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Improving the pedagogic competence of physical education teachers

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ABSTRACT

The competencies possessed by teachers have not been as expected, as evidenced by the results of the average value of pedagogic competencies which are still low when compared to the results of professional competence scores on the Teacher Competency Test. This study aimed to develop a model for improving the pedagogic competence of Physical Education Teachers which was arranged in a module that contains how to develop a learning implementation plan, how to create and use the learning media, how to create and use the teaching materials, and how to prepare and implement the learning assessments. The development tests that were carried out were: 1) alpha test, 2) beta test, and 3) final product validation. The alpha test is a product validation test by three experts, while a beta test is a load and product suitability test involving 27 teachers and 3 supervisors, then a final product validation stage involving 84 teachers who are divided into two groups, namely experimental and control. The research instruments used were a questionnaire and a competency improvement scale. The data analysis techniques used are quantitative descriptive data analysis, gain score data analysis, and t-test. Based on the results of the assessment at the alpha test, beta test, and program validation stages, the resulting product was declared suitable for use as a teaching material set. Furthermore, through the process of testing the effectiveness of the product, the model of increasing pedagogic competence based on teaching materials is proven to be effective and can significantly improve the pedagogic competence of Physical Education Teachers.

Keywords: teacher, pedagogic competence, competency improvement

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INTRODUCTION

Education is a process that can encourage the ability of students to take part in building sustainable development (Bertschy, Kunzli, & Lehmann, 2013; Holden, Linnerud, & Banister, 2017). Thus, to achieve the educational goals, teachers as educators and instructors have a strategic role in education (Hanushek, 2016). This was conveyed by the Organization for Economic Co-operation and Development (OECD) in Darmody and Smyth (2016: 14) which is stated that the quality of education is largely determined by the quality of teaching provided where the teaching system is carried out by teachers. This explains that the quality of teaching is very influential on the quality of teachers (Avalos, 2011). Qualified teachers can improve students' abilities in the learning process (Aaronson, Barrow, & Sander, 2007), even it can increase at least 25% of students' abilities (Slater, Davies, & Burgess, 2011). There is a lot of evidence showing that the quality of the teacher education has an impact on a teacher's knowledge and skills, the quality of teacher competence (Blomeke & Kaiser, 2012; Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2009; Tatto, Schwille, Senk, Rodriguez, Bankov, & Reckase, 2012), and students' achievement (Hanushek & Rivkin, 2010).

The relationship between the competence and the performance has been investigated by researchers and shows that there is a relationship between teachers' professional competence and learning performance (Udiyono, 2011; Hakim, 2015), teachers' personality competence makes a significant contribution to improving the quality of teacher performance (Angmalisang, 2011;

Hakim 2015; Achyar, Rusdinal, Gistituati, & Khairudin 2019), there is a positive relationship between social competence and teachers' performance (Hamidi & Indriastuti 2012; Hakim 2015), and there is a positive and significant relationship between pedagogic competence on teachers' performance in mastering teaching materials, ability to manage learning and good learning commitment (Hamidi et al, 2012; Hakim 2015; Achyar et al, 2019).

The main components of pedagogic competence consist of knowledge of classroom management, knowledge of teaching methods, knowledge of assessment, structure of learning objectives and learning processes, planning and evaluation of learning, and the ability to adapt to heterogeneous groups in the classroom (Voss, Kunter, & Baumert, 2011; Konig, Blomeke, Paine, Schmidt, & Hsieh, 2011).

A study conducted by Gokalp (2016) on the investigation of teachers' competence when teaching in the classroom resulted in the conclusion that many teachers are more competent in measuring and evaluating but very incompetent in planning and managing learning activities. Furthermore, Andre Rosser (2018: 1) in his book Beyond Access: Making Indonesia's Education System Work, states that many teachers in Indonesia lack of pedagogical competence and knowledge about the subjects they teach, this draws low students' learning outcomes that make them unable to compete in the professional world.

