

# The Influence of Teacher Competencies on Secondary School Students in Science National Exam 2015 based on School Types and School Locations: Case Study in Banten Province

## ABSTRACT

The main purpose of this study is to analyze the influence of science teachers' competencies on students' achievement in science national exam based on school locations (urban, rural, and remote area) and school types (government and private schools) in Banten Province, Indonesia. This study fully based on the existing data from Information Center in Educational Quality Assurance Institution (EQAI) in Banten Province. Data consisted of: (1) Average scores from science teachers' competency test within school in 2015 (pedagogic and professional competence scores); (2) Average scores of student achievement in science national exam 2015 within school in Banten Province, Indonesia. Those data then ordered based on types of schools (government and private schools) and locations of schools (urban, rural and remote area). Total numbers of schools for this study are 714. Data were analyzed through SPSS version 20 software. Researcher used independent sample T-test, ANOVA, correlation and multiple regression to investigate the influence of science teacher competencies on students' achievement in science national exam based on school types and school location. The results showed that government's schools most likely have higher scores in science national exam than private schools; schools in urban area was most likely have higher average scores in science national exam than schools in remote area, meanwhile there were no differences in student achievement both in rural and remote areas. There was no significant positive correlation between student achievement ( $M=54.02$ ,  $SD$  and pedagogic competence in urban area,  $r= .076$ , as well as remote area ( $r= .062$ ). Small positive correlation was given by relationship between student achievement ( $M=36.11$ ,  $SD=2.19$ ) and teachers' pedagogic competence ( $M=49.56$ ,  $SD=9.47$ ) in rural area,  $r= .225$ . The relationship between student achievement ( $M=57.46$ ,  $SD=12.98$ ) and teachers' professional competence in urban area was small positive correlation,  $r= .222$ , meanwhile in rural area was moderate positive correlation. In contrast, remote area was giving no significant correlation between student achievement and teachers competence,  $r= .190$ . A hierarchical multiple regression analysis showed that the linear combination of teacher professional, school location in remote area and school type was significantly related to Student Achievement The unique contribution to explain student achievement for remote area, school type, and teacher's professional competence are 13.5 %, 2.8 %, 3.1% respectively.

*Key Words: science, national exam, teachers, competence, schools, location, type.*

## INTRODUCTION

Teacher quality refers to all teacher-related characteristics including teacher competencies that produce favorable educational outcomes (Cochran-Smith & Fries, 2005 cited in Hansen, 2008) such as student performance on standardized tests. One of measurement for students' achievement which held by Indonesian national government is National Exam. Students in final year in middle school, and senior high school must take this final test to graduate from school.

In Indonesia, there are four competencies that should be mastered by teachers: pedagogic, professional, personality and social. Differences in teacher background, status, experience, school condition and situation in Indonesia influencing variety of teacher competencies. These facts lead

government to mapping teacher competencies by teacher competency test or also known as UKG (Uji Kompetensi Guru). Competencies that tested are pedagogic and professional competence. Results from this test focus on identify teachers' weaknesses in pedagogic and professional competence. These results will be considered to teachers' professional development program (Kemdikbud, 2013).

Teachers' competencies expected to enhance teacher's ability to create an environment that is fair, understanding, and accepting of diverse students, ideas, experiences, and backgrounds. They need to know the basics of the subjects they teach, how to keep order in the classroom, how to get along with people, and how to abide by administrative regulations. Experience will teach them how to organize the classroom and cooperate with institutional authority (Hansen, 2008). However, school environment has different in many areas, especially for urban, rural and remote area. These conditions become problems for teacher that they have to manage with.

Karmel (cited in Lamb and Glover) identified several aspects of educational disadvantage experienced by schools in rural areas – including high teacher turnover, low retention rates, less confidence in the benefits of education, limited cultural facilities in the community, lack of employment opportunities for school completers, and a less relevant curriculum – that led to lower levels of attainment. Students who attend schools with fewer resources and disruptive environments tend to perform poorly, which could ultimately limit their prospects in life (Lamb & Groover, 2014).

Recently, a growing interest in improving school quality and student outcomes, and a quest for greater school choice for parents and students, and for more creativity and innovation in the schools, themselves, have challenged the notion of government's primacy in education. This trend, emerging in a number of countries, is based on the belief that the public interest in education can be better served by also involving private entities, including parents, non-governmental organizations and enterprises, in addition to government agencies, in managing and funding schools (OECD, 2012).

