Measuring Teacher's Competency in Describing Student Activities in Learning with Problem Based Learning

Imam Safi'i[1*], Lili Wahdini[2], Reni Warpitasari[3] iD

[1]Universitas Muhammadiyah Prof. DR. HAMKA Jakrata, Indonesia
[2]Universitas Tama Jagakarsa Jakarta, Indonesia
[3]Sekolah Dasar Negeri Gandaria Selatan 01 Jakarta, Indonesia

ARTICLE INFO

A B S T R A K

Pemanfaatan model problem based learning dapat meningkatkan keaktifan dalam pembelajaran. Penelitian tentang problem based learning (PBL) telah banyak dilakukan, namun penelitian yang menggali tentang kompetensi guru dalam mendeskripsikan aktivitas siswa pada pembelajaran dengan model PBL belum banyak yang melakukan. Tujuan penelitian ini untuk menganalisis kompetensi guru dalam memaparkan aktivitas siswa pada pembelajaran dengan model problem based learning. Penelitian ini menggunakan metode padan, yaitu dengan cara memadankan aktivitas pembelajaran yang telah dikembangkan oleh para guru dengan sintak problem based learning, yakni berupa mengorientasikan siswa pada masalah, mengorganisasikan siswa untuk belajar, membimbing penyelidikan, menyajikan hasil karya, dan mengevaluasi pemecahan masalah. Sumber data dalam penelitian ini adalah rencana pelaksanaan pembelajaran bahasa Indonesia yang telah disusun oleh guru SMP, SMA, dan SMK. Hasil penelitian menunjukkan, rata-rata kompetensi guru dalam mendeskripsikan aspek orientasi siswa pada masalah sebesar 17,24, mengorganisasikan siswa untuk belajar 55,17, membimbing penyelidikan sebesar 55,17, menyajikan hasil karya 62,07, dan mengevaluasi pemecahan masalah sebesar 58,62. Rata-rata kompetensi secara keseluruhan adalah 49,7 (kurang kompeten). Hasil penelitian ini dapat dimanfaatkan sebagai salah satu landasan untuk mengukur kompetensi guru.

A B S T R A C T

Utilization of problem based learning models will be able to increase student activity in learning. Many researches on problem based learning (PBL) have been carried out, but research that explores teacher competence in describing student activities in learning with the PBL model has not been done much. The purpose of this study is to analyze the teacher's competence in explaining student activities in learning with a PBL. This study uses the matching method, namely by matching the learning activities that have been developed by the teachers with the PBL syntax, namely in the form of orienting students to problems, organizing students to learn, guiding investigations, presenting work, and evaluating problem solving. The source of the data in this study is the implementation plan for learning Indonesian which has been prepared by teachers of SMP, SMA, and SMK. The results showed that the average competence of teachers in describing aspects of student orientation to problems was 17.24, organizing students to learn 55.17, guiding investigations was 55.17, presenting the work of 62.07, and evaluating problem solving was 58, 62. The overall competency average is 49.7 (less competent). The results of this study can be used as a basis for measuring teacher competence.

1. INTRODUCTION

Teacher performance is influenced by several factors, including teacher commitment, teacher professional competence and teacher motivation. The higher the commitment, professional competence and motivation of a teacher, the better the performance (Aji et al., 2019; Prayogi, Rayinda Dwi; Estetika, 2019). Teacher competence and motivation are important factors that also influence teacher performance, to carry out their duties and responsibilities as educators (Kasim et al., 2018; Star et al., 2014). Teacher