Preparation of the lesson plans is one of the most challenging problems faced by the teachers and the prospective teachers when they are asked to develop the lesson plans (Dickson, Riddlebarger, Stringer, Tennant, & Kennetz, 2014; Bin-Hady, 2018). It is because teachers must work to serve approximately thirty students at once, with diverse needs and characteristics. Teachers, also, must balance the general learning objectives of the existing material demands with the needs of each student. Teachers must use a lot of knowledge, carry out development, understand the social and cultural character of each student, and understand the students' languages and expressions in the learning process.

Teachers' pedagogic competency development programs in preparing lesson plans such as education workshops and training are considered less effective because they do not support training participants with sufficient practice on how to prepare lesson plans. This causes confusion for teachers when writing their own lesson plans (Berchini, 2017).

Planning lessons is an important step in reminding teachers of what to do in class and how to make students believe in the material presented by the teacher. (Harmer, 2001). Studies on the problems faced by the teachers in preparing lesson plans or steps for implementing lesson plans in the classroom have been carried out. As a result, teachers not only faced difficulties in classroom management but also in the implications of planning lessons (Dickson et al, 2014). Another study also found that teachers faced many language difficulties and problems in planning lessons and implementing learning steps according to their lesson plans (Bin-Hady, 2018).

These various problem frameworks make researchers consider it necessary to develop a model of increasing pedagogic competence in the form of practical guidelines for preparing lesson plans so that they can be used and studied for all Physical Education Teachers to be able to develop their pedagogical competencies in preparing lesson plans.

This development model has characters that are not found in the existing models. First, this model is based on an analysis of pedagogical competency needs related to the preparation of learning plans obtained from the results of the initial competency test. Thus, the implementation of the model is in accordance with the needs based on the teacher's weaknesses. Second, the material is delivered in accordance with the systematic preparation of learning plans that are inspirational and adapted to the characteristics of students, facilities and infrastructure in schools and most importantly the ability of teachers to teach.

Third, this model has a sustainable nature. That is, the first activity with the next activity has a close relationship to resolving the weaknesses of the teacher in the preparation of lesson plans. Fourth, the implementation of activities involves resource persons from universities in accordance with the linearity and relevance of their scientific background. Fifth, this model has strengthensng of the aspect of supervision that will be carried out by Subject Supervisors and Principals through monitoring and evaluation during the implementation of activities.

With this product, it is hoped that all teachers can understand the components and systematics of learning planning that are adapted to the curriculum, because good planning will have an impact on a systematic, practical, planned, and measurable learning process to be able to improve students' academic achievement.

METHOD

The research method adopted the Borg and Gall (2007:775) method, which was simplified into three stages, they are: 1) preliminary study, 2) development stage, and 3) trial stage. Product development testing is carried out in 3 stages, namely alpha testing, beta testing, and final product validation. Alpha test is an initial product assessment activity. Beta testing is carried out by field testing to implement the product draft. While the final product validation is carried out to determine user response and product effectiveness.

The research subject is based on the stages of the test to be carried out. The Alpha test respondents consist of three expert judgments. The Beta test respondents consisted of 27 teachers and three school supervisors. Meanwhile, the subject of the product validation stage consisted of 84 teachers who were determined based on non-probability sampling with a purposive technique.

The alpha test instruments consisted of material experts, linguists, and media experts. The beta test instrument used is a user response instrument. While the product validation instrument used is a systematic scale instrument for the preparation of learning plans consisting of 8 aspects, 19 indicators, and 37 items.

In order to obtain accurate data, valid and reliable instruments are needed. Therefore, the systematic scale of the preparation of this learning plan needs to be tested for validity and reliability before being used in the product effectiveness test stage. The validity test used is face validity with three validators. The results of the validity of the appearance of the systematic scale instrument for the preparation of learning plans get the "very appropriate" category, this shows that the aspects, indicators, and items contained in the instrument are in accordance with the intended use of the instrument.

