

The Correlation between Teacher Professional Competence and Natural Science Learning Achievement in Elementary School

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ABSTRACT

This present study aims at investigating the correlation between teachers' professional competence and natural science learning achievement in elementary schools in Buleleng regency. The population in this study are all sixth grade teachers, which it is further narrowed down to 30 teachers as the sample. In order to gather the data, the researcher employs questionnaire regarding teacher professional competence and document study toward students' achievement on national examination in academic year 2016/2017. Further, ex post facto is chosen as the design of the study. Meanwhile, the data are analysed through correlation analysis with assistance of SPSS 16 software. Based on the analysis, it was obtained that the correlation between teacher professional competence and the learning achievement on natural science subject is in the interval of 0.40-0.59 with correlation coefficient at $\rho=0.506$. This means there is a significant correlation between teacher professional competence and students' learning achievement on natural science in national examination in academic year 2016/2017 ($t_{count} = 3.103 > t_{table} = 2.048$ with significance level at $\alpha = 0,05$ and coefficient of determination at 0.2560 (25.60%)

Keywords: *Natural Science; Learning Achievement; Teacher Professionalism; Elementary School*

INTRODUCTION

As stated in the Indonesia National Standard of Education, teachers who are equipped with four major competences play a key role in the success of an instructional process. The urgency of creating professional teachers has increased in this past few years, as teachers are demanded to improve their own quality. Nevertheless, teachers are considered as means to produce highly qualified human sources that are able to put all their efforts toward development of education (Koksai, 2013; Hakim, 2015). This is in line with Trilling and Fadel (2009) who argue that learning in the 21st century needs teachers with high qualification, skills, creativity, critical thinking,

communicative competence, and collaboration. In addition, teachers also need to be updated to the latest materials as it is dynamically changed. The need to move forward is not only on professional activities, but also on improving somebody's academic level (Drovnikov et al., 2016).

Teachers are required to have the ability to teach and role professionally as well as multi-function in creating an effective learning atmosphere. Thus, professional competence is one of the basic skills that a teacher must have (Sugiharti, 2016). Professional teachers are basically determined by their attitude, willingness and intellectual abilities (Mudiono, 2016). Moreover, the teacher is one of the

factors in the determinant of success in education efforts.

Since students' learning achievement is the benchmark of students' success in learning, an evaluation regarding the delivered materials is necessary. Generally, the ministry of education in Indonesia has pointed national examination as one of the means to measure students' achievement in school. Aside from determining how effective the instructional process in schools is, implementing national exams also means to determine the degree of teachers' professionalism in their area of interest and how it contributes to improve their teaching strategy (Hakim, 2015).

Based on the aforementioned explanation, Kunter as cited in Bertchy et al. (2013) recommends that this professional competence is needed for teachers to conduct an effective instructional strategy. In addition, professional competence also encourages students to actively participate in the sustainability in education. Accordingly, based to the study conducted by Ilanlou and Zand (2011) which entitled "professional competencies of teachers and the qualitative evaluation", they find out that there is a high correlation between teacher professional competence and their perspective in qualitative evaluation.

Another study related to this topic is also conducted by Kordestani et al. (2014) which entitled "The Study of Elementary School teachers' Professional Competencies and Comparing it with International Standards". This study aims to investigate teachers' professional competence and compare it to the international standard. A descriptive survey design is employed in this study. This study results in revealing that primary school teachers have the seven expected components of professional competence. These components cover instructional design, learning space, learning achievement and its management, communication, in collaboration with parents, society, organisations or school partners, self-review and evaluation on the academic capacity.

Those studies prove that teacher professionalism has been becoming imperative and inseparable parts of teachers in improving the instructional quality. In other words, these two things have a mutual relationship or can be called as interaction in instructional process. Taking into account of the aforementioned explanation, this article focuses on investigation the correlation between teacher professional competence and students learning achievement on natural science based on the result in national examination.