*Corresponding author
E-mail addresses: imam99@gmail.com (Imam Safi'i)

competence and commitment have a significant positive effect on teacher professional performance (Abu et al., 2020; Aris et al., 2021; Sari et al., 2020). Teacher pedagogic competence has a significant effect on teacher performance. Competence is a form of very productive work behavior (Ana et al., 2020; Muspawi et al., 2020). Many scientists in the field of educationhas established a model of competence needed by teachers to be successful in achieving learning objectives (Blömeke et al., 2022; Georgieva, 2019; M. R. Wulandari & Iriani, 2018). Previous study state competencies that must be developed by teachers can be in the form of knowledge, skills, and attitudes (Liang et al., 2022). One of the competencies in the form of knowledge and skills that must be possessed by teachers is to develop a learning implementation plan. Previous sresearcher state the lesson plan has an important role in the preparation of the learning process (Anggraeni & Akbar, 2018). A good learning process must of course go through good planning preparation. The learning implementation plan can be used as a reference and guide in carrying out the learning process (Jayanti & Senam, 2017; Rambe, 2019). Learning tools, one of which is a learning implementation plan, can be a reference in learning activities and improving teacher quality (Makhrus, 2018; Nirtha et al., 2021). Teacher competence in designing learning is one of the important aspects in the success of education.

The preparation of a good learning implementation plan must refer to innovative learning models. One of the innovative learning models that can be used as the basis for developing a learning implementation plan is a problem based learning model. Learning with problem based learning models can increase student motivation, critical thinking, independent learning, and retention or long-term knowledge storage (Dwyer et al., 2014; Giuliano et al., 2021). Utilization of problem based learning models can improve learning outcomes, responsibility and capacity to handle complex problems. This is because the problem based learning model uses the principles of constructivism to encourage the application of prior knowledge, collaborative learning, and active engagement (Candra & Retnawati, 2020; Seibert, 2021). The implementation of good learning, of course, must be supported by good preparation and planning. Therefore, teachers can carry out learning with problem-based learning models effectively, teachers need to have good competence in preparing learning implementation plans with problem-based learning models. Various studies that explore the effectiveness of using problem based learning have been carried out, but research that explores the competence of teachers in preparing lesson plans has not been found. For example, research that improving description writing skills through a scientific approach with problem based learning methods in grade IV elementary school (Nugraha, J., MS & Fuad, 2019). Then research that improving exposition text writing skills using problem based learning model (Kristyanawati et al., 2019). Then there are research that improving English learning achievement through the application of problem based learning models (Ting et al., 2021).

So far, research related to teacher competence regarding the implementation of problem based learning has not been carried out by researchers. However, several previous studies related to other teacher competencies have been carried out, namely regarding the ability of teachers to integrate character education values in learning Indonesian (Safi'i & Tarmini, 2019) and the ability of Indonesian language teachers in preparing lesson plans with a genre pedagogy approach (Safi'i et al., 2020). Research that explores the competence of teachers in preparing learning implementation plans using problem based learning models is important and interesting to do because concrete information will be obtained about the level of teacher competence in applying innovative learning models. The acquisition of data regarding the level of teacher competence in preparing learning implementation plans can be used as a basis for determining various follow-ups in conducting coaching and counseling about teacher competencies. Thus, efforts to improve the quality of education can take place continuously. Based on the description above, the purpose of this study is to analyze the teacher's competence in explaining student activities in learning with a PBL. This study collect and describe data regarding the level of competence of teachers in preparing learning implementation plans with the problem based learning model, especially with regard to the efforts of the teachers in describing student activities that are in line with the problem based learning model. Obtaining data on the ability of teachers to describe student activities in learning with a problem based learning model will provide information about the stages and effectiveness of learning that will be carried out by the teacher. In addition, information will also be obtained regarding the accuracy of learning activities that position students as the center of learning.

2. METHOD

The approach used in this research is qualitative, namely by looking closely at the description of syntax and learning activities that have been prepared by the teachers. The method used in this study refers to the equivalent method, namely the determination of research data by using determinants or criteria outside the data, regardless, and not being part of the language or object of the research

concerned. The source of the data explored in this research is the lesson plan that has been prepared by SMP, SMA, and SMK teachers who take part in teacher professional education activities at one of Indonesia's private universities in 2020/2021. During the training, the teachers were given an explanation and understanding of various learning models. One of them is the problem based learning model. Furthermore, the teachers were assigned to make a learning implementation plan using a problem based learning model. The data collection carried out refers to the rubric which contains the components of student activities in learning with the problem based learning model presented (Ariyana et al., 2018). Descriptions of student activities in learning with the problem based learning model that have been prepared by the teachers are matched with the learning criteria as show in Table 1.