After the face validity test was carried out by the three validators, the instrument was tested to find out whether or not the statements in the systematic scale of the preparation of learning plans were valid. The criteria used to test the validity of the systematic scale of the preparation of learning planning refers to the formula (df = n-2) with a significant level of 0.05. Respondents in the trial of the systematic scale instrument for the preparation of learning plans amounted to 30 respondents, then the r table was determined by the formula (df = n-2) resulting in df = 28 with a significant level of 0.05 showing R table value of 0.3610. Based on the results of the validity test (table 1), it is not known that there are items that have coefficient values below the r table criteria, meaning that the systematic scale instrument for preparing learning plans is said to be valid.

Then the instrument reliability test was carried out using Cronbach's Alpha reliability coefficient analysis with the help of SPSS 26. The results of the calculation of the alpha value of the reliability test of the final product validation instrument (Table 2) were 0.987 and it could be interpreted that the systematic scale instrument for preparing learning planning was declared reliable.

At the Alpha test and Beta test stages, quantitative data were obtained in the form of scores that is obtained from the assessment instruments, which were arranged using an interval scale of 1-5. Then the data was analyzed to determine the classification of the assessment criteria. Widoyoko (2012; 111) stated that to compose a classification table using the same rules as the basis for the number of respondents' scores by determining the highest score (ideal), lowest score (ideal), number of classes and interval distance. The result of the classification assessment categories can be seen in Table 3.

Data analysis techniques to test the effectiveness of the product validation test used gaint-score techniques and t-test. The data gain analysis aims to determine the comparison of the average of enhancement in the results of the pre-test and post-test of the experimental group and the control group. The steps in calculating the gain score technique according to Hake (1991: 1) are calculating the average sample score, both pre-test and post-test scores, calculating gain <g>, and determining criteria. From these calculations, the gain score categorization is determined as in table 4. The t-test was used to determine and test the hypotheses from the results of the two groups.

Table 1. Instrument validity test results

Item	R hitung Sig. (2-Tailed)	N	R Table	Decision
Item_1	0.723	30	0,361	Valid
Item_2	0.895	30	0,361	Valid
Item_3	0.722	30	0,361	Valid
Item_4	0.744	30	0,361	Valid
Item_5	0.852	30	0,361	Valid
Item_6	0.735	30	0,361	Valid
Item_7	0.871	30	0,361	Valid
Item_8	0.829	30	0,361	Valid
Item_9	0.839	30	0,361	Valid
Item_10	0.878	30	0,361	Valid
Item_11	0.844	30	0,361	Valid
Item_12	0.916	30	0,361	Valid
Item_13	0.841	30	0,361	Valid
Item_14	0.752	30	0,361	Valid
Item_15	0.823	30	0,361	Valid
Item_16	0.907	30	0,361	Valid
Item_17	0.846	30	0,361	Valid
Item_18	0.873	30	0,361	Valid
Item_19	0.908	30	0,361	Valid
Item_20	0.867	30	0,361	Valid
Item_21	0.884	30	0,361	Valid
Item_22	0.846	30	0,361	Valid
Item_23	0.806	30	0,361	Valid
Item_24	0.722	30	0,361	Valid
Item_25	0.871	30	0,361	Valid
Item_26	0.844	30	0,361	Valid
Item_27	0.823	30	0,361	Valid
Item_28	0.908	30	0,361	Valid
Item_29	0.806	30	0,361	Valid
Item_30	0.723	30	0,361	Valid
Item_31	0.744	30	0,361	Valid
Item_32	0.867	30	0,361	Valid
Item_33	0.907	30	0,361	Valid
Item_34	0.916	30	0,361	Valid
Item_35	0.750	30	0,361	Valid
Item_36	0.807	30	0,361	Valid
Item_37	0,876	30	0,361	Valid

Table 2. Instrument reliability test results

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.987	37

Table 3. Assessment rubric

Skor	Klasifikasi
$4{,}20 \leq \bar{x} \geq 5{,}00$	Very appropriate
$3{,}40 \leq \bar{x} \geq 4{,}19$	Appropriate
$2{,}60 \leq \bar{x} \geq 3{,}39$	Moderate
$1{,}80 \leq \bar{x} \geq 2{,}59$	Deficient
$1{,}00 \leq \bar{x} \geq 1{,}79$	Very Deficient

