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Influence Methods of Training for Competence of Technological Pedagogical and Content Knowledge for (TPACK) PAUD Teachers in Banten Province

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Abstract This research points to the TPACK/PAUD teachers in Banten Province for the influence of the training methods on competence. The result from the research was carried out by the *Stratified multistage cluster*, which is an *efficient sampling* method which combines the techniques of stratified sampling. Which came from teachers in Banten province and obtained a sample of two groups. The two groups of 70 teachers and other teachers in the Pamulang region were given a mentoring training method of 70 people (25% of the total target population). The type of research is an experiment. The result of the survey showed that there was an effect of the training method toward the competence of TPACK/PAUD teachers in the province of Banten. The average value of competence for the TPACK/PAUD teachers using *coaching* methods is higher than the teachers which using mentoring methods (35.2>32.9). So it can be concluded that an appropriate training method can improve the TPACK teachers competence in an early stage of childhood.

Keywords TPACK Training and Competence Methods

1. Introduction

The development of the era in the 21st century was an era of digital development which brought a rapid change in the technological aspect. It does not only apply to part of the communication, but propagates in the world of education to use technology for students and let them understand the content in it. This is also something which goes back to an early stage of childhood education.

The teacher is essential element in education, who plays a big active role in developing and makes the children's intelligence grow optimally. The successful teachers are those who can make the students feel interested to participate in activities to learn, and make the students more enthusiastic in exploring their curiosity. Teachers using technology in teaching and learning activities in the class can relate more to them.

The integration of information and communication technology in the learning process is a challenge faced by teachers. These challenges must be faced by the teachers in all disciplines including early childhood teachers who are expected to learn how to design and develop technologies that can grow and motivate students to achieve success in a modern learning environment [1].

Technological Pedagogical and Content Knowledge (TPACK) is according to Niess [2] a conceptual framework that shows the connection and meeting between the three pieces of knowledge that must be mastered by a teacher, technological knowledge, pedagogy, and content. Mishra and Kohler in Lubke [3] revealed that TPACK is a framework that describes technological knowledge, pedagogical knowledge and content knowledge that emphasizes the effectiveness of learning using technology.

The teachers understanding in mastering (TPACK) can be trained using an appropriate training method. In order to integrate it into the classroom learning activities, in this research uses two different training classes. The experimental class was using the *coaching* method, and the control class was using the mentoring method.

In the world of education, Clarkson in Ibarra [4] revealed that *coaching* is defined as a professional learning which integrates the most effective teaching methods in how teachers work. Ibarra [4] reveals that coaching is an interactive process of managers and supervisors which

have a goal to solve a work-related problem or to develop the employee capabilities. This process depends on the collaboration of the three components, 1) technical assistance, 2) personal support, 3) individual challenges. Mentoring is an offer to others in the form of advice, information or guidance by someone who has the experience, skills or expertise that is useful for personal, professional development. Mentoring does aim to support individual development through a career and psychosocial functions.

The results from the preliminary observations conducted by researchers illustrated that in the present time. It is still many PAUD teachers who have not yet integrated technology, pedagogics and the content of knowledge (TPACK) in the implementation of the learning process. This is shown clearly from teachers who are still stuttering about the technology, to adjust the teaching into the classroom. Another problem about the training which has been followed by the teachers is the implementation of training materials, especially in the implementation of teaching, which haven't fully integrated with the technology. Therefore it is necessary to improve the effort of the quality of PAUD educators by using training methods which are adjusted to the conditions and needs of the PAUD teachers from Banten province. Based on what has been mention above, an interesting thing for the researchers to examine was how the training method had an influence on the TPACK competency of PAUD teachers in Banten Province.

2. Research Method

This research was conducted in Banten Province, with the type of experimental research. In this study, there were two sample groups, each of the groups were randomly selected, the teachers who followed the coaching training method and the group of teachers who followed the mentoring training method. The table used in the research is one-way ANOVA design. The constellation of these variables can be seen in Table 1 below.

Table 1. Research Table with One-Way ANOVA Design

Group	I	II	Σ
N	70	70	140

The targets in this study were all PAUD teachers in populated in Banten provinces which had studied an undergraduate education. The reach in this study were all

PAUD teachers in Tangerang City, a total of 673 teachers.

The sample is a portion of the population where the research was conducted [5]. Based on the description above, it can be concluded that the sample is part of the research object that represents the population produced by the procedure of sampling techniques that are in accordance with the procedure, so that the sampling is correct, representative and accurate so that the results of the research can be generalized. In this study, the sampling technique was carried out using the *Stratified multistage cluster random sampling technique* [12]. *The initial process of sampling is carried out in the following ways:*

- A choice from one of the eight districts/cities in Banten Province by a random method, the city of South Tangerang was selected.
- The gathering of teachers from the city of South Tangerang came from Pamulang subdistrict/kelurahan and Ciputat Timur subdistrict/kelurahan, which had an undergraduate education.
- The randomized study will compare the teachers in the Ciputat area as the experimental class by giving them the coaching training method. The teachers from the Pamulang region as the mentoring training method. In both groups, it was as many as 70 people (25% of the total target population).