Nowadays, there are many private school managed by non-governmental organizations and the number become greater especially in urban area. Given the higher probability that private school will ask fees from parents, the social background of students in private and government schools will vary, especially in term of occupational, educational and financial characteristic of both parents. Consequently, more students from a favorable background will go to private schools. This will increase the opportunities of reaching higher level of student achievement, as a result of higher level start and better teaching and learning conditions. This will promote a potentially better reputation of academic quality for private schools in comparison to government school, thus attracting different students (Dronkers and Robert, 2003). Teacher in this school will supported with high salary, more complete teaching and learning facility, and school cultural that make a better learning for students.

Mostly in urban area in Indonesia, private schools have wide spread all around the city. In general, they have good facilities, qualified teachers with high salary, and good management. Private schools in rural area have different condition than urban area. Poor facilities, teachers and management have given negative impact to students' achievement. Low achiever students who cannot enter favorite government schools, have to go to this school to continue their study. Majority of schools in the remote areas are government-aided, the situation is made worse by the unfavorable learning environment characterized by unavailable resources, for example, teachers and learning materials. According to Cochran-Smith, the school environment has a strong positive relationship with students' ratings of their overall school satisfaction, students' self-esteem, and

academic performance. Teachers have been found to be the single most important factor influencing student achievement (Cochran-Smith, 2002).

This study has purpose to identify what factors that influence students' achievement in National Exam, especially in science subject. Science still becomes a problem for many students in Indonesia beside mathematics and others. Several factors will be investigated in this study such as teacher competencies, school types (private and government school) and school locations (urban, rural and remote area).

## **LITERATURE REVIEW**

### ***Teacher Competence***

Competence can be defined as the skills, knowledge, attitudes, and motivational variables that form the basis for mastery of specific situations (Kunter et al, 2013). According to this approach, skills, knowledge, attitudes, and motivational characteristics are not innate, but learnable and thus teachable. Kane (2002) said that the term "professional competence" is the application of the concept to working life, particularly in highly complex and demanding professions, in which mastery of situations is especially dependent on the interplay of knowledge, skills, attitudes, and motivation (Cited in Kunter et al., 2013)

According to Anselmus (Cited in Hamilton, 2013) teacher's competence refers to the right way of conveying units of knowledge, application and skills to students. The right way includes knowledge of content, process, methods, and means of conveying content. Teacher's competence should have a specialist knowledge of the subject(s) they teach, plus the necessary pedagogical skills to teach them, including teaching to heterogeneous classes, making effective use of ICT, and helping pupils to acquire transversal competences (European Commission, 2013).

There are four competences that required for teachers in Indonesia: pedagogical competence, personal competence, professional competence and social competence. These competences were measured by instrument teacher performance assessment every year. This measurement was conducted by school principal or senior teacher in that school (Permendiknas No. 25, 2010). Nationally, teacher competence was measured by government but only for two competences: pedagogic and professional competence (Kemdikbud, 2015). According Mulyasa (cited in Hakim, 2015) that, pedagogical competence is the ability to manage the learning of learners includes an understanding of learners, instructional design and implementation, evaluation of learning outcomes, and the development of learners to actualize their potential.

There are seven components related to teacher pedagogic competence: (1) know the characteristic of learners; (2) mastering learning theories and principles of learning; (3) develop curriculum related to the subject matter; (4) conducting educated learning activities; (5) utilize information and communication technology for the sake of learning; (6) well communication with learners; (7) conducting assessment and evaluation process (Kemdikbud, 2015). There are four components that related to teacher professional competence: (1) mastering concept and structure of subject matter; (2) mastering basic competence that they will taught; (3) developing subject matter creatively; (4) developing continuous professional development (5) using information technology and communication for self-development (Kemdikbud, 2015).

### ***Rural, Urban and Remote Area***

The definition of 'rural' versus 'urban' areas used in the Longitudinal Surveys of Australian Youth (LSAY) research is based on the following measures. The first measure simply distinguishes metropolitan students (living in a capital city with 100,000 or more inhabitants) from

nonmetropolitan students. This is based on the student's home address (or school address in the earlier cohorts) when they first took part in the LSAY study – generally at around age 14. The second measure is similar to the first, but disaggregates the non-metropolitan group into two further categories: regional and rural/remote areas. Metropolitan areas are defined as above, whilst regional areas are defined with populations between 1000 and 99 999 persons, and rural/remote areas defined as with less than 1000 persons (ACER, 2002).