Table 4. Categorization of gain score analysis

Limitation	Category
$g \geq 0{,}7$	High
$0{,}7 > g \geq 0{,}3$	Moderate
$g < 0{,}3$	Low

FINDING AND DISCUSSION

Finding

Based on the study of the regulatory analysis of curriculum development which is used as a source of guidance for the preparation of the model for improving pedagogic competence, it results in the preparation and distribution of basic materials that form the basis of the material in the model presented in Figure 1.

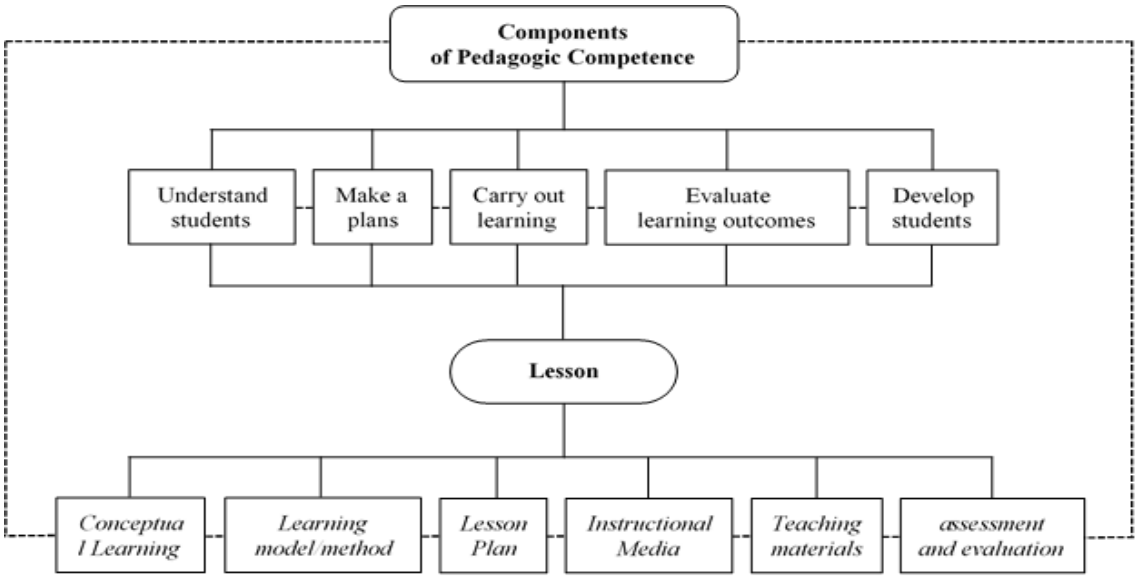

Figure 1. Material Base Analysis

After the subject matter is determined, and the basic material is prepared, the next step is to validate the product draft before being tested in the field. The alpha test was carried out to validate the initial product and overall, the assessment carried out by the expert judgment was in the "very appropriate" category according to the alpha test scoring rubric.

Based on the results of the alpha test conducted by expert judgment (Table 5), it can be concluded that the model design can be tested in the field. Field tests or beta tests are carried out to obtain an assessment of the content and suitability aspects of the product from potential users. The aspects assessed by beta test respondents are aspects of appearance, aspects of material presentation, and aspects of benefits. Data from the beta test (table 6) shows that the average product draft assessment is 4.13 or is included in the "appropriate" category according to the conversion in the beta test assessment rubric. These results indicate that the draft model for improving pedagogic competence can enter the final product validation stage.