The descriptive analysis used to describe and interpret the data from the sample and population. To know the normality of the TPACK competency data in this study use the Lilliefors test. To know the homogeneity of the TPACK competency data in this study using Bartlett test [12,13]. The researcher used standard of ANOVA to test of the data which were normal distribution and the variances were homogeneous. The testing standard of ANOVA used is that the null hypothesis (H0) is acceptable if the rate of probability gain is greater than 0.05, while, the null hypothesis (H0) is rejected if the rated probability is lower than 0.05.

3. Research Findings

In general, the description of the data from the TPACK competence is the complete control of the cognitive aspects from the training material that the teachers participated in for six days. There are 50 of samples presented in the table below.

Tabel 2. Description of the TPACK/PAUD teachers 5 Data

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
COACHING	70	35.1857	9.8662	1.179	32.833	37.538	15.00	56.00
MENTORING	70	32.9143	8.1822	.978	30.963	34.865	12.00	46.00
Total	140	34.0500	9.1024	.7693	32.529	35.571	12.00	56.00

The following is a picture of the average value of the results of the TPACK training method score followed by PAUD teachers:

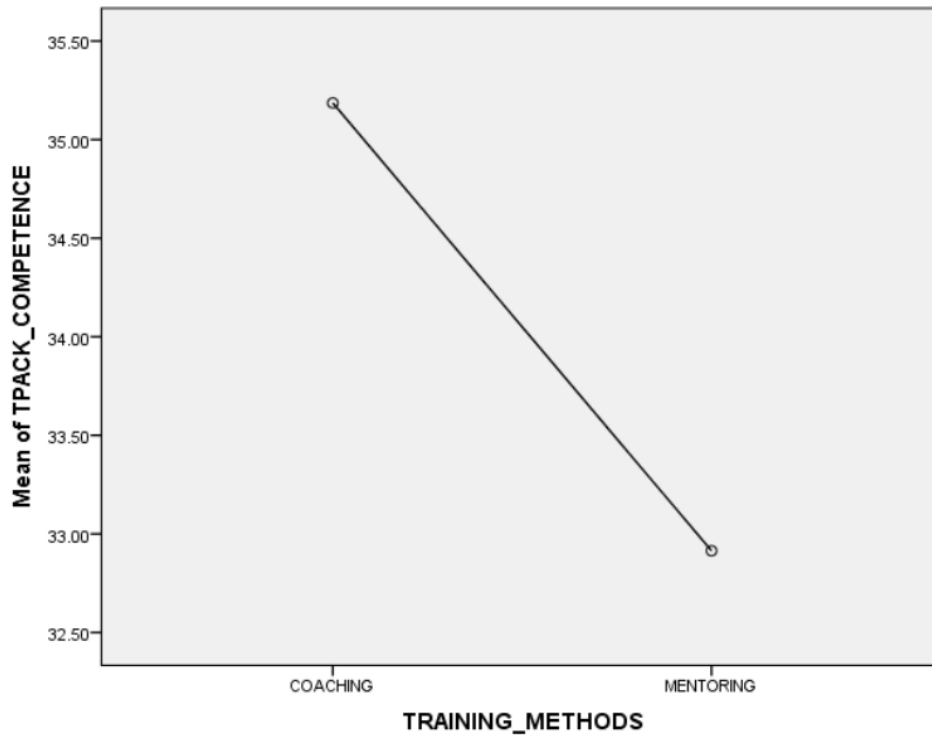


Figure 1. Average value of the results of the TPACK training method

To know the normality of the TPACK competency data in this study use the Lilliefors test. To know the homogeneity of the TPACK competency data in this study use the Bartlett test. Hypothesis:

H0 = samples derived from the normal population distribution

H1 = samples derived from unnormally population distribution

From the calculation results in the table above obtained $L_0 = -0.1318$, by taking $\alpha = 0.05$ and $n = 38$ obtained $L_t = 0.1437$ thus $L_0 = -0.1318 < L_t = 0.1437$, this means H0 accepted. These results indicate that the sample is derived from a normal population distribution.

To know the homogeneity of TPACK competency data in this study use the Bartlett test. The competency, data of TPACK guru of Banten province, which became the subject of this research is grouped by sample. X^2 price at the rate of significance of 5% ($\alpha = 0.05$) and $db = K-1 = 4-1 = 3$, obtained X^2 table by $0,95,3 = 7.81$. So the countdown price of Bartlett (X^2) is smaller than X^2 table ($1.04 < 7.81$), so that the zero hypotheses (H0) on the receive and H1 is rejected. Thus, it can be concluded that the competency data of TPACK guru PAUD come from a homogeneous population

The statistical hypothesis tested in this study was carried out using a one-way ANOVA design. The one-way ANOVA is used to test the effectiveness of independent variables from the dependent variable.