According to National South Wales Government (2013), there are some disadvantages of schools in rural and remote area. This condition has adjusted with the same condition in Indonesia. Disadvantages are as follow:

- It is hard to recruit qualified teachers in specific subject area, such as mathematics and science
- Schools have very large proportion inexperienced teachers, first year teacher and teachers who are in their first three years.
- Small and isolated school do not always have specialist teacher to deliver some aspects of the curriculum
- The opportunity for teacher and school leaders to access professional learning, work collaboratively and learn from each other is limited by distance and isolation

### ***Private and Public/Government Schools***

Choy (1997) was defined distinction between public and private schools is their different sources of support. Public schools depend primarily on local, state, and federal government funds, while private schools are usually supported by tuition payments and sometimes by funds from other nonpublic sources such as religious organizations, endowments, grants, and charitable donations. Other differences are private schools provide an alternative for parents who are dissatisfied with public schools or have other reasons for wanting their children to attend a private school. Because most private schools charge tuition, only parents with the personal financial resources or financial aid to afford the tuition truly have the option of selecting a private school (Choy, 1997).

According to Grossberg (2017), there are 5 differences between private and government school as following:

#### 1. Class size

The class size in urban public schools can be as large as 25-30 students (or more) while most private schools keep their class sizes closer to an average of 15 or 16 students. It's important to note that some schools will publicize a student to teacher ratio. Smaller class sizes also mean that teachers can give students longer and more complicated assignments, full attention from the teacher, and each student can have enough facilities in classroom or school.

#### 2. Teachers qualification

While public school teachers always need to be certified, private school teachers often don't need formal certification. Nevertheless, many are experts in their fields or have masters or even doctoral degrees. While it is very difficult to remove public school teachers, private school teachers generally have contracts that are renewable each year.

#### 3. Preparing students for college or post-high school life

While many public schools do a good job of preparing students for college, many do not. For example, a recent study found that even A-rated public schools in New York City have remediation rates of over 50% for their graduates who attend the City University of New York.

Most college-preparatory private schools do a thorough job of preparing their graduates to succeed in college; however, this too varies based on the individual school.

4. Students attitude to their work

In part, because private schools often have selective admissions processes, they are able to choose students who are highly motivated. Many private school students want to learn, and they will be surrounded by students who regard academic achievement as desirable.

5. Meaningful services and activities for students

Many private school students simply attend school for more hours in the day than do public school students because private schools offer after-school programs and a longer schedule. Many private schools also offer specialized programs in areas of interest to the students, such as arts, music, or sports.

## **METHODOLOGY**

### ***Data Collection***

This study fully based on the existing data from Information Center in Educational Quality Assurance Institution (EQAI) in Banten Province. Data consisted of:

1. Average scores from science teachers' competency test within school in 2015. There are two average scores that will be analyzed: pedagogic and professional competence scores
2. Average scores of student achievement in science national exam 2015 within school in Banten Province, Indonesia.

Those data then ordered based on types of schools (government and private schools) and locations of schools (urban, rural and remote area). Samples are from secondary school in Banten province which total numbers of schools for this study are 714.

### ***Data Analysis***

Data were analyzed through SPSS version 20 software. Researcher used independent sample T-test, ANOVA, correlation and multiple regression to investigate the influence of science teacher competencies on students' achievement in science national exam based on school types and school location.

1. Independent Sample T-Test

Independent sample T-test was used to analyze the mean different in average scores of students' achievement, teachers' pedagogic and professional competence in government and private schools.

2. ANOVA

ANOVA was used to analyze the mean different in average scores of students' achievement, teachers' pedagogic and professional competence in urban, rural and remote area.

3. Correlation

Pearson correlation coefficient was used to analyze the relationship between teachers' competencies (pedagogic and professional) and students' achievement.

4. Multiple Regression

Multiple regression analysis was used to predict the factors influencing students' achievement in science national exam.

## RESULTS AND DISCUSSION

### 1. Portrait of Teachers' Competencies and Students' Achievement

The total numbers of secondary schools in this study were 714 schools, which 378 schools were government schools and 336 schools were private schools. From figure 1 shows the proportion of schools in urban, rural and remote area from 714 schools in Banten Province.

