INFLUENCE OF EDUCATIONAL QUALIFICATION AND PROFESSIONAL COMPETENCE ON EARLY CHILDHOOD TEACHERS ABILITY IN SCIENCE EDUCATION

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Abstract
The purpose of this research was to provide additional thought the influence of educational qualifications (Science/IPA and Social Studies/IPS) and professional competence on the performance of early childhood teachers in Science education. The ability of early childhood teachers in Science education is the behavior in their Efforts to Achieve outcomes when carrying out their duties as instructors and educators. This research uses descriptive statistical analysis. The method of the data collection is done by simple random sampling. The number of samples is determined as many as 200 teachers who are considered to represent the entire population. There are 100 teachers with IPA/science backgrounds and 100 teachers or prospective teachers with IPS/social studies in Jabodetabek region of West Java. Test results shows there is an influence of the interaction of two independent variables on the ability of early childhood teachers in science education. So, the ability of early childhood teachers in science education is greatly influenced by educational qualifications and professional competence. The ability of early childhood teachers in science education also can be influenced by other variables.
Keywords: Early childhoood teacher, educational qualifications, professional competence, learning science

1.Introduction

Early Childhood Education is a form of non-formal education, focuses on growth and physical development, intelligence, socio emotional, language, and communication, in accordance with the uniqueness and passed by early childhood.

The competence of an early childhood teacher should be in accordance with national education standards. Permendikbud 137/2014, Competency Standards for early childhood educators includes four components : (1) pedagogical competencies, (2) personality competencies, (3) social competencies, and (4) professional competencies. In carrying out their duties, they must have educational qualifications and competencies that appropriate for early childhood (Langdon, 2016).

The policy on early childhood education is very important, it is also in line with the goals of sustainable development to develop the intellectual skills, creativity, and welfare become healthy and productive adults (Selina, 2017).

Good skills and knowledge must be possessed by a teacher to be more confident in teaching (Nolan 2017). From the 2012 Dapodik data, the number of National Early Childhood Education

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teachers is 275,099, whose qualifications are lower than Bachelor's Degree (71.29%) and those Bachelor's or higher qualifications are only 28.71%) (Kemendikbud, 2012).

Early childhood teachers should be adapted to educational qualifications, professional competencies, existing curriculum, and characteristics of early childhood. In this research, will be explained how the influence of educational qualifications, professional competence on the ability of early childhood education teachers.

2.Research methods

This study uses a causal connection established through so-called ex post facto with 2x2. There was no independent variable.

Data analysis techniques used in this research include:

1. Descriptive statistical analysis on the trends that converged data such as average scores, median, mode, and distribution of data in the form of standard deviation, variance and range of data, and preparation of data frequency distribution table. Data are also presented with pictures or histogram.
2. Testing Requirements analysis; normality test and homogeneity variance test.
3. Hypothesis testing; Tests performed after analysis prerequisite test, when the data were expressed from normally distributed populations and homogeneous. Hypothesis testing using two-way analysis of variance (two-Way ANOVA).

Statistical hypothesis in this study:

1. H0: $\mu A1 = \mu A2$
   H1: $\neq \mu A1\ \mu A2$
2. H0: $\mu A1B1 = \mu A2B1$
   H1: $\mu A1 > \mu A2$
3. H0: $\mu A2B2 = \mu A1B2$
   H1: $\neq \mu A2B2\ \mu A1B2$
4. H0: Interaction of A x B = 0
   H1: Interaction of A x B $\neq$ 0

Information:

$\mu A1$: The average score of early childhood teachers ability in science education, education qualifications (IPA/science)

$\mu A2$: The average score of early childhood teachers ability in science education, education qualification (IPS/social studies)

$\mu A1B1$: The average score of early childhood teachers ability in science education, high professional competence

$\mu A2B1$: The average score of early childhood teachers ability in science education, IPS/social studies qualification group of high professional competence

$\mu A1B2$: The average score of early childhood teachers ability in science education, IPA/science qualifications group of professional competence

μA2B2 : The average score of early childhood teachers ability in science education, IPS/social studies qualification group of lower professional competence

Interaction : The inffluence of interaction between educational qualifications and professional competence in the ability of early childhood teachers ability in science education,

A x B

3Results and Discussion

A. Description of Data

The results obtained descriptions of data.

