah, 2013). The impact of the change in the Institute to UIN was experienced by Prof. Muhammadiyah University Dr. Hamka, is the opening of new study programs which not only produces religious graduates, but also produces general graduates. Students who are accepted to study at the University are also from various kinds of High Schools, High Vocational High Schools, Boarding Schools and other high schools.

Stephens et al., (2014) urged to help closing the social-education class to reduce the achievement gap where a education may improves students' learning outcomes as education transition run. This differences in school backgrounds in study programs taken by students, then provide a difference in understanding in following the course, as is the case with Biology Education courses in Uhamka. The Biology Education Study Program has been opened by Uhamka since May 20, 1997. The graduates of this study program are producing Biology graduate teachers. However, for a Biology education lecturer to produce undergraduate graduates from the university he teaches is not as easy as turning the palm of a hand. Differences in educational backgrounds

that are far different from the study programs taken make lecturers use a variety of different methods and strategies in providing sharpening of understanding to students.

Davidson, (2017), in reforming the new education change, he suggested that the institution need to think how to bring such revolutionization into the university context with various new reform and preparing student for the global competition. Refer to a practical classroom approach, Buehl, (2017) pointed out that classroom practical strategies for more interactive ways require teachers across discipline knowledge and content areas have be brought into classroom practice for enriching and attract student to be active classroom participants. The strategies should be based on the practical strategies that students have been uninnovative classroom of past time classrooms. Therefore, here teacher strategies in solving problems in Biology courses vary, such as inquiry strategies, (Tanjung, 2016), Flip Chart methods (Ziliwu, 2019), problem solving methods, (Razali dkk., 2015); (Bundu, 2006), scientific method, (Kartikawati, 2019), concept map method, (Juanda, 2015), *graphical organizers* methods, experimentation methods and other methods. (Marfita, S. N & Purwana, U, 2019); (Nirwana dkk., 2017). Different strategies and methods used in each subject are inseparable for success in teaching. However, each method performed will obtain different results, including scientific methods carried out in the Biology course at the Uhamka in the Biology Education Study Program.

In line with the explanation above, Richard, (2001), Crowe dkk., (2008) notes that the scientific method implemented in Biology courses has a weakness in providing understanding to students, because not all students master all stages of the scientific process. This problem also lies not with the students, but due to the unavailability of biology textbooks as conducted by Muttaqin dkk., (2016). Subsequent research was conducted by Wardianti & Jayati (2018), that textbooks are not in accordance with local wisdom in the area. Misunderstanding about Biology will have a big impact in the world of education as conducted by research by Juanda (2015), that students who major in biology education and when students are fielded in the Field Experience Practices (PPL) in schools, students are assigned these experience obstacles in teaching biology subjects, even more so integrating them with Islamic religious education.

Drew, (2010) reasoned that the current issues and 21st century challenges in higher education requires a leadership strategic role play in engaging for learning reform. This what has been adopted by most Australian institutions with the recommendation of educational researcher across the subjects. Similarly in the Indonesian educational context, those various kinds of problems and challenges faced by UIN when these Islamic educational institutions experience has also be changed. Because students who are accepted are not only in various regions, but also in various disciplinary backgrounds, including students entering Muhammadiyah University Prof. Dr. Hamka (UHAMKA) in Biology Study Program. For this reason, researchers are interested in finding out more about students' understanding of biology courses at Prof. Muhammadiyah University Dr. Hamka (UHAMKA) using the scientific method.

