SCIENCE TEACHER'S PROFESSIONALISM IN PLANNING PRACTICAL LEARNING ACTIVITIES

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Abstract

Learning is a process of interaction between students and educators and learning resources in a learning environment. Teachers should always carry out self-development so that they always perform optimally in providing knowledge and being facilitators for students. The implications of teacher professional development relate to the quality of education. Professional development of teachers is very important to improve the quality of schools, the way teachers teach, and student achievement. Teachers participate in several types of professional development, including activities to improve knowledge, skills, and attitudes. Practical learning is an activity that is closely related to teacher professionalism, carried out to get the opportunity to test and apply theory using laboratory facilities/outside the laboratory. Practical learning is described as an activity that invites students' positive attitudes from the conditioning created by the teacher.

Keywords: Learning, Teacher Professionalism, Practical

Introduction

The professional concept is not only related to teachers but also the teaching and learning process are included in it. Professional learning can be obtained through abstract generalizations and understanding that is realized through deep involvement with the nuances of certain learning situations in activities where knowledge is not transferred but developed directly in practical activities (Athanases et al., 2020). In practical learning, students are directly involved in learning to observe, experiment, and test as well as develop certain concepts and designs according to the material (Augusto et al., 2019).

Practical learning is often described as an activity that invites students' positive attitudes from the conditioning created by the teacher (Schindler et al., 2021). An important component of the learning process is student involvement, learning motivation, and getting experience from the learning process (Salminen, Vasalampi, Mets, Lerkkanen, & Marja, 2021:1).

With practice, it is hoped that students can gain experience in the form of understanding, skills, and facts (Lander, Seeho, & Foster, 2019:1). This is because practice is a creative and practical method for increasing knowledge through the application of knowledge in a practical environment in the real world (Connaughton &

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Spengler, 2006). Practice is meant by learning in which exploring/having a pedagogical reach is proof of something (Fauser, 1996).

Practical learning is a teaching and learning activity that aims to allow students to test and apply theory using laboratory facilities/outside the laboratory. Laboratories have traditionally been used to supplement and practically reinforce the theoretical instruction received in class during lectures. The student experience in the laboratory is not only used in an academic environment to complement and practically strengthen the theoretical concepts introduced to students in lectures, but also it is used as a means to develop skills such as obtaining and processing data, experimenting, comparing the data with theoretical models, develop critical and analytical thinking, draw conclusions, teamwork, and ethics, as well as the ability to convey findings and conclusions in the form of written reports and oral presentations (Stammitti, 2013).

Practical learning can help prospective teachers (students) to later be able to guide students from an academic and practical perspective to bridge the learning gap (Lu, 2021). Learning is a process of interaction among educators, students, and learning resources in a learning environment. Practical learning is one of the learning methods that have a function to clarify concepts through direct contact with tools, materials/natural events, improve intellectual skills through observation/searching for information completely and selectively in solving practical problems, practicing problem-solving, applying knowledge and skills to situations encountered, training in designing experiments, interpreting data and fostering scientific attitudes.

The practical learning method can develop psychomotor, cognitive, and affective skills. Practical learning is a form of learning that requires students to play an active role in solving the given rubric/problem by using certain tools, materials, and methods. Practical learning must carry out the preparation of SAP(course unit)/RPP (lesson plan) and curriculum analysis.

Practical learning is closely related to teacher professionalism. The quality education process is supported by various elements in the school environment as a unified system. One of the determining factors for the realization of a quality education process is teacher participation and a sense of responsibility. One of the teacher's responsibilities is pedagogical innovation, where teachers as humans must understand the conceptual components of learning based on the environment (Ungar & Forkosh-Baruch, 2018: 183).

In the educational process, teachers are expected to be able to lead students in certain commands to achieve learning objectives. Not all teachers have the same experience, it depends on the diversity of knowledge and activities (Dille & Røkenes, 2021). The abilities that support teachers in achieving their performance have a basis for fulfilling competencies. Teacher performance is the overall ability and success of teachers in carrying out their duties in the learning process.

This success will not be optimally achieved if the supporting factors are not implemented. Teachers must be professional. Today's professionals must adapt to 21st-century learning and possess global skills and competencies (Sprott, 2019). Lai & Jin, (2021) explained that teachers must understand how to understand behavior in their work as educators, especially in the use of technology in the learning process.