Table 1. Student Activities in Learning with a Problem Based Learning Model

Work steps	Student Activities
Student orientation on the problem	Students in groups observe and understand the problems presented by the teacher or obtained from the recommended reading material.
Organizing students to learn	Students discuss and divide tasks to find data/materials/tools needed to solve problems.
Guiding individual and group investigations	Students conduct an investigation (search for data/references/sources) for group discussion materials.
Develop and present the work	Students in groups conduct discussions to produce problem-solving solutions and the results are presented/presented in the form of works.
Analyze and evaluate the problem solving process	Each group makes a presentation, the other groups give appreciation. The activity is continued by summarizing / making conclusions according to the input obtained from other groups.

Base on Table 1, show the data that has been collected through the matching technique is then analyzed for the level of trend. In addition, it will be used as a basis for measuring the level of understanding and competence of teachers in implementing the problem based learning model in the learning implementation plan. Score (1) to identify the suitability between the description of student activities with problem-based learning syntax. The score (0) is used to identify discrepancies between the activities described by the teacher and the PBL syntax. Analysis of teacher competence in describing student activities in learning with a problem based learning model is then categorized into five categories, namely as contained in Table 2.

Table 2. Teacher competency category range

No	Number Range	Information
1	0 – 40.44	very less competent
2	45.55 - 55.55	Less competent
3	56.55 - 65.55	Competent enough
4	66.55 - 75.55	Competent
5	76.55 - 10.00	Very Competent

3. RESULT AND DISCUSSION

Result

The findings of this study are in the form of a description of student activities carried out by Indonesian language teachers in the lesson plan. The student activities described refer to the problem-based learning syntax, namely the orientation of students to problems, organizing students to learn, guiding individual and group investigations, developing and presenting work, and analyzing and evaluating problem solving processes. The data or findings regarding teacher competence in describing student activities in learning activities through problem based learning models is show in Table 3.

Base on Table 3 it show that syntax of Student orientation on the problem obtain very less competent category. Then for syntax of organizing students to learn obtain less competent. Then for guiding individual and group investigations is obtain less competent category. Then for Develop and present the work of syntax is obtain competent category. And same as analyze and evaluate the problem solving process is obtain Competent category.

Table 3. The teacher's ability to describe student learning activities in PBL

No	Syntax	Average Ability Teacher	Category
1	Student orientation on the problem	17.24	Very less competent
2	Organizing students to learn	55.17	Less competent
3	Guiding individual and group investigations	55.17	Less competent
4	Develop and present the work	62.07	Competent enough
5	Analyze and evaluate the problem solving process	58.62	Competent enough

Discussion

The acquisition of research data above illustrates the level of competence of teachers in describing the stages of student learning activities with a problem based learning model. This research has explored some more basic things about the implementation of problem based learning, namely in the lesson plan. The difference between the results of this study and several previous studies is concerned with the implementation of problem-based learning in learning. Previous studies were more concerned with the effectiveness of problem based learning in learning. This study emphasizes how the readiness, understanding, and ability of teachers in making learning implementation plans using a problem based learning model. Thus, indirectly the results of this study can provide information about the competence of teachers in carrying out learning with a problem based learning model. The description of the first student activity in learning with a problem based learning model is about orienting students to problems. At this stage, the teacher directs students to observe and understand the problems presented by the teacher or obtained from the suggested reading material. The teacher's ability to describe these activities is 17.24 (very less competent). Of the 29 lesson plans analyzed, there are only 5 lesson plan which has accurately described student activities. The low competence of teachers in describing student orientation to the problem will have implications for the description of the next learning activity. The low competence of teachers related to the preparation of this learning implementation plan is in accordance with the results of research from previous study show that teacher competencies related to classroom management skills, communication competencies, and social skills are not yet optimal (Sudrajat, 2020).