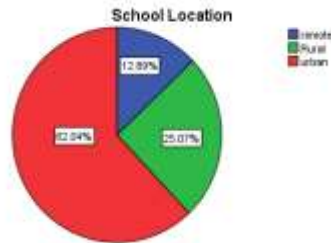


Figure 1. Proportion of school locations

From those figure, 62.04% of schools in Banten province were distribute in urban area, meanwhile 25.07 % were in rural area and only 12.89% were in remote area. There are four out of eight districts in Banten province are categorized in urban area: Tangerang, South Tangerang, Cilegon and Serang. The rest of four, mostly in rural area and few of them are in remote area.

*Question 1. 1. How is the portrait of average teachers' pedagogic competence, average teachers' professional competence and average students' achievement in Banten Province?*

Table 1 present the answers of this questions.

Table 1.

*Mean scores of students' achievement, teachers' pedagogic and professional competence*

	N	Minimum	Maximum	Mean	Std. Deviation
Pedagogic Competence	714	19.84	79.37	50.8865	11.11422
Professional Competence	714	22.68	90.70	54.5704	12.93566
Student Achievement	714	31.40	84.42	47.3009	14.35606
Valid N (listwise)	714				

From this table, we know that average scores of national exam in Banten Province was quite low ( $M=47.30$ ,  $SD=14.36$ ) from the scale of 100. Teachers' professional competence has higher scores ( $M=54.57$ ,  $SD=12.94$ ) than teaches' pedagogic competence ( $M=50.89$ ,  $SD=11.11$ ). The minimum score for students' achievement was 31.40 and the highest was 84.42. Teachers' pedagogic competence has 19.84 for minimum scores and 79.37 for maximum score. Meanwhile the minimum score of teachers' professional competence was 22.68 and maximum score was 90.70.

### 2. The Difference based on School Types and School Locations

*Question 2. Is there any significant difference in average scores of science teachers' and students' achievement on science national exam based on school location and school type?*

Figure 2 shows the boxplots graph for average score of students' achievement, teachers' pedagogic competence and teachers' professional competence in urban, rural, and remote area. It was indicate that students' achievement, teachers' pedagogic and professional competencies in urban area have higher scores than rural and remote area.

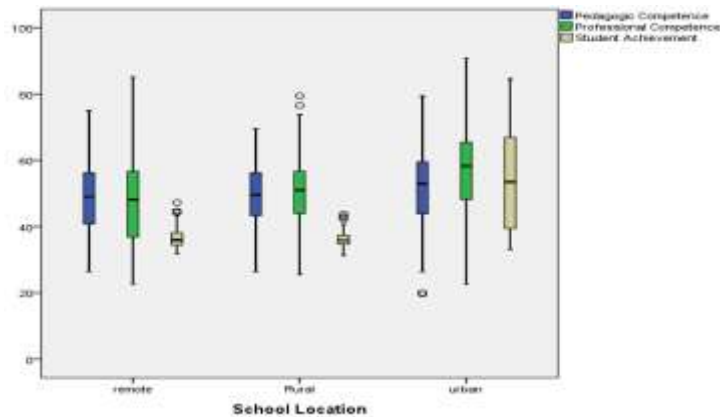


Figure 2. Boxplot of distribution scores of three variable in three locations of schools

The difference of average scores of students' achievement, teachers' pedagogic and professional competence between government and private schools were analyzed by independent sample T-Test. An independent sample t-test is used when we need to compare the mean score on some continuous variable, for two different groups (Palant, 2016). To answer the question above is shown in Table 2.

Table 2.

*Mean Difference between Private and Government Schools*

Variable	Private		Government	
	M	SD	M	SD
Teacher's Pedagogic competence	51.22	9.31	50.59	12.51
Teachers' Professional Competence	53.57	11.13	55.46	14.31
Students' Achievements	40.66	8.94	53.21	15.64

There was no significant difference in mean of average scores for teachers' pedagogic competence in private (M=51.22, SD=9.31) and government schools (M=50.59, SD=12.51;  $t(712) = .764, p = .445$ , two-tailed). Mean difference for average scores of teachers' professional competence in private (M=53.57, SD=11.13) and government school (M=55.46, SD=14.31) was significant with  $t(712) = -1.976$  at  $p = .049$  with very small effect size ( $\eta^2 = .005$ ). There was a significant difference for average scores of students' achievement in private (M=40.66, SD=8.94) and government school (M=53.21, SD=15.64;  $t(712) = -13.345, p = .000$ ) with moderate effect size ( $\eta^2 = .07$ ).