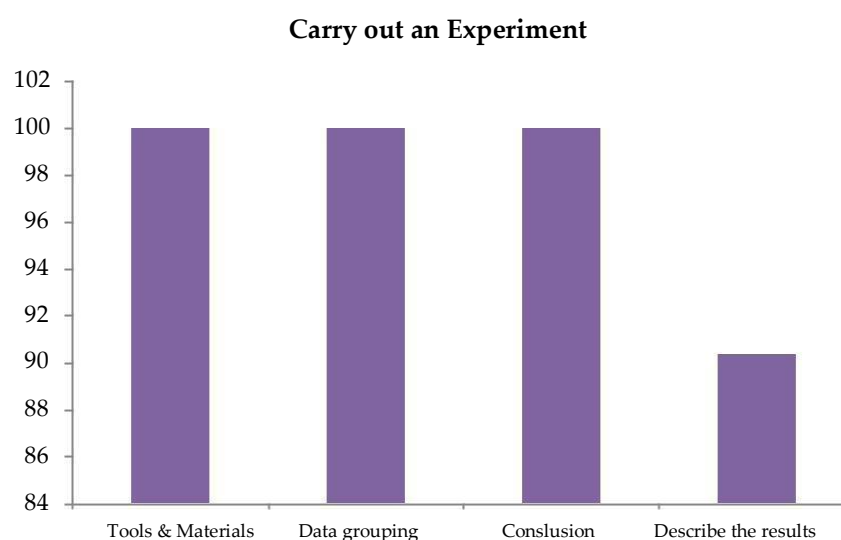
## II. METHOD

The students in the General Biology course of the UHAMKA Biology Education Study Program were involved in this data collection that held in the even semester of the 2019/2020 academic year, from February to July 2019. Teddlie, C & Yu, F, (2007), suggested that using mixed sampling approach and method can be used to analysing

data collected from a experimental and case study sampling. So, this mixed methods studies were in line with the sampling with a purposive sampling technique with consideration of students who took the general biology course. They were 37 students both early semester or final semester who were reregistered for the General Biology grade improvement. To process the dataanalyses, the descriptive method with quantitative approach was taken through non-test techniques. Non-test techniques performed in the form of assignments to plan, carry out and deliver the results of simple research experiments.

### III. RESULTS

The results of this study were obtained from the assessment through the assessment sheet about carrying out the experiment which consists of four aspects of the assessment in carrying out the experiment namely; 1) using experimental tools and materials; 2) grouping experimental data; 3) make the conclusions of the experiment and 4) describe the results of the experiment. The research data can be seen below.



**Figure 1:** Comparison of Aspects of Ability to Conduct Experiments

The results of the data obtained based on the above data that aspects of assessing the ability to carry out experiments on students obtained 100% using experimental tools and materials, 100% grouping experimental data, 100% making conclusions and 90.4% describing the results of the experiment. Data on the average results of the ability to carry out experiments is equal to 97.6% which is included in the excellent category.

This excellency in higher education word results are highly correlation with the research skill development mastery in higher education in most modern university institutions the world where research competencies are vital components to support learning. (Abdurrahman dkk., 2017).

The results of the percentage of the three indicators that are using tools and experimental materials, grouping experimental data each score 100%. The excellent results of the category were seen from the implementation of the experimental group of students who had been prepared carefully and in accordance with the experiments they wanted so that like this in the implementation of the use of tools and materials, they used them according to their

needs. Similarly, the grouping of data in accordance with the experiments that have been carried out by them independently so that the results are easily made this is because students have planned well and conducted experiments with what was planned before so that in making groupings and conclusions and can be done easily without any difficulties. (Chiappetta & Koballa, 2010).

On one hand, Biology education students from one group were able to describe the results of biological material experiments, but one other group still did not fully describe the results of data that had been obtained so that the percentage was only 90.4%. The inability of students in describing the results of answers submitted by lecturers, is inseparable from the right learning strategies and methods. (Nasution, 2016). The right method in learning, students are able to think scientifically and the lessons learned are remembered faster. (Saepuzaman & Yustiandi, 2017). This result was corresponded to the research question. Therefore, this findings has met the validity and reality of the research problem formulated above as recommended by avaluation theory in most higher eduaction practices. (Beck dkk., 2013).

#### IV. CONCLUSION AND RECOMMENDATION

The results of the study can be concluded that the ability of scientific methods of students with different educational backgrounds in taking Biology education study programs at the University of Muhammadiyah Prof. DR. Hamka, still in the very good category with a percentage of 97.6%. These results are obtained from the four aspects of the ability to carry out experiments, namely using tools and experimental materials, grouping experimental data, making conclusions and describing the results of the experiment.

Future studies are suggested to understand the ability to carry out experiments on the next level of students with different subjects. In order to strengthen and generalize related research conclusions.

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