Student orientation to the problem will be able to increase student motivation. Orientation to students on problems can trigger students' interest in learning to be actively involved in learning. Therefore, if the student's orientation to the problem cannot be carried out properly, it will be able to affect student learning motivation. Learning motivation that is not optimal will affect the desire or involvement of students in learning. As a result, it will affect the low student learning outcomes. This is in accordance with the results of study that state the use of the PBL learning model has a significant effect on students' motivation and learning outcomes (Pratiwi, V. D., & Wuryandani, 2020). Student orientation to problems in problem-based learning will also be able to improve students' critical thinking skills that interactive multimedia based on problem based learning is proven to be able to improve students' critical thinking skills (Saepuloh et al., 2021; Sulisworo et al., 2020). The description of the next student activity in problem based learning is to organize students to learn. At this stage, the teacher directs students to discuss and divide tasks to find data, materials or tools needed to solve problems. The average competence of teachers in describing these activities is 55.17 (less competent). The low competence of this teacher is in line with what is expressed by previous study that found teachers do not have adequate competence (Leonard, 2015). One of them is in making learning designs. The reality of the lack of competence of the teachers is also in line with what was stated by previous study related to the research that has been done on the competence of teachers in inclusive schools (R. S. Wulandari & Hendriani, 2021). According to him, the pedagogic competence of teachers in inclusive schools is relatively low. If the teacher cannot organize students to learn, the teacher will also have difficulty in carrying out learning. Students will be less focused and tend to do activities that are less controlled.Student learning conditions that are less controlled or less well organized will result in teacher difficulties in realizing learning objectives. As stated by previous study through the results of her research, that learning can take place effectively because of continuous conditioning (Rohmawati, 2015). The third activity in problem based learning is guiding individual and group investigations. The description of student activities is to conduct an investigation, which is to find data and references or sources for group discussion materials. The teacher's competence in describing the learning activities is 55.17 (less competent). As many as 16 teachers have been able to describe the learning activities accurately and the rest, as many as 13 teachers have not been able to describe the activities properly. The results of this study are different from the research which shows that the teacher's ability to prepare the 2013 Curriculum learning implementation plan can be said to be very good (Wijaya et al., 2021). The ability of teachers to guide students in learning

will be able to direct students to always focus on learning objectives. This is also in accordance with the results of research that state the problem based learning learning model if done properly according to the stages can improve students' critical thinking skills (Rahmat et al., 2020).

The fourth activity in the problem based learning model is developing and presenting the work. Student activities that must be described by the teacher are directing each group of students to carry out discussions in finding or producing problem solving solutions. Then the results are presented or presented in the form of works. The average competence of teachers in this case is 62.07 (competent enough). As many as 18 teachers have been able to describe student activities well and as many as 11 teachers have not been able to describe student activities properly. Although the average competence of teachers in describing student activities related to the 4th problem-based learning syntax is better than other syntaxes. However, the average competence of the teachers is not optimal. The abilities of these teachers are not optimal yetin line with the results of research from previous study that the competence of the teacher is not as expected (Hastuti et al., 2022). The average value of pedagogic competence is still low.Teachers need to provide opportunities for students to present their work because it will be able to improve students' communicative competence. The communicative aspect is one of the components of 21st century skills that must be developed by students, both in learning and in learning tools (Safi'i, I., & Wahdini, 2021; Ting et al., 2021).