We can conclude that teachers' pedagogic competence in private and government school are not different, meanwhile teachers' professional competence have small differences in both schools. One of the qualification of teacher in middle school is they have to graduate from bachelor degree in subject they apply to teach (e.g. a science teacher should graduate from university whose majors in science). All schools in Indonesia have the same curriculum to apply in their school, same topics to teach and even same books to use that released by government, even though schools can use another related resources to use in the classroom. These factors could become an explanation for these results to analyze further.

In contrast, students' achievement in government school was higher than private school. Schools conditions in Indonesia are different from another country (e.g. Australia or U.S) especially in sub urban and rural area. Government or public schools are more favorable than

private school. Only students with higher achiever could attend these schools. Private schools are the only choice for students who failed entering government schools. But in urban area, there are many private schools with high qualification for students to enter. Only higher achievers and higher family income can enter these kinds of schools. Better facilities, higher qualified teacher and education staff, higher quality and quantity of schools programs; making it a better choice for parents to have their children study in this schools. Private schools provide an alternative for parents who are dissatisfied with public schools or have other reasons for wanting their children to attend a private school (Choy, 1997).

A one way ANOVA was conducted to analyzed the mean different in average scores of students' achievement, teachers' pedagogic competence, and teachers' professional competence in urban, rural and remote area. The result for this test is shown in table 3.

Table 3  
*ANOVA table for school locations*

	School location						F	Sig.
	Urban		Rural		Remote			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Students' achievement	54.02	14.47	36.11	2.19	36.72	2.97	198.822	.000
Pedagogic competence	51.87	11.70	49.56	9.47	48.72	10.68	4.815	.008
Professional competence	54.57	12.93	50.71	10.77	48.16	12.41	33.026	.000

Note:  $p < .05$

There was a statistically significant difference at the  $p < .05$  in average scores of students' achievement for three locations:  $F(2, 711)=198.82, p= .000$  with very large effect size ( $\eta^2=0.56$ ). Post-hoc comparisons using the Dunnett T3 test indicated that the mean of average score for remote area ( $M=36.72, SD=2.97$ ) was significantly different from urban area ( $M=54.02, SD=14.47$ ). Rural area ( $M=36.11, SD=2.19$ ) did not differ significantly from remote area.

Teachers' pedagogic competence was significantly different at the  $p < .05$  in three locations:  $F(2, 711)= 4.815, p= .000$  with small effect size ( $\eta^2= .01$ ). Post-hoc comparisons using the Dunnett T3 test indicated that the mean of average score for remote area ( $M=48.72, SD=10.68$ ) was significantly different from urban area ( $M=51.87, SD=11.70$ ). Rural area ( $M=49.56, SD=9.47$ ) did not differ significantly from remote area.

Teachers' professional competence also has significant difference in three locations:  $F(2, 711)=33.026, p= .000$ . The effect size calculated using eta square, was medium ( $\eta^2= .09$ ). Post-hoc comparison using Dunnett T3 test indicated that the mean of average scores for remote area ( $M=48.16, SD=12.41$ ) was significantly different from urban area ( $M=54.57, SD=12.93$ ). Rural area ( $M=50.71, SD=10.77$ ) did not differ significantly from remote area. Meanwhile, teachers' professional competence in rural area did not differ significantly from urban area.

From this result we found that students in urban area have higher scores in science national exam than rural and remote area. As mention above, there are many good schools in urban area than rural and remote area. Students from rural and remote areas are more likely to have lower educational outcomes in terms of academic performance and retention rates than students from urban areas (ACER, 2002). Issues affecting access to education in rural and remote areas include costs, the availability of transport and levels of family income support. In addition, inequity exists with regard to the quality of the education that rural/remote students receive, often as a result of restricted and limited subject choice. Furthermore, students may also have limited recreational and educational facilities within their school (Considine & Zappala, 2002).



Teachers in urban area tend to have higher competencies than teachers in rural and urban area. The opportunity for teacher to access professional learning, work collaboratively and learn from each other is limited by distance and isolation in rural and remote areas. Meanwhile teacher in urban area have better facilities and easier access to learning resources such as ICT facilities and internet connection which in turns encourage them to integrate ICT in teaching and learning (Gomatti, cited in Khairani, 2017).