Table 5. Alpha test assessment results

Assessment Aspect	$\bar{X}$Score	Category
Material	4,67	Very appropriate
Media	4,70	Very appropriate
Language	4,73	Very appropriate

Table 6. Beta test results data

Aspect	Indicator	Score	Category
Appearance	Text clarity	4,37	Very appropriate
	Media/image/illustration clarity	4,06	Appropriate
	The suitability of media/images/illustrations with the material	4,30	Very appropriate
Material Presentation	Material presentation	4,31	Very appropriate
	Ease of understanding the material	4,19	Appropriate
	Systematic accuracy of material presentation	4,06	Appropriate
	Sentence clarity	4,02	Appropriate
	Clarity of symbols	3,89	Appropriate
	Clarity of terms	4,07	Appropriate
	The suitability of the example with the material	4,07	Appropriate
Benefit	Ease of learning	4,09	Appropriate
	Interest in using teaching materials	4,19	Appropriate
	Increased motivation	4,01	Appropriate
	$\bar{X}$Score	4,13	Appropriate

The final product validation stage is carried out by testing the effectiveness of the product and user responses to determine the acceptability of the model. The activity of testing the effectiveness of this product is divided into three stages. The first stage begins with the data collection process, the second stage is the delivery of material and the distribution of the pedagogic competency improvement model product to the experimental group. As for the control group, the material was delivered without distributing the product model to increase pedagogic competence. The last step at this stage is to give the task of compiling lesson plans to the experimental group and the control group. The results of the assignment are then supervised, and the data from the supervision results are analyzed using gain score analysis techniques to determine the effectiveness of using the product.

Based on table 7, the data from the gain score analysis of the experimental group is 0.751 where the score is in the g range of 0.7 with the "high" category. While the analysis in the control group showed a gain score of 0.217 where the score was in the g range of 0.3 with the "low" category. These results indicate that the average score of increasing pedagogic competence in the experimental group is proven to be higher than the average score of the control group.

Table 7. Gain score analysis results

Nilai	Experiment		Control	
	Pre	Post	Pre	Post
Highest Value	150	170	154	158
Lowest Value	136	157	138	141
Σ	5993	6854	6083	6312
$\bar{X}$	142,69	163,19	144,83	150,29
N-Gain Score	0,751		0,217	
Gain Criteria	High		Low	

The next step is to find out whether the effectiveness of the model product is significant or not, it is necessary to do an independent sample t-test. Before carrying out the analysis using the t-test, it is necessary to carry out prerequisite tests in the form of data normality tests and homogeneity tests. Based on the results of the normality test (table 8) the pre-test Sig value of the experimental group was 0.203, and the control group was 0.144 and the Sig post-test value was 0.60 for the experimental class and the control group. is 0.293. The data shows a significance value greater than 0.05 (sig > 0.5) which indicates the data is normally distributed.

Table 8. Normality test results

		Shapiro-Wilk		
	Class	*Statistic*	df	Sig.
Pre-Test	Experiment	.964	42	.203
	Control	.960	42	.144
Post-Test	Experiment	.949	42	.060
	Control	.968	42	.293

a. *Lilliefors Significance Correction*

Then seen from the homogeneity test data (Table 9) between the experimental group and the control group at the pre-test and post-test stages there is also no score variance so the two samples are homogeneous, this is evidenced by a significance value of 0.678 (pre-test) and 0.891 (post-test) or a sig > 0.05.

Table 9. Homogeneity test results

	Levene Statistic	df1	df2	Sig.
Pre-Test	.173	1	82	.678
Post-Test	.019	1	82	.891

After fulfilling the requirements for normality and homogeneity, the next step is to test the independent sample t-test. Based on the pre-test data obtained a sig (2-tailed) value of 0.753 (table 10). If the value of sig (2-tailed) is greater than the significance level of 0.05 (sig > 0.05), then there is no significant difference between the pre-test scores of the experimental group and the control group. After the implementation of the pedagogic competency improvement model product to the experimental group, the sig (2-tailed) value in the post-test data became 0.000. If the value of sig (2-tailed) is smaller than the significant level of 0.05 (sig 0.05), then Ho is rejected and Ha is accepted. This shows that there is a significant difference between the pedagogical competence scores of teachers who use the product model (experimental class) and classes that do not use the model (control class).