The description of learning activities in the last problem based learning model is to analyze and evaluate the problem solving process. The description of activities that must be carried out by the teacher related to student activities is to provide opportunities for each group to make presentations. Another group of students gave their appreciation. After that, each group summarizes or draws conclusions according to the input obtained from other groups. The average competence of teachers in describing these activities is 58.62 (competent enough). The competence of these teachers is not optimal, according to the results of the study what did in Coal (Setiawan & Sitorus, 2017). The professional competence of some teachers is still low so they have not been able to carry out their professional duties optimally. The teacher's ability to describe learning that directs students to collaborate in giving appreciation and evaluation of the work of other groups will greatly assist the development of students' competence in communication and cooperation. Communication and collaboration skills are important to develop because they will be able to help students to solve some problems effectively. Communication skills must be flexible to adapt to individual learners, local needs, and circumstances. Simulation activities, in the form of group presentations and giving responses, can improve students' communication skills, self-efficacy, and critical thinking tendencies (Ammentorp et al., 2022; Choi & Um, 2022). Starting from the low competence of Indonesian language teachers in preparing learning implementation plans with a problem based learning model, training efforts to improve the competence of teachers become a necessity that needs to be done. Performance-based training model can be an alternative. According to previous study performance-based training models can improve pedagogic and andragogic competencies (Sutisna & Trisnamasyah, 2010). In addition, to improve the quality of training results also need to be supported by adequate facilities. The quality of learning and learning support facilities can realize the competence of students and teacher professionalism (Amrulloh, 2022; Liang et al., 2022). The implication of this study provide overview related to teacher's competency in describing student activities in learning with problem based learning. Base on the result of this research it is known that teacher competence in preparing lesson plans is still very limited because it only analyzes 29 lesson plans prepared by Indonesian language teachers. Therefore, the results of this study cannot be generalized to describe teacher competencies in general. Further research that uses data sources more broadly still needs to be done in order to obtain more comprehensive data. In addition, it can also be used as a basis for drawing conclusions more broadly about teacher competence.

4. CONCLUSION

Teacher competence in preparing lesson plans is one of the fundamental things in the teacher's professional duties. Lesson plans that is well prepared will be used as an operational basis in carrying out learning. Therefore, learning implementation plans must be prepared with reference to innovative learning models. One of them is a problem-based learning model. Based on the research that has been done, it can be seen that the average teacher's ability to plan the implementation of learning with a problem-based learning model is not optimal. Therefore, further training is needed to improve the competence of these teachers. Thus, efforts to improve the quality of learning can be realized.

5. REFERENCES

Abu, S., Supartha, I. W. G., I. P. G., S., & Rahyuda, A. G. (2020). Does teacher competence and commitment improve teacher's professionalism. *Cogent Business & Management*, *7*(1). https://doi.org/10.1080/23311975.2020.1781993.

Aji, A. P., Martono, S., & Fakhruddin, F. (2019). The effect of teacher motivation in mediating commitment and professional competence on teacher's performance of vocational school in Blora regency. *Educational Management*, *8*(2), 150–156. https://journal.unnes.ac.id/sju/index.php/eduman/article/view/32889.

Ammentorp, J., Chiswell, M., & Martin, P. (2022). Translating knowledge into practice for communication skills training for health care professionals. *Patient Education and Counseling*, *105*(11), 3334–3338. https://doi.org/10.1016/j.pec.2022.08.004.

Amrulloh, M. S. (2022). Professional development teacher in contextual teaching and learning to improve skills of science process and creativity of learners. *Journal of Education and Learning (EduLearn)*, *16*(3). https://doi.org/10.11591/edulearn.v16i3.20404.

Ana, A., Kustiawan, I., Ahman, E., Zakaria, S., Muktiarni, M., Dwiyanti, V., Saripudin, S., & Kahoerunnisa, I. (2020). Defining vocational teacher competencies in industry 4.0 from the perspective of policymakers. *Journal of Engineering Education Transformations*, *34*(Special Issue), 159–167. https://doi.org/10.16920/JEET/2020/V34I0/157884.

Anggraeni, P., & Akbar, A. (2018). Kesesuaian rencana pelaksanaan pembelajaran dan proses pembelajaran. *Jurnal Pesona Dasar*, *6*(2), 55–65. https://doi.org/10.24815/pear.v6i2.12197.

