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The Effect of Laboratory Processing Capability and Science Literacy Readiness of Professional Pre-Service Physics Teachers

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Abstract—**This research aims to describe the state of readiness of physics teachers' candidates are graduate from PTKIN to greet corporate world, especially in education. Aspects of observed in this research is effect of skill of laboratory processing and science literacy of quality physics teacher's candidate. The research was conducted by collecting related management data capabilities of laboratory and science literacy of students as graduate by PTKIN and to be a teacher. Subjects in the research are students of physical education at UIN Sunan Gunung Djati Bandung in three batches. The data in this research were collected by spearing the instruments in the form of a multiple-choice test and essay for determine the ability of students theatrically in the terms of management of laboratory and science literacy. Second instrument was a questionnaire the contains of the questionnaire were statements about attitude to do prospective teachers in the implementation of learning. The collected data were analyzed using multiple regression analysis to determine the effect of skill of laboratory processing(X1) to readiness professional physics teacher (Y) and the same analysis was also conducted to clarify the effect of the science literacy (X2) to readiness professional physic teachers (Y). The result of this research is expected to be referenced to make improvements in the course have a planning for prepare professional physic teachers. Generally, the research gives a conclusion that laboratory processing capability and science literacy do not give effect to readiness become a professional pre-service physics teacher.**

Keywords—processing, laboratory, literacy, science, teachers.

I. INTRODUCTION

The curriculum that used at the university is directing the student to have a plan after their studies. Based on the president regulation number 8 of 2008 is make the rule that the student have choice their job corresponding to the performance. To student of physics education have three choices as minimum profession there are the teacher, laboratory assistant and the researchers [1].

To be a professional teacher the student must be have the interesting and good performance in educational process because the key of teacher is not transfer knowledge only. More than that, the teacher must be able the student to be interest in the lesson and let them to get the knowledge alone [2]. To make the student interest in the lesson so the teacher is must be come from the good background in education, interesting to be a teacher and have a good ability to teach the students.

Based on the results of research conducted suggests that the average laboratory processing at the school/ Madrasah is still in the poor category. It is shown by the acquistoin of laboratory processing in madrasah/school which shows the average value of 37,28 with aspect be reviewed by the knowladge about laboratory processing and observations about the conditions and management system. [3] [4] [5]. Other related research states that there is a significant correlation between laboratory processing capabilities with the skill to design and implement practical by the teacher. So that the weakness of teachers in managing the laboratory must be overcome so that the implementation can be optimized physics learning through practical activities [6][7].

In 2015 the majority of children in Indonesia get a test by the programme for International Students Assessment (PISA). It tested include science literacy which Indonesia students have. PISA result obtained showed that Indonesia students still has a low science literacy, the rate Indonesia ranks is 62nd out of 69 countries evaluated [8][9]. Accordingly, one of other research suggested that the low level of science literacy Indonesia students starting from a low lavel of science literacy that a teacher at madrasah/school [10][11][12].

The second indication would be a consideration for Institutions of Higher Education Teaching (LPTK) to seriously prepare graduates to be able the problems and obstacles encountered in the vocations. This research aims to

show the readiness of candidate profiles LPTK especially graduate teachers under the auspices of Kementrian Agama on both aspects of the contributors to the low quality of education in Indonesia. The result of this research can be a references to make improvements in the lecture program planning in the order to prepare professional physics teachers candidate.

Based on the background of these problems this research aims to identify how the influence of a skill of laboratory processing and level of science literacy readiness prospective professional physics teachers.

The rest of this paper is organized as follow: Section II describes the proposed method. Section III presents the obtained results and following by discussion. Finally, Section IV concludes this work.

II. PROPOSED METHOD

This research was conducted using quantitative research methods. Quantitative research method is a method used to examine the population or sample that aims to the hypothesis that has been formulated. This quantitative research methods must use a valid and reliable instrument, but it must use appropriate statistical analysis and precise so that the result does not deviate from actual conditions [13].