Tabel 3. The One-Way ANOVA results summary

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	180.579	1	180.579	2.198	.140
Within Groups	11336.071	138	82.145		
Total	11516.650	139			

4. Discussion

Based on the findings in this analyse, the discussion of the results of hypothesis testing in this study can be presented as follows: Based on the results of ANOVA statistical test the results obtained $F_h < F_t$, $F_h = 2.198 < F_t$ ($\alpha 0.05$) = 3.92. Based on the comparison of F_h results with F_t . This shows that the training method has no significant effect on the TPACK competence of PAUD teachers in Banten Province. However, based on the empirical values obtained in the field, the teachers who participated in the training with the coaching method were higher than the teachers who were given the mentoring method. This can be seen from the average TPACK competency test of teachers who were given the *coaching method*, which was 35.2 and those who were given the mentoring training method were 32.9.

TPACKs competencies are the ability to master the conceptual structure that shows the connection between meeting and the three pieces of knowledge that must be mastered by the teacher, technology, pedagogic and content knowledge [2]. In mastering these three pieces of knowledge, the teacher needs an appropriate method or system. In order to help to master this content, technology and pedagogics should be a foundation at an early stage in childhood.

The method is a way or path that must be taken/passed to achieve the goal [6]. The function of the method means as a tool to achieve goals [7, 14]. The results of the study showed that to develop the TPACK competencies of PAUD teachers, the use of a more effective training method is the coaching method. This is because of that, the method is very developing for teachers' knowledge. So the teacher feels more interested in trying to find their information, and it will make the learning atmosphere less monotonous (information obtained from the teacher himself). The *coaching* method activates the teacher's brain working system as a resource person who acts as a facilitator, so the information truly receives from the teacher himself. The resource person seeks to optimize the potential of knowledge within each teacher so that the teacher better understands the content discussed because the information comes from the teacher himself. This is in line with the results of a study from Fauzia [8]. That after the coaching process was conducted, the teacher was able to plan and prepare for teaching, using flashcards as a tool to teach vocabulary and apply games in teaching.

The *coaching* method will further optimise the teaching process. Teachers who take part in the training with *coaching* methods enable the emergence of positive practices. This is because of the *coaching* process is built on positive communication, so it does not make the teachers feel judged for their mistakes or weaknesses. Thus the appearance of negative emotion in *coachee*, feelings like upset or anxiety can be minimised. Therefore in the process of *coaching*, the teacher feels safer to open himself

up. Especially regarding the difficulties he faces and safely tries new and more effective approaches. Also, to minimise the negative emotions encourages the ability to think clearly to the assisted teacher, so that the creative ideas for solutions against the difficulties become easier to emerge from within the teacher.

Coaching, according to McKee, Tilin and Mason [9], is basically about helping people to bring out their best potential by helping them find things that are their obstacles and helping them find their way. The coaching method is exploring the potential or empowering the potential knowledge that the teacher has. The supervisor in this method is only a facilitator who functions to facilitate trainees to find their knowledge in their way. The advantage of this method is that participants tend to remember more what they are doing in the long term because they find new knowledge themselves.

In the mentoring method, the mentees tend to be more reactive rather than proactive, focusing on emerging class issues but unable to anticipate them. Mentees tend to imitate what they believe to be appropriate behaviour, imitating their ideal models of good teaching, imitating other educators, without knowing the reason why the educators act as they do [10, 15]. The reactive attitude shown to the training participants by the mentoring method makes participants depend entirely on the mentor. Participants tend to be passive, lack of their initiative and even makes choices (be passive). Initiatives are usually taken by mentors and participants often tend to follow. In training activities, the resource persons who act as mentors are the only source of information. This is what makes the knowledge of the training participants less varied and develops optimally, so that can influence the competitiveness of TPACK as the result of the training modules carried out. This is slightly different from the mentoring training method where the sources tend to be more dominant so that the teacher only receives the information from the resource person. Goldsmith, Lyons, Freas and Witherspoon [11] revealed the mentor as someone who helped others to learn something which he had learned before, but the result was not good, even slower or nothing as a result.

5. Conclusions

Based on the results from the research in the field, it can be concluded that the average value competency of TPACK/PAUD teachers in the Banten Province, which participated in the research using the coaching method than the teachers using the mentoring method, (35.2>32.9). The result in this research indicates that the usage of *coaching* methods is more effective in improving the TPACK competencies of PAUD teachers compared to the usage of the mentoring method in the Banten Province. The conclusion is that the training method can improve the

competence of TPACK teachers in childhood educations. The coaching method is recommended to use to improve the TPACK competency of PAUD teachers in Banten Province.

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