Aris, M., Supriyatno, A. S., & Yuli, E. (2021). The influence of work environment and teacher competence through school climate toward teacher performance at all Islamic Junior High School in Malang. *Ournal of Economics, Finance and Management Studies*, *4*(7), 896–903. https://doi.org/10.47191/jefms/v4-.

Ariyana, Y., Pudjiastuti, A., Bestary, R., & Zamromi, Z. (2018). Buku Pegangan Pembelajaran Keterampilan Berpikir Tingkat Tinggi Berbasis Zonasi. *Direktorat Jendral Guru Dan Tenaga Kependidikan*.

Blömeke, S., Jentsch, A., Ross, N., Kaiser, G., & König, J. (2022). Opening up the black box: Teacher competence, instructional quality, and students' learning progress. *Learning and Instruction*, *79*. https://doi.org/10.1016/j.learninstruc.2022.101600.

Candra, & Retnawati, H. (2020). A meta-analysis of constructivism learning implementation towards the learning outcomes on civic education lesson. *International Journal of Instruction*, *13*(2), 835–846. https://doi.org/10.29333/iji.2020.13256a.

Choi, Y.-J., & Um, Y.-J. (2022). The effects of a home-visit nursing simulation for older people with dementia on nursing students' communication skills, self-efficacy, and critical thinking propensity: Quantitative research. *Nurse Education Today*, *17*, 105564. https://doi.org/10.1016/j.nedt.2022.105564.

Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century. *Thinking Skills and Creativity*, *12*(1), 43–52. https://doi.org/10.1016/j.tsc.2013.12.004

Georgieva, S. (2019). The role of feedback when training pre-service native language teachers. *V International Forum on Teacher Education*, *1*, 323–337. https://doi.org/10.3897/ap.1.e0196.

Giuliano, C., Martirosov, A. L., Lipari, M., Wilhelm, S., Salinitri, F., Lahiri, M., & Binienda, J. (2021). Incorporating verbal defense into problem-based learning. *Currents in Pharmacy Teaching and Learning*, *13*(2), 109–115. https://doi.org/10.1016/j.cptl.2020.05.014.

Hastuti, T. A., Soegiyanto, S., Suherman, W. S., Rahayu, S., & Utami, N. S. (2022). Improving the pedagogic competence of physical education teachers. *Jurnal Cakrawala Pendidikan*, *41*(2), 377–387. https://doi.org/10.21831/cp.v41i2.48231.

Jayanti, K. D., & Senam, S. (2017). Studi kinerja guru lulusan Program Studi Pendidikan Kimia Universitas Negeri Yogyakarta di Daerah Istimewa Yogyakarta. *Jurnal Inovasi Pendidikan IPA*, *3*(1), 63. https://doi.org/10.21831/jipi.v3i1.13686.

Kasim, A., Pendit, S. S. D., & Tangge, L. N. (2018). Pengaruh kompetensi dan motivasi kerja guru terhadap kinerja guru Biologi di SMA Negeri Se-Kota Palu. *Proceeding Biology Education Conference: Biology, Science, Enviromental, and Learning*, *15*(1), 547–553. https://jurnal.uns.ac.id/prosbi/article/view/32608.

Kristyanawati, M. D., Suwandi, S., & Rohmadi, M. (2019). Peningkatan keterampilan menulis teks eksposisi menggunakan model problem based learning. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *9*(2), 192–202. https://doi.org/10.24246/j.js.2019.v9.i2.p192-202.

Leonard, L. (2015). Kompetensi tenaga pendidik di Indonesia: Analisis dampak rendahnya kualitas SDM guru dan solusi perbaikannya. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *5*(3), 192–201. https://doi.org/10.30998/formatif.v5i3.643.