Table 10. Test results of independent sample T-test

	t-test for Equality of Means				
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre-test	-.315	82	-753	-.238	.755
Post-test	15.177	82	.000	12.905	.850

Discussion

The core of learning lies in teacher competencies, especially pedagogic competencies related to the learning process, teaching methods, and how to adapt them to the needs of students (Dotger, 2015). Optimal pedagogic competence is integrated with the best roles and functions in planning, implementing, and evaluating the learning process so as to create quality education (Faltis & Abedi, 2015; Afandi et al., 2021). Learning planning is designed in the form of a syllabus and lesson plans that refer to content standards. In addition, the learning planning also includes the preparation of learning media and resources, assessment tools and learning scenarios.

Table 11. Composition of product material

BAB		Theory
1	Preliminary	
	A	Background
	B	Juridical Platform
	C	Purpose and Scope of the Guide
2	Conceptual Learning of Higher Order Thinking Skills (HOTS)	
	A	Concept of Higher Order Thinking Skills
	B	Learning Competencies of 21st Century
	C	Scientific Approach
3	The learning model of Kurikulum 2013	
	A	Discovery Learning
	B	Inquiry Learning
	C	Problem Based Learning
	D	Project-Based Learning
4	Lesson plan	
	A	Nature of Lesson Plan
	B	Preparation of Lesson Plan Principles
BAB		Theory
4	C	Components and Systematics of Lesson Plans
	D	Preparation of lesson plans
5	Instructional Media	
	A	Understanding of Learning Media
	B	Functions of Learning Media
	C	Classification of Learning Media
	D	Use of Learning Media
	E	Strategies for Using Learning Media
6	Teaching materials	
	A	Types of Teaching Materials
	B	Teaching Material Development Procedure
7	Learning Assessment	
	A	Assessment of Affective Domain
	B	Assessment of Cognitive Domain
	C	Assessment of Psychomotor Domain
8	Conclusion	

This research and development resulted in a model of increasing pedagogic competence related to the preparation of a systematic learning plan. The product draft of the pedagogical competency improvement model consists of related materials to assist teachers in preparing lesson plans (table 11). The material presented is based on a study of the stages in analyzing the Kurikulum 2013.

Research activities in the experimental class are guided by the product material produced in this study and are oriented to the stages taken in project evaluation and metacognitive strategies. Project-based material delivery is a systematic teaching model in how to learn and understand through discovery learning, complex structured processes, authentic questions and products, and carefully designed assignments. Assignments are based on very challenging problems and require participants to design how to solve problems, make decisions, carry out investigative activities,

and provide opportunities for independent learning (Koparan & Guven, 2014). So competency-based project assessments provide opportunities for teachers to be active, independent, and responsible.

Furthermore, the metacognitive strategy in this study is seen as a cognitive set of information processing that allows a teacher to use the acquisition of knowledge and previous experiences in an organized manner to assist students in problem-solving by selecting, seeking and applying relevant skills, such as reflection and evaluation. According to Flavell (1976), metacognition is the process of monitoring, planning, controlling, and evaluating information to achieve a goal. This metacognitive strategy can help teachers to pay attention to aspects in preparing lesson plans in applying metacognitive skills and strategies for classroom activities, teachers' pedagogical knowledge about teaching and learning subjects, knowledge of classroom assessments that must be carried out during teaching and learning, knowledge of psychological components, knowledge of individual differences, as well as knowledge of classroom management, resulting in a better understanding by students. In addition, using student evaluations and their views on teaching and learning helps in informing possible changes to the module framework or content. In this way, aspects of the knowledge and skills of teachers in preparing lesson plans can be developed simultaneously.

Learning activities in the experimental class also apply a strategy of optimizing cooperation between teachers. Collaboration between teachers includes case discussions and study groups. By optimizing the collaboration between teachers, it can help teachers to exchange ideas educatively and learn from each other more relaxed because teachers are used to it.