METHOD

This present study utilizes ex post facto design. The data in this study are analysed through correlation analysis with the assistance of SPSS 16. An ex post facto study is an approach to investigate the research subjects without giving any treatments to the variables (Dantes, 2012). In order to gather the data, the researcher directly enters the field of the study and searching for the documentation of the national examination in 2016/2017. This research was conducted from May-July 2017 in Buleleng regency. From the sampling, there were 30 primary school teachers from different schools who are selected as the sample of the study.

The data are gathered through some instruments. There are two instruments used in this study, they are questionnaire and documentation. For teacher professional competence, questionnaire with 25 questions are employed. On the other hand, the data for students' achievement in national examination are gathered from students result in national exams in 2017 released by the education authorities in Buleleng regency.

Further, in order to measure whether the quality of the variable is high or low, the mean score of each variable is converted by referring to the ideal mean (M_i) and ideal standard deviation (SDI). The scale is presented as follows.

Table 1. Criteria of Ideal Mean (M_i) and Ideal Standard Deviation (SDI)

Score	Category
$M_i + 1,5 SD_i \leq M \leq M_i + 3,0 SD_i$	Very High
$M_i + 0,5 SD_i \leq M < M_i + 1,5 SD_i$	High
$M_i - 0,5 SD_i \leq M < M_i + 0,5 SD_i$	Moderate

$M_i - 1,5 SD_i \leq M < M_i - 0,5 SD_i$	Low
$M_i - 3,0 SD_i \leq M < M_i - 1,5 SD_i$	Very Low

RESULT AND DISCUSSION

This study reveals some findings in relation to teacher professional competence and students' achievement. The first finding is about

students' mean score from the national examination on natural science subject and teacher professional competence score as they are presented in Table 2.

Table 2. Teacher Professional Competence Score and Students' Mean Score in National Examination on Natural Science Subject

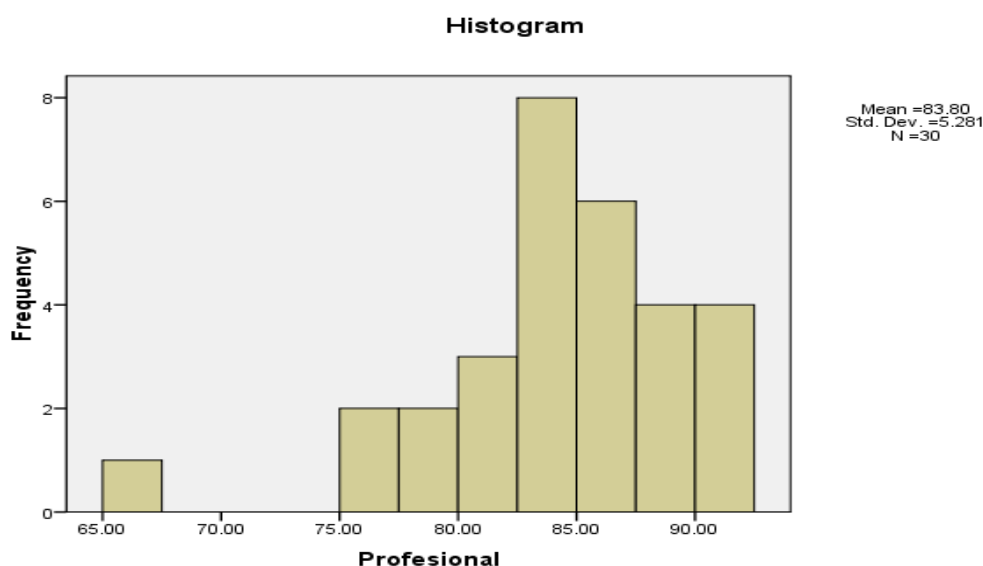
No	Schools	Prof. Competence score	Students' mean score on natural science
1	SD LAB UNDIKSHA SGR	87	92,86
2	SD MUTIARA	84	69,95
3	SD NO. 1 KAMPUNG BARU	86	76,12
4	SD NO. 2 KAMPUNG BARU	83	83,19
5	SD NO. 3 KAMPUNG BARU	78	71,46
6	SD NO. 4 KAMPUNG BARU	86	91,89
7	SD NO. 5 KAMPUNG BARU	90	87,64
8	SD NO. 7 KAMPUNG BARU	84	75,79
9	SD NO. 1 BANJAR BALI	65	75,45
10	SD NO. 2 BANJAR BALI	88	87,25
11	SD NO. 1 KAMPUNG KAJANAN	76	58,75
12	SD NO. 1 ASTINA	88	81,23
13	SD NO. 1 BANYUNING	90	78,78
14	SD NO. 3 BANYUNING	84	60,25
15	SD NO. 4 BANYUNING	86	70,83
16	SD NO. 7 BANYUNING	83	83,38
17	SD NO. 1 PAKET AGUNG	90	87,16
18	SD NO. 2 PAKET AGUNG	88	82,38
19	SD NO. 1 BERATAN	88	82,17
20	SD NO. 1 KENDRAN	81	80,63
21	SD NO. 2 BANYUNING	81	62,01
22	SD NO. 5 BANYUNING	77	82,36
23	SD NO. 6 BANYUNING	81	79,82
24	SD NO. 8 BANYUNING	84	68,43
25	SD NO. 1 PENGLATAN	86	90,00
26	SD NO. 2 PENGLATAN	90	77,62
27	SD NO. 3 PENGLATAN	84	75,16
28	SD NO. 1 ALASANGKER	83	68,17
29	SD NO. 2 ALASANGKER	78	61,55
30	SD NO. 3 ALASANGKER	85	72,38
	Mean Score	83,80	77,16