Liang, J. F., Hsu, T. F., Chen, C. Y., Yang, C. W., Jean, W. H., Ou, L. S., Cheng, H. M., Huang, C. C., Yang, Y. Y., & Chen, C. H. (2022). Developing a competency-based framework for resident-as-teacher. *Journal of the Formosan Medical Association*, *121*(10), 1–7. https://doi.org/10.1016/j.jfma.2022.01.027.

Makhrus, M. (2018). Analisis rencana pelaksanaan pembelajaran (rpp) terhadap kesiapan guru sebagai "role model" keterampilan abad 21 pada pembelajaran IPA SMP. *Jurnal Penelitian Pendidikan IPA*, *5*(1). https://doi.org/10.29303/jppipa.v5i1.171.

Muspawi, M., Anwar, K., & Rosadi, K. I. (2020). The influence of headmaster leadership and teacher pedagogical competence on teacher performance. *International Journal of Innovation, Creativity and Change*, *14*(1), 913–931. https://ijicc.net/images/Vol_14/Iss_1/14184_Muspawi_2020_E_R.pdf.

Nirtha, E. N., Ismanto, B. I., & Sulasmono, B. S. (2021). LCL Model experiential learning based training model development to improve teacher competence in designing learning. *JPI (Jurnal Pendidikan Indonesia)*, *10*(3), 430–440. https://doi.org/10.23887/jpi-undiksha.v10i3.33832.

Nugraha, J., MS, Z., & Fuad, N. (2019). Peningkatan keterampilan menulis deskripsi melalui pendekatan saintifik dengan metode problem based learning di kelas IV sekolah dasar. *Prosiding Seminar Nasional Pendidikan KALUNI*, *2*, 118–124. https://doi.org/10.30998/prokaluni.v2i0.37.

Pratiwi, V. D., & Wuryandani, W. (2020). Effect of problem based learning (PBL) models on motivation and learning outcomes in learning civic education. *JPI (Jurnal Pendidikan Indonesia)*, *9*(3), 401–412. https://doi.org/10.23887/jpi-undiksha.v9i3.21565.

Prayogi, Rayinda Dwi; Estetika, R. (2019). Kecakapan Abad 21: Kompetensi Digital Pendidik Masa Depan. *Jurnal Manajemen Pendidikan: Universitas Muhammadiyah Surakarta*, *14*(2), 144–151. https://doi.org/10.15330/jpnu.5.1.40-46.

Rahmat, M. R., Arip, A. G., & Nur, S. H. (2020). Implementation of problem-based learning model assisted by e-modules on students' critical thinking ability. *JPI (Jurnal Pendidikan Indonesia)*, *9*(3), 339–346. https://doi.org/10.23887/jpi-undiksha.v9i3.22410.

Rambe, M. (2019). Pelaksanaan supervisi akademik sebagai upaya untuk meningkatkan kompetensi guru dalam menyusun rencana pelaksanaan pembelajaran. *Jurnal PAJAR (Pendidikan Dan Pengajaran)*, *3*(4), 782–790. https://doi.org/10.33578/pjr.v3i4.7464.

Rohmawati, A. (2015). Efektivitas pembelajaran. *Jurnal Pendidikan Usia Dini*, *9*(1), 15–32. https://doi.org/10.21009/JPUD.091.02.

Saepuloh, D., Sabur, A., Lestari, S., & Mukhlishoh, S. U. (2021). Improving students' critical thinking and self-efficacy by learning higher order thinking skills through problem based learning models. *JPI (Jurnal Pendidikan Indonesia)*, *10*(3), 495–504. https://doi.org/10.23887/jpi-undiksha.v10i3.31029.

Safi'i, I., & Wahdini, L. (2021). Communicative and collaborative aspects in indonesian bse evaluation instruments. *Journal of Education Research and Evaluation*, *5*(2), 168–175. https://doi.org/10.23887/jere.v5i2.33146.