The various stages that have been carried out in product development, product use, and product effectiveness testing produce a product in the form of a set of teaching materials to improve pedagogic competence which can significantly and effectively improve pedagogic competence. The average score for improving pedagogic competence in the experimental group was also shown to be higher than the average score for the control group.

CONCLUSION

Good teachers can give love and care to students, have a desire to develop their knowledge of the subjects they teach, and support and encouragement in helping students achieve their best. Pedagogic competence develops as a scientific tool and method that bridges the gap in achievement and intrinsic quality as a result of social and economic disparities and improves personal quality and learning achievement. Therefore, it is important for teachers to always develop their pedagogical competence.

This research produces a model product for improving teacher pedagogic competence in the form of teaching materials related to the preparation of learning plans which are arranged in 8 chapters of teaching materials. Based on the results of the assessment at the alpha test, beta test, and program validation stages, the resulting product was declared eligible to be used as teaching material for Physical Education Teachers in improving pedagogic competence.

Through the process of testing the effectiveness of the product, the model of increasing the pedagogic competence of Physical Education Teachers based on teaching materials has proven to be effective and can significantly improve the pedagogic competence of physical education teacher.

From this development research, the following recommendations are made: the use of the product is used to improve the pedagogic competence of teachers related to the preparation of lesson plans. In using this product, teachers must also apply their metacognitive abilities. So in compiling learning plans, a teacher must first carry out the process of monitoring, planning, controlling and evaluating information so that the learning plans that are prepared can be right on target so that they are able to improve the learning achievement of their students. This is in accordance with the opinion of Tachie (2021) who said that teachers' pedagogical knowledge is developed through the combination of metacognitive skills and strategies that help students much better than those who do not have these skills.

REFERENCES

Aaronson, D., Barrow, L., & Sander, W. (2007). Teachers and student achievement in the Chicago public high schools. *Journal of Labor Economics*, *25*(1), 95–135. http://dx.doi.org/10.1086/508733

Achyar, N., Rusdinal., Gistituati, N., & Khairudin. (2019). Health education teaches pedagogic and personality competencies in guiding practical clinical training of nursing students. Advances in social science, *Education and Humanities Research*, *178*, 132-136. https://doi.org/10.2991/icoie-18.2019.31

Afandi, M., Wahyuningsih, S., & Mayasari, L. I. (2021). Does elementary school teacher's performance matter? *Cakrawala Pendidikan*, *40*(1), 242-252. https://doi.org/10.21831/cp.v40i1.35284

Angmalisang, H. (2011). Influence of personality on performance master teacher. *Elektromatika*, *1*(1).

Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *International Journal of Teaching and Teacher Education*, *27*(1), 10-20. https://doi.org/10.1016/j.tate.2010.08.007

Berchini, C. N. (2017). Critiquing un/critical pedagogies to move toward a pedagogy of responsibility in teacher education. *Journal of Teacher Education*, *68*(5), 463–475. https://doi.org/10.1177/0022487117702572

Bertschy, Franziska., Kunzli, Christine., & Lehmann, Meret. (2013). Teacher's competencies for the implementation of educational offers in the field of education for sustainable development. *Jurnal Sustainability*, *5*(12), 5067-5080. https://doi.org/10.3390/su5125067.

Bin-Hady, W. R. A. (2018). A study of novice teachers' challenges at their practical teaching phase. *International Journal on Language, Research and Education Studies*, *2*(3),333-345. https://doi.org/10.30575/2017/IJLRES-2018091203

Blomeke, S., & Kaiser, G. (2012). Homogeneity or heterogeneity? Profiles of opportunities to learn in primary teacher education and their relationship to cultural context and outcomes. *ZDM*, *44*(3), 249–264. https://doi.org/10.1007/s11858-011-0378-6

Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Educational Evaluation and Policy Analysis*, *31*(4), 416–440. https://doi.org/10.3102/0162373709353129

Darmody, M. & Smyth, E. (2016). *Entry to programs of initial teacher education*. The Economic and Social Research Institute.