### 3. Relationship between Students' Achievement and Teachers, competencies

In this section, the relationship between science teachers' competencies and student achievement will be analyzed. A scatterplot was generated before calculating the relationship between two variables. It will give an indication whether the variable are related in a straight line or curvilinear fashion. Only linear relationships are suitable for correlation analysis (Palant, 2016). Figure 3 shows the relationship between variables.

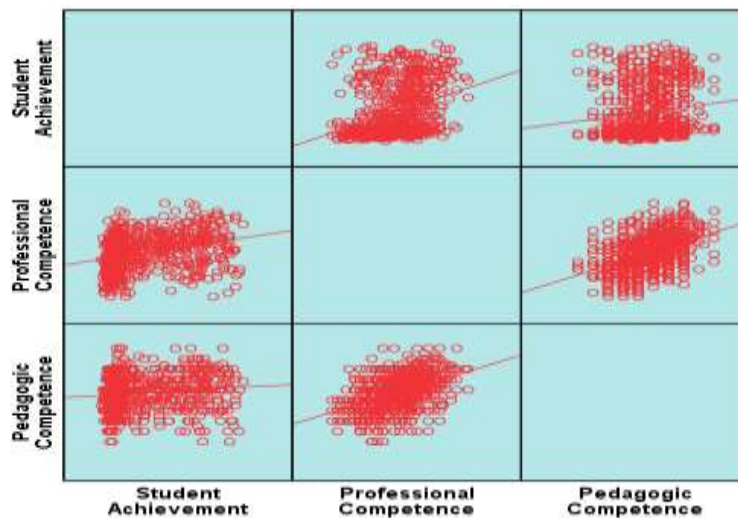


Figure 3. Scatterplot for students' achievement and teachers' competencies

From the figure above, generally there was a positive correlation between teacher competencies and students' achievement. Teachers' professional and pedagogic competencies have positive correlation and also for relationship between students' achievement and teachers' professional competence. Teachers' pedagogic competence and students' achievement seems to have lower positive correlation because of the flat line.

Question 3. *Is there any significant relationship between science teachers' competencies and students' achievement on science national exam based on school type and school location?*

To answer this question, a Pearson product-moment correlation coefficient was computed to assess the relationship between students' achievement and teachers' competencies in different school types and locations. Table 4 shows the relationship between students' achievement and teacher's competencies in private and government schools.

Table 4.

*Means, Standard Deviations, and Intercorrelations between variables based on school Types*

	<i>M</i>	<i>SD</i>	1	2	3
<b>A. Private School</b>					
1. Pedagogic Competence	51.22	9.31	-		
2. Professional Competence	53.57	11.13	.441**	-	
3. Student Achievement	40.66	8.94	.192**	.393**	-
<b>B. Government School</b>					
1. Pedagogic Competence	50.59	12.51	-		
2. Professional Competence	55.46	14.31	.456**	-	
3. Student Achievement	53.21	15.64	.142**	.308**	-

\*\* Correlation is significant at the 0.01 level (2-tailed).

From the output given above, the relationship between teachers' professional competence ( $M=53.57$ ,  $SD=11.13$ ) and teachers' pedagogic competence ( $M=51.22$ ,  $SD=9.31$ ) in private schools was giving moderate positive correlation,  $r= .441$ . In government school also giving moderate positive correlation ( $r= .456$ ) between teachers' pedagogic competence ( $M=50.59$ ,  $SD=12.51$ ) and professional competence ( $M=55.46$ ,  $SD=14.31$ ). There was small positive correlation ( $r=.192$ ) between teachers' pedagogic competence and students' achievement ( $M=40.66$ ,  $SD=8.94$ ) in private school and also for government school ( $r= .142$ ). The relationship between teachers' professional competence and student achievement in private schools was moderate positive correlation ( $r= .393$ ) and also for government schools ( $r= .308$ ).

The relationship between student achievement and teacher competencies in urban, rural and remote area was shown in table 6.

Table 6

*Means, Standard Deviations, and Intercorrelations between variables based on school locations*

	<i>M</i>	<i>SD</i>	1	2	3
<b>A. Urban Area</b>					
1. Pedagogic Competence	51.87	11.70	-		
2. Professional Competence	57.46	12.98	.446**	-	
3. Student Achievement	54.02	14.47	.076	.222**	-
<b>B. Rural Area</b>					
1. Pedagogic Competence	49.56	9.47	-		
2. Professional Competence	50.71	10.77	.495**	-	
3. Student Achievement	36.11	2.19	.225**	.398**	-
<b>C. Remote Area</b>					
1. Pedagogic Competence	48.72	10.68	-		
2. Professional Competence	48.17	12.41	.289**	-	
3. Student Achievement	36.72	2.97	.062	.190	-

\*\* Correlation is significant at the 0.01 level (2-tailed).