In the implementation of the research variables measured were lab management capabilities, the level of science literacy of students and readiness of students into professional physics teacher. Skill of laboratory processing and science literacy is the independent variable with each as $X1$ and $X2$. As for the readiness become a professional physics teacher is the dependent variable of the study. In these simple mapping of variables can be seen in the following Table I:

TABLE I. RESEARCH VARIABLE

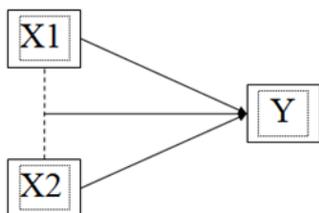| No.	Variable	Type	Symbol
1.	Capabilities of Laboratory Management	Independent Variable	$X1$
2.	Physical Science Literacy	Independent Variable	$X2$
3.	Readiness become a professional physics teacher	Dependent Variable	Y

Diagrams of research conducts as follows:

Fig. 1. Diagram Variable

The diagram shows in the Figure 1 have the following meanings:

Relations of Variable Research

No.	Independent Variable	Dependent Variable	Formula
1	Capabilities of Laboratory	Readiness become a professional	$X1 \rightarrow Y$
2	Physical Science Literacy	Readiness become a professional physics teacher	$X2 \rightarrow Y$
3	Capability of Management Physics Laboratory and Science Literacy	Readiness become a professional physics teacher	$X1$ and $X2 \rightarrow Y$

Collecting data in this research conducted by spreading the instruments to the pre-defined subject. The technique used to collect data in this research is the used of multiple-choice questions, essay, and use of questionnaires.
Data obtained from this research were analyzed with receipts regression of each variable as seen on the research chart. Before carrying out the regression test then tested prerequisite of research data covering normality test, homogeneity test and linearity test.

III. RESULTS AND DISCUSSION

Based on the results of data processing research data obtained a description that is not a significant difference between science literacy and student lab management capabilities to become a readiness professional teacher. Prerequisite test results on the data indicates that all data collected is already meet the level of normality and homogeneity of data. At this stage of hypothesis testing data looks a picture of how the influence of each independent variable on the dependent variable.

The first research hypothesis put forward is a significant difference between lab management capabilities to become a readiness professional teacher.

TABLE II. LINIERITY OF $X1$-Y

Variable	F	Sig
Readiness to be a teacher capability of Laboratory Management	1.515	0.216

The line of level testing is have done by providing the results as presented in Table II and Table III which indicates that the relationship between these two variables is linear in Physics Education Study Program UIN Sunan Gunung Jati Bandung with significant value 0.216> 0.05.

TABLE III. REGRESSION OF $X1$-Y

Variables	F	Sig
Readiness become a teacher* Capabilities of Laboratory Management	0.107	0.746

TABLE IV. REGRESSION COEFFICIENT OF $X1$-Y

Variable	Constant	B
Readiness become a teacher* Capabilities of Laboratory Management	0.835	0.000

The next analysis of the level of influence exerted by variables lab management capabilities to become a teacher readiness shown by Table IV and Table V. Based on the calculation of the data obtained significance value of 0.746 with the interpretation of regression does not significantly [14]. It is if the review is more deeply to see the great value given the regression coefficient is worth 0.162 with

kepengaaruhan level of 4% only. By plotting the data obtained regression equation calculation results for the variable relationship with the lab management capabilities become a physics teacher professional readiness at UIN Sunan Gunung Jati is $Y = 0.835 + 0.00X2$. From these equations we can see that the contribution provided by the laboratory management capabilities virtually no or very little at all. This is shown by the coefficient of the variable X in the equation is worth 0.00 [15]. Such data is presented in Figure 2 as follow:
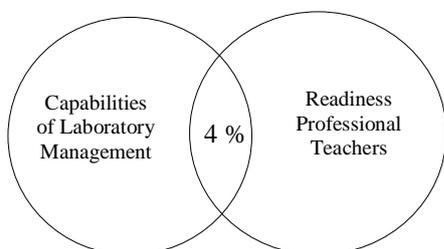

Fig. 2. Laboratory management influence on the readiness to become a teacher

Thus it can be stated that the initial hypothesis of the study which states that a significant difference between lab management capabilities with the readiness to become a teacher was rejected because of influence exerted by the variable laboratory management capabilities are very small.