Table 1. Descriptive Statistics

Group	Average	standard deviation	The amount of data	variance
A1	64.3	3.83	50	14.87
A2	63.22	4:10	50	16.8
A1B1	67.76	3.96	25	15:56
A1B2	63.04	4:30	25	18:49
A2B1	64.84	5:29	25	27.96
A2B2	66.28	3.66	25	13:40

1.The ability of early childhood teachers in science education of IPA/science bacground (group Al). Class interval having the greatest absolute frequency is the interval 64-66 (34%), the interval 61-63 (20%) and the smallest is 55-57 and 73-75 respectively are the same percentages (2%) ,

2.The ability of early childhood teachers in science education with educational qualifications IPS/social studies (A2).Class interval having greatest absolute frequency is the interval 64-66 (30%); 61-63 interval (24%) and the smallest is 73-75 (2%).

3.The ability of early childhood teachers in science education and science education qualifications with high professional competency (A1B1),Class interval having the greatest absolute frequency is the interval 66-69 (48%) and the interval 62-65 (24%) and the smallest is 58-61 dan 78-81 with the same absolute frequency (4%).

4.The ability of early childhood teachers in science education with educational qualifications IPS with High Professional Competence (A2B1).Class interval having the greatest absolute frequency is the interval 60-63 (28%) and the interval 64-67 (24%) and the smallest is 72-75 (12%).

5. The ability of early childhood teachers in science education and qualifications IPA with low professional competence (A1B2).Class interval having the greatest absolute frequency is the interval 60-63 (28%) and the interval 62-65 (40%) and the smallest is 58-61 (24%) and the smallest interval is 70-73 and 74-77 with absolute frequency (4%).

6.The ability of early childhood teachers in science learning with educational qualifications IPS with Low Professional Competence (A2B2). Class interval having the greatest absolute frequency is the interval 71-75 (44%) and the interval 76-80 (28%) and the smallest is the class interval 61-65 (4%).

B. Testing Requirements Analysis Data

Liliefors test for normality test and homogeneity of variance using Bartlett test.

1. Normality test

Normality test is done by Liliefors test :

Ho: normal distribution of data

H1: the data are not normally distributed

If the test results show the significant value is smaller than the α = 0.05 then accept Ho. Conclusions calculation normality test data group Al, showing that Lcount = (0.145697) <Ltab = (0.145805) Conclusions calculation normality test data group A2 shows that Lcount = (0.1282192) <Ltab = (0.145805). Further testing A1B1 group data : Conclusion the normal test calculation data group Al B1 shows Lcount = (0.102668) < Ltab = (0173), Conclusions calculation data group A2B1 normality test showed Lcount = (0 099 677) < Ltab = (0173), Conclusions calculation data group A2B1 normality test showed Lcount = (0 099 677) < Ltab = (0173), Conclusions calculation data group A2B2 normality test showed Lcount = (0.09738) <Ltab = (0173). So samples were normally distributed at α = 0:05. Finally, the results summary of the normality test data can be shown in Table 2.

Table 2. Summary of Normality Test Data Group A1, A2, A1B1, A2B1, A1B2 and A2B2

The sample group	Lhit	Ltab	Conclusion
A1	0.145597	0.145805	distributed Normal
A2	0.1282192	0.145805	
A1B1	0.102668	0173	
A2B1	0.099677	0173	
A1B2	0.129632	0173	
A2B2	0.09738	0173	

Thus, it was concluded that the data of each group came from a normal distributed population.

2. Homogeneity of Variance Test

Otherwise homogenous group when the significance of data obtained from Barlett test calculation is greater than α = 0.05 (accept Ho). Conversely, if the significance is not homogeneous obtained from the calculation is smaller than α = 0.05 (reject Ho). Based on calculations obtained Bartlett homogeneity with typically uses a table as follows:

Test criteria homogeneity Barlett test data based on the variance, as follows:
Ho : Variance in each group of data homogeneous
H1 : Variance in each group of heterogeneous data

Table 3. Test Results Homogeneity Using Data Group Bartlett test
A1B1, A1B2, A2B1 and A2B2

samples	dk	1/dk	Si^2	Log S^2	(Dk) log S^2
A1B1	24	0,042	15.6816	1,195	28.68
A1B2	24	0,042	18:49	1,267	30.41
A2B1	24	0,042	27.9841	1.4469	34.73
A2B2	24	0,042	23.1361	1.3643	32.74
amount	96	0167			126.56

Variant combined = s^2 = 21.322925; log 21.322925 = 1,329; B = 96 x 1329 = 127 584; chi squared = (2.3026) {127 584 - 126.56} = 2.3579; to α = 0.05 and df = 24-1 23. chi squared = 36.4. chi count 2.3579 <chi table 36.4; then accept Ho, means all four data groups comes from homogeneous population.