From the table above, there was a moderate positive correlation between teachers' pedagogic competence ( $M=51.87$ ,  $SD=11.70$ ) and teachers professional competence ( $M=57.46$ ,  $SD=12.98$ ) in urban area ( $r= .446$ ). Moderate positive correlation between teachers' pedagogic ( $M=49.56$ ,  $SD=9.47$ ) and professional competence ( $M=50.71$ ,  $SD=10.77$ ) was given by schools in rural area as well,  $r= .495$ . In remote area, small positive relationship was given by the relationship

between teachers' pedagogic ( $M=48.72$ ,  $SD=10.68$ ) and professional competence ( $M=48.17$ ,  $SD=12.41$ ) with correlation coefficient  $r= .289$ .

There was no significant positive correlation between student achievement ( $M=54.02$ ,  $SD$  and pedagogic competence in urban area,  $r= .076$ , as well as remote area ( $r= .062$ ). small positive correlation was given by relationship between student achievement ( $M=36.11$ ,  $SD=2.19$ ) and teachers' pedagogic competence ( $M=49.56$ ,  $SD=9.47$ ) in rural area,  $r= .225$ ).

The relationship between student achievement ( $M=57.46$ ,  $SD=12.98$ ) and teachers' professional competence in urban area was small positive correlation,  $r= .222$ , meanwhile in rural area was moderate positive correlation. In contrast, remote area was giving no significant correlation between student achievement and teachers competence,  $r= .190$ .

From this analysis, we found that there was a connection between teachers' pedagogic and professional competence. Teacher with high knowledge tend to have skill to transfer their knowledge to students in the test. However, in reality, only teachers' professional competence has small effect in students' achievement than teacher pedagogic competence. This condition was due to private and government schools, as well as urban, remote, and very small in rural area. Studies of teachers' scores on the subject matter tests of the National Teacher Examinations (NTE) have found no consistent relationship between this measure of subject matter knowledge and teacher performance as measured by student outcomes or supervisory ratings. Most studies show small, statistically insignificant relationships, both positive and negative (Darling-Hammond, 2000)

In urban and remote area, teachers with higher scores in UKG test tend to have very small effect to national exam scores. It is lower than rural area does. Since we used school unit based for this study, science teachers' score was taken from the average science teachers test score in every schools without considering which teacher that teach students who take the national exam test. This is the weakness about this study. For further research, specific teacher in specific class should be considered to get an accurate result for this analysis.

#### 4. Predictor for Student Achievement

*Question 4. How well do the science teachers' competencies, school locations and school types predict students' achievement in science national exam? Which is the best predictor of students' achievement in science national exam?*

A hierarchical multiple regression was used to answer this questions. This analysis was conducted to analyze all the independent variables entered into model in the specific ordered based on theoretical background. This result will indicate how well this set of variables is able to predict students' achievement in science national exam (Palant, 2016). The model that used in this analysis was shown in figure 4.