Second analysis is about the effect of science literacy to become aprofrssional physics teachers. At the initial hypothesis the researchers stated that a significant difference between the level of science literacy of students with readiness be a teacher. According to the research done, it can be stated that the initial hypothesis was rejected. This is based on linearity and regression test results in Tables VI, VII and VIII as follows:

TABLE IV. LINIERITY OF $X2$-Y

Variables	F	Sig
* Readiness to be a teacher of Science Literacy	1,279	0.331

TABLE V. REGRESSION OF $X2$-Y

Variables	F	Sig
Readiness to be a teacher of Science Literacy	0.363	0.552

TABLE VI. REGRESSION COEFFICIENT OF $X2$-Y

Variable	Constant	B
Readiness to be a teacher * capabilities of Management Laboratory	0.831	0.000

In Table VII and Table VIII obtained information that the results of the regression of the data not show a good linearity. It refers to the value obtained for 0.552 significance far greater than 0.05 degrees of freedom. On the basis of this interpretation indicates that there is no significant effect between the level of science literacy of students with a readiness professional teacher [16][17]. Further influence exerted by science literacy variable regression coefficient dala otherwise only obtained a value of 0.113 with a given level of contribution of 1.3% to support the readiness become professional teachers. The

result of this calculation is supported by the results of plotting the data and identification of the linear correlation shown by the linearity of the equation

$$Y = 0.831 + 0.00X1.$$

The value of the coefficient for literacy variable is 0.00. So it can be stated that there is no contribution which given by the level of science literacy for readiness to become professional teachers in UIN Sunan Gunung Jati [18]. The diagram of influence is given Figure 3 as follow:
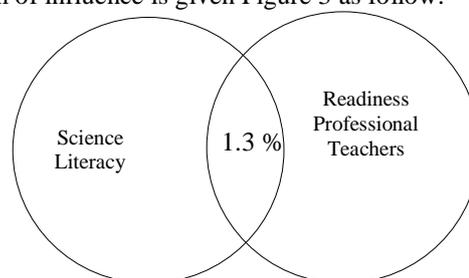

Fig. 3. Science Literacy contribution to the Readiness Professional Teachers

Final testing phase is to test the hypothesis that the second linkage independent variables on the dependent variable. The third hypothesis of this research reads: "There is a significant contribution of laboratory management ability and science literacy to be a readiness profrssional physics teacher ". Based on the research results obtained refute the hypothesis put forward at the beginning of the research. This is evidenced by the low index of regression resulting from the research conducted.

Regression of $X1X2$ - Y

Variable	F	Sig
Readiness become a teacher* Ability Laboratory Management and Science Literacy	0.205	0.816

TABLE VII. REGRESSION COEFFICIENT OF $X1X2$ – Y

Variable	Constant	X1	X2
Readiness become a teacher* Ability Laboratory Management and Science Literacy	0.818	0.047	0.107

Based on the tables 9 and 10 which illustrate the regression of the three variables of the study at UIN Sunan Gunung Jati provides enormous significance value is 0.816 with a variable data interpretation does not make a significant contribution. Followed by reviewing formula regression produced by

$$Y = 0.818 + 0.00 + 0.00X1\ X2$$

shows that the contribution of independent variables $X1$ (lab management capabilities) and $X2$ (scientific literacy) together does not significantly [19]. The correlation is given as follows:
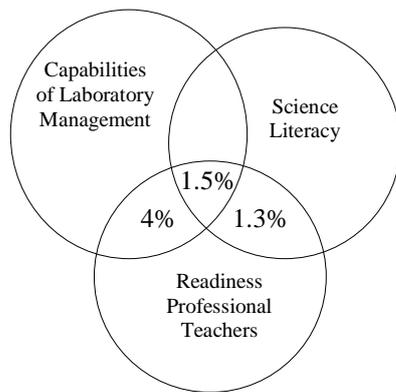
Fig. 4. Contributions Laboratory Management Capabilities and Readiness Literacy to become Teacher of Science

Based on the Figure 4 above can be seen that the contribution made by the independent variable is below 5%, which means very little. In this research the effect of laoratorium management capabilities are not the focus of research so that in Figure 4 are also not included how the influence exerted by both.

IV. CONCLUSION

Based on the results of the discussion there are conclusions of this research are: 1) There is a significant difference between the ability of the management of laboratory on the readiness professional prospective physics teachers, 2) There is a significant difference between science literacy on the readiness professional prospective physics teachers, 3) there significant influence of laboratory management ability and science literacy on the readiness professional physics teacher candidates. Based on this result, the phase further research is needed on the development of physics teaching model to improve the scientific literacy of physics and is also necessary for the development of teaching materials such as books, student worksheets and lectures authentic observation sheet.

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