Safi'i, I., & Tarmini, W. (2019). Penanaman nilai-nilai pendidikan karakter di SMP Muhammadiyah 22 Pamulang, Tangerang Selatan. *Imajeri: Jurnal Pendidikan Bahasa Dan Sastra Indonesia*, *2*(1 SE-Articles), 43–50. https://doi.org/10.22236/imajeri.v2i1.5076.

Safi'i, I., Tarmini, W., & Ilyas, H. P. (2020). Factual Text Genre: Analysis of the Ability of High School Teachers in Developing Learning Tools. *Jurnal Pendidikan Progresif*, *10*(2), 222–232. https://doi.org/10.23960/jpp.v10.i2.202008.

Sari, P. P., Ganefri, G., & Anwar, M. (2020). The contribution of principal's leadership style, teacher competence, and school climate toward students' learning outcomes. *JPI (Jurnal Pendidikan Indonesia)*, *9*(3), 508–516. https://doi.org/10.23887/jpi-undiksha.v9i3.24409.

Seibert, S. A. (2021). Problem-based learning: A strategy to foster generation Z's critical thinking and perseverance. *Teaching and Learning in Nursing*, *16*(1), 85–88. https://doi.org/10.1016/j.teln.2020.09.002.

Setiawan, D., & Sitorus, J. (2017). Urgensi tuntutan profesionalisme dan harapan menjadi guru berkarakter (Studi kasus: Sekolah dasar dan sekolah menengah pertama di Kabupaten Batubara). *Cakrawala Pendidikan*, *1*, 122–129. https://doi.org/10.21831/cp.v36i1.11382.

Star, J. R., Chen, J. A., Taylor, M. W., Durkin, K., Dede, C., & Chao, T. (2014). Studying technology-based strategies for enhancing motivation in mathematics. *International Journal of STEM Education*, *1*(1), 2. https://doi.org/10.1186/2196-7822-1-7.

Sudrajat, J. (2020). Kompetensi guru di masa pandemi covid-19. *Jurnal Riset Ekonomi Dan Bisnis*, *13*(2), 100–110. https://doi.org/10.26623/jreb.v13i2.2434.

Sulisworo, D., Ummah, R., Nursolikh, M., & Rahardjo, W. (2020). The analysis of the critical thinking skills between blended learning implementation: Google Classroom and Schoology. *Universal Journal of Educational Research*, *8*(3 B), 33–40. https://doi.org/10.13189/ujer.2020.081504.

Sutisna, A., & Trisnamasyah, S. (2010). Model pelatihan berbasis kinerja dalam peningkatan kompetensi tutor pendidikan kesetaraan. *Jurnal Cakrawala Pendidikan*, *3*(3), 365–378. https://doi.org/10.21831/cp.v3i3.364.

Ting, K. H., Cheng, C. T., & Ting, H. Y. (2021). Introducing the problem/project based learning as a learning strategy in University Social Responsibility Program - A study of local revitalization of Coastal Area, Yong-An District of Kaohsiung City. *Marine Policy*, *131*(700), 104546. https://doi.org/10.1016/j.marpol.2021.104546.

Wijaya, L. H., Sholeh, M., & Mispandi, M. (2021). Evaluation of teacher's pedagogical competence in developing 2013 curriculum learning. *JPI (Jurnal Pendidikan Indonesia)*, *10*(2), 379–386. https://doi.org/10.23887/jpi-undiksha.v10i2.29531.

Wulandari, M. R., & Iriani, A. (2018). Pengembangan Modul Pelatihan Pedagogical Content Knowledge (PCK) Dalam Meningkatkan Kompetensi Profesional dan Kompetensi Pedagogik Guru Matematika SMP. *Kelola: Jurnal Manajemen Pendidikan*, *5*(2), 177–189. https://doi.org/10.24246/j.jk.2018.v5.i2.p177-189.

Wulandari, R. S., & Hendriani, W. (2021). Kompetensi pedagogik guru sekolah inklusi di Indonesia (Suatu pendekatan systematic review). *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *7*(1), 143–157. https://doi.org/10.33394/jk.v7i1.3152