Based on the analysis of the previous table, it is gained that teacher professional competence

score is at 83.80 and being categorized as very high. Meanwhile, students' mean score on natural

science subject is 77.16, and being categorized as very high.

Figure 1. Teacher Professional Competence



Accordingly, from those data, the researcher continues to calculate the correlation between teacher professional competence and students' achievement on natural science subject in academic year 2016/2017 by using SPSS 16. Based on the analysis, it is shown that the coefficient correlation is 0.506. This means that there is a significant correlation between variables. In order to know the degree of correlation, the calculation is continued to t-test. From the t-test, it is revealed that the $t_{count} > t_{table}$ ($3.103 > 2.048$) with significance level at 5%. Thereunto, in order to seek the effect of teacher professional competence toward students' learning achievement in national examination, the researcher persists to calculate the coefficient determination. The result of the calculation shows that the coefficient determination is at 0.2560 (25.60%). In other words, teacher professional competence influences 25.60% students' achievement on natural science in national examination. Meanwhile, the other 74.40% of the achievement is influenced by other factors which are not interpreted in this study. These findings are supported by Pujasari and Nurdin (2012) who find out that students' achievement is influenced by teacher professional competence by 29.59%.

To ensure that in natural science learning is meaningful, teachers are expected to emphasize the process compared to the outcomes and to involve students directly in learning. Teacher support is also essential to build understanding and confidence in natural science learning. Teachers support affect students in the way teachers define learning objectives clearly, prepare the materials, approach students and evaluate learning in the classroom (Richardson, 1996; Levitt, 2002).

Similarly, utilizing constructivist approach in natural science learning can also be done by teachers. They can start by exploring students' daily experience or encourage them to express ideas. In the end of the lesson, students are expected to build their critical thinking and creativity. Through this approach, teachers are able to see through possibilities and opportunities to explore students' potentiality. (Fitzgerald & Smith, 2016).

Professional competence is about to master materials, concept, language structure, and meant to make teachers master basic and standard competence, develop their professionalism through the use of technology (Sikki et al., 2013).

CONCLUSION AND SUGGESTION

Based on the data analysis, it is revealed that the coefficient correlation is at 0.506 and being classified as moderate, thus it can be stated that there is a high correlation between teacher professional competence and student achievement on natural science subject in the national exams. It is also noted that the t-test results in $t_{\text{count}} = 3.103$ and it is higher than the $t_{\text{table}} = 2.048$ with coefficient of determination at 0.256 (25.60%).

Looking at the result of the study, the researcher suggests to all teachers to realize the importance of having four teacher competencies covering pedagogical competence, professional competence, social competence, and personal competence since it has been proven effective to improve students' learning achievement.

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