C. Hypothesis test

1. First hypothesis

Ho: μA1 = μA2
H1: ≠ μA1 μA2
The first hypothesis is to test differences in ability of early childhood teachers with IPA/science and IPS/social studies education qualifications.

Table 4. Analysis of Two Way ANOVA from SPSS (Test of Between-Subjects Inffluent Dependent Variable: Y)

Source	Type III Sum of Square	df	Mean Square	F	Sig.
Corrected Model	1665.640	3	555.213	55.637	.003
Intercept	396144.360	1	396144.360	3.970E4	.000
A	207.360	1	207.360	20.779	.001
B	104.040	1	104.040	10.426	.002
A * B	1354.240	1	9.979	135.707	.001
Error	958.000	96			
Total	398768.000	100			
Corrected Total	2623.640	99			

R Square = .635 (Adjusted R Square = .623)

interpretation table

For A (educational qualification), obtained F count/hit= 20,779 with a p-value (sig.) = 0.01 <value α = 0:05 thus reject Ho; educational qualification gives effect on the ability of early childhood teachers in science education; so there is no difference in the ability of early childhood teachers in science education with educational qualifications (IPA/science and IPS/social science).

2. **Second hypothesis**

   Ho: μA1B1 = μA2B1

   H1: ≠ μA1B1 μA2B1

   In Table 11 from the line Corrected Model, obtained F count = 55 637 with a p-value (sig.) = 0.003 <value α = 0:05 thus reject Ho; there is an average difference between the four groups in the research design. This means for the third and fourth hypothesis accept Ho.

3. **Third hypothesis**

   Ho: μA2B2 = μA1B2

   H1: ≠ μA2B2 μA1B2

4. **Fourth hypothesis**

   Ho: Interaction of A x B = 0

   H1: Interaction of A x B ≠ 0 /

   For the A * B (educational qualifications and professional competence); obtained Fcount = 135 707 with a p-value (sig.) = 0.001 <value α = 0.05 thus reject Ho; this means that there is significant influence educational qualifications and professional competence of the ability of early childhood teachers in learning science

Table 5. Summary of Hypothesis Testing Results

Hipotesis	Different test	F_{count}	Q_{count}	F_{table}	Q_{table}	Conclusion
				$\alpha = 0.05$		
$H_o : \mu_{A1} = \mu_{A2}$ $H_1 : \mu_{A1} \neq \mu_{A2}$	Anova	20.779	-	6.86	-	Reject H_0
$H_o : \mu_{A1B1} = \mu_{A2B1}$ $H_1 : \mu_{A1B1} \neq \mu_{A2B1}$	Anova	55.637	-	6.86	-	Reject H_0
$H_o : \mu_{A2B2} = \mu_{A1B2}$ $H_1 : \mu_{A2B2} \neq \mu_{A1B2}$	Anova	55.637	-	6.86	-	Reject H_0
H_o : Int. A x B = 0 H_1 : Int. A x B $\neq$ 0	Anova	135.707	-	6.86	-	Reject H_0

D.Discussion of Results

Based on the results of hypothesis testing through the Anova test, the findings in this study show there is a significant influence of educational qualification and professional competence on early childhood teachers ability in science education. This explained, an early chilhood teacher who has an educational qualification (IPA/science) have the desire to do or try a series of science games in early chilhood schools. If this can be done in a planned manner, it will be able to provide nuances of science education and will be liked by students. Science education in early chilhood schools can be packaged in very interesting and fun games to achieve these goals, early chilhood teachers need to be opened insight about their science for example carried out socialization or training or seminars on science education using materials which available in everyday life, for example water, soap, salt, vinegar, eggs, sugar, baking soda, spices, doormats, or children's toys can be used as material for learning education in early chilhood.

Through this research, it is hoped that the community (parents or early chilhood observers) will not prioritize science only (which science is difficult and dangerous) and provide insight that science is easy and close in our daily lives.

CONCLUSION

The ability of early childhood teachers in science education is strongly influenced by educational qualifications and professional competence. The ability of early childhood teachers in science education also can be influenced by other variables.

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