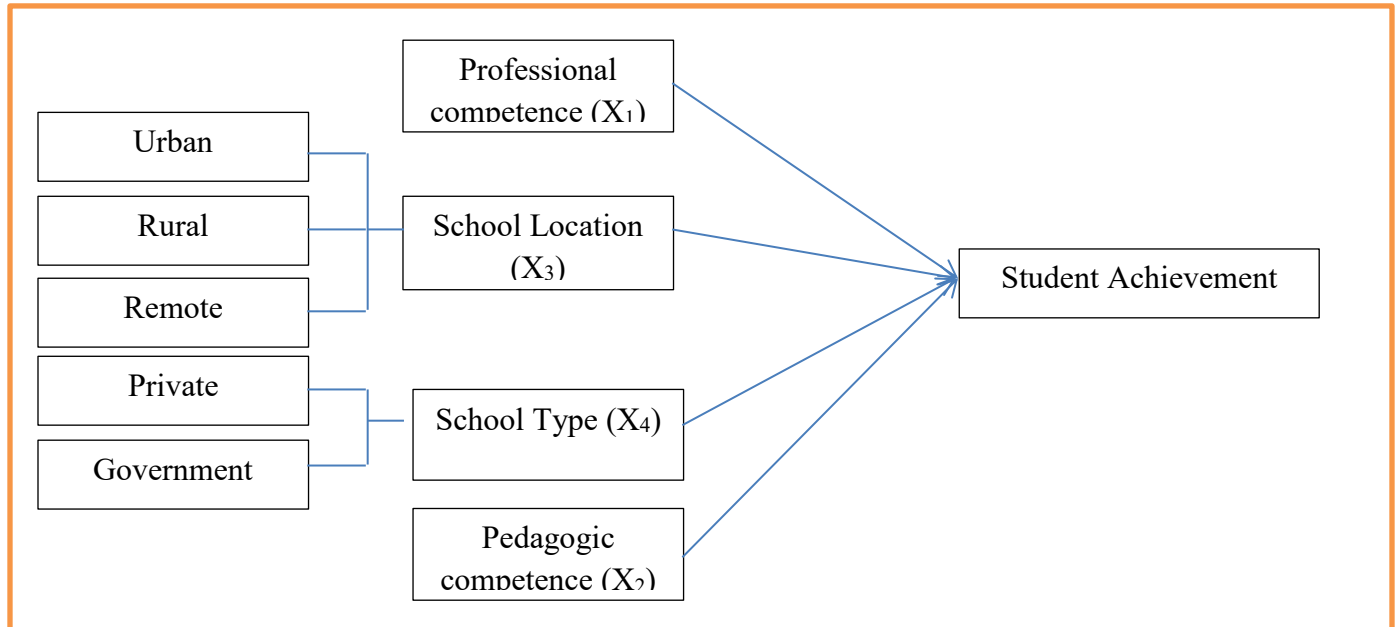


Figure 4. Hypotheses model

Form figure 4, independent variables were ordered from the highest to the lowest as a predictor based on previous study. Teacher quality is an important factor in determining gains in student achievement (OECD, 2012). Teacher competencies show the quality of the teacher that have role in student achievement. Besides that, school location and school type also have important role in determining student achievement. Predictors in this model were: teacher professional and pedagogic competence, school locations (urban, rural and remote area) and school types (private and government school). School in urban area was ‘base line’ for this analysis. The equation for hypotheses model in this study is:

$$Y = a + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$$

After entering all predictor to multiple linear regression analysis, it was found that teachers’ pedagogic competence ( $p = .976$ ) and schools in rural area ( $p = .079$ ) are the most insignificant variables in predicting students’ achievement. Next analysis was run again after removing insignificant variable from the model and the results was shown in table 5.

Table 5.

*Regression Analysis Summary for Variables Predicting Students’ Achievement*

Variable	B	SE B	$\beta$	t	p
(Constant)	24.910	1.821		13.677	.000
Professional competence	.205	.033	.185	6.146	.000
Schools in Remote area	13.182	1.029	.446	12.814	.000
School type	5.682	.961	.198	5.912	.000

The linear combination of teacher professional, School Location in remote area and School Type was significantly related to Student Achievement,  $F(3,710) = 167.050$ ,  $p < 0.005$ . R Square

was .414. This result indicate that the model explain approximately 41.4 % of the variance in the Student Achievement.

The result shows that the intercept is 24.91, coefficient of the teacher professional competence was .205, coefficient of remote area was 13.182 and coefficient of school type is 5.682. The prediction equation for standardized student achievement is as follow:

$$\text{Student Achievement} = 24.910 + 0.205(\text{Professional}) + 13.182(\text{remote}) + 5.682(\text{school Type})$$

Schools in remote area make the strongest unique contribution to explaining student achievement since  $\beta = .446$  is larger than school type ( $\beta = .198$ ) and teacher professional competence ( $\beta = .185$ ). The unique contribution for remote area, school type, and teacher's professional competence are 13.5 %, 2.8 %, 3.1% respectively.

## CONCLUSION

The conclusions of this study are as following:

1. Influencing factors of students' achievement are school location (urban, remote), school type (private and government school), and teachers' professional competence.
2. Government's schools most likely have higher scores in science national exam than private schools,
3. Schools in urban area was most likely have higher average scores in science national exam than schools in remote area, meanwhile there are no differences in student achievement both in rural and remote areas.
4. Teachers' professional competence has smaller effect compared with school locations and school types.

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