Dickson, M., Riddlebarger, J., Stringer, P., Tennant, L., & Kennetz, K. (2014). Challenges faced by Emirati novice teachers. Near and middle eastern. *Journal of Research in Education*, *4*, 1–10. https://doi.org/10.5339/nmejre.2014.4

Dotger, B. H. (2015). Core pedagogy. *Journal of Teacher Education*, *66*(3), 215–226. https://doi.org/10.1177/0022487115570093

Faltis, C., & Abedi, J. (2013). Extraordinary pedagogies for working within school settings serving nondominant students. *Review of Research in Education*, *37*(1), vii–xi. https://doi.org/10.3102/0091732x12462989

Gokalp, M. (2016). Investigating classroom teaching competencies of pre-service elementary mathematics teachers. *Eurasia Journal of Mathematics, Science and Technology Education*, *12*(3), 503-512. https://doi.org/10.12973/eurasia.2016.1296a

Hakim, A. (2015). Contribution of competence of teacher (pedagogical, personality, professional competence and social) on the performance of learning. *International Journal of Engineering and Sciences*, *4*(2): 1-12.

Hamidi, M., & Indriastuti, S. (2012). Influence analysis of competence. *Proceedings of The National Seminar on Industry and Technology*, December 26, 2012.

Hanushek, E. A & Rivkin, S. G. (2010). Generalizations about using value-added measures of teacher quality. *The American Economic Review*, *100*(2), 267-271. https://doi.org/10.1257/aer.100.2.267

Hanushek, E.A. (2016). What Matters for Student Achievement: Updating Coleman on the

Influence of Families and Schools. *Education Next*, *16*(2), 18-26.

Harmer, J. (2001). *How to teach English: An introduction to the practice of English language teaching*. Edinburgh Gate: Longman.

Holden, E., Linnerud, K., & Banister, D. (2017). The imperatives of sustainable development. *Sustainable Development*, *25*(3), 213-226. https://doi.org/10.1002/sd.1647.

König, J., Blömeke, S., Paine, L., Schmidt, W.H., & Hsieh, F.-J. (2011). General pedagogical knowledge of future middle school teachers: On the complex ecology of teacher education in the United States, Germany, and Taiwan. *Journal of Teacher Education*, *62*(2), 188 - 201. https://doi.org/10.1177/0022487110388664

Koparan, T., & Guven, B. (2014). The effect of project-based learning on the statistical literacy levels of student's 8th grade. *European Journal of Educational Research*, *3*(3), 145-157. https://doi.org/10.12973/eu-jer.3.3.145

Rosser, Andrew. 2018. Beyond access: Making Indonesia's education system work. Sydney: Lowy Institute.

Slater, H., Davies, N. M., & Burgess, S. (2011). Do teachers matter? Measuring the variation in teacher effectiveness in England. *Oxford Bulletin of Economics and Statistics*, *74*(5): 629–645. https://doi.org/10.1111/j.1468-0084.2011.00666.x

Tachie, S.A. (2021). Improving teachers' pedagogical knowledge of teaching mathematics: metacognitive skills and strategies application. *Journal of Studies in Social Sciences and Humanities*, *7*(4), 433-450.

Tatto, M. T., Schwille, J., Senk, Sh, Rodriguez, M., Bankov, K., & Reckase, M. (2012). *Policy, practice, and readiness to teach primary and secondary mathematics*: First findings. Amsterdam: International Association for the Evaluation of Educational Achievement.

Udiyono, M. P. (2011). Pengaruh kompetensi profesional dan keikutsertaan dalam forum ilmiah serta karya pengembangan profesi terhadap kinerja guru (studi kasus di Universitas Widya Dharma Klaten). *MAGISTRA*, *23*(76), 1.

Voss, T., Kunter, M., & Baumert, J. (2011). Assessing teacher candidates' general pedagogical/psychological knowledge: Test construction and validation. *Journal of Educational Psychology*, *103*(4), 952-969. https://doi.org/10.1037/a0025125