Based on what has been explained above, it is necessary for teachers who are professional, qualified, and have various competencies to have good performance. Teachers' professional knowledge is considered central to student learning (Evens et al., 2018). Professional teachers must be able to focus on learning materials, to foster so that active learning is created, the duration of learning can be effective, and class participation can be comprehensive (Rigney et al., 2021).

Professionalism is defined as a socio-cultural approach in which learning is subject-centered and emphasizes subjective and individual developmental perspectives as well as socio-cultural factors and contexts (Chaaban et al., 2021). The professional development of teachers is considered one of the main drivers for transferring knowledge in teaching and learning practices (Schindler et al., 2021).

Government Regulation No. 19 of 2005 requires teachers to understand, master, and skillfully use new learning resources and master pedagogic competencies, personality competencies, professional competencies, and social competencies as part of the teacher's abilities. It can be concluded that teacher competence is quality, in the form of mastery of knowledge, skills, and professional attitudes.

Teaching is a profession that requires special skills. Teachers must be able to pay attention and analyze important events that occur in the classroom (Gold et al., 2021). The teacher's job is to educate, teach, then train. Educating is intended to continue and develop values in life. Teaching is the continuation and development of science and technology. Meanwhile, training is intended to develop one's skills to be implemented in the teaching and learning process.

All of these skills are based on Law Number 20 of 2003 concerning National Education Article 39 paragraph 2, namely: "Educators are professionals who are tasked with planning and implementing the learning process, assessing learning outcomes, conducting guidance and training, as well as conducting research and community service, especially for educators in higher education".

Professional teachers are emphasized to have competence in implementing learning programs. According to Wang, Ramdeo, & Mclaughlin, (2021) foreign and international experiences are also considered important in making teachers professional. Teachers must have an interest in teaching and the willingness and ability to develop themselves (Tang et al., 2020).

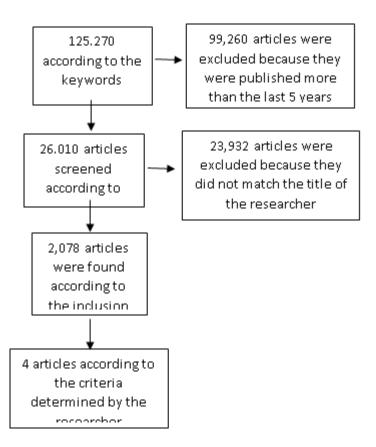
Teacher competence is one of the factors that influence the achievement of learning and educational goals in schools. These competencies are pedagogic, personality, social, and professional, obtained through professional education. The conclusion from the explanations described above by the author is that mastery of four absolute competencies must be possessed by every teacher to become a professional.

Research Methods

This article is a literature review, namely a review method where the actual collection method and the synthesis method are still simple, not using the standard method as a systemic review. The explanation in the literature review is in the form of theory, and

research findings are obtained from reference materials as the basis for research activities. In the search conducted in this article through international journals, the keywords used are teacher professionalism, teacher professional, practical learning utilizing collection, and simple techniques. From several search results of Scopus articles from sciencedirect.com, several articles related to professional teachers and practical learning were found.

This paper is an independent study, interpretation, and common perception are carried out to avoid information bias. The preparation of a literature review in this article is needed to support students in doing their final project so that the quality of the research is by the original research. The identification process uses PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) (Nursalam, 2020). For more details, see the prism chart image below.



Result and Discussion

Teachers should always carry out self-development so that they are always optimal in providing knowledge and becoming facilitators for students. The implications of professional development relate to the quality of education (Wolf & Peele, 2019). Akkary (2019) explains that teacher professional development is very important to improve school quality, the teaching and learning process, and student achievement. One of the professional supports is experience (Yan, 2021).

The relationship between the experience of the learning process and student achievement is that professional learning is a mechanism used to build teacher capacity to stimulate students to reach a higher level (in this case achievement) as a result of the teaching and learning process (Dunn et al., 2018). Professionalism can be developed by opening discussions, and exchanging arguments with competent academics according to their fields (Sprott, 2019).

Practical learning is one of the real efforts or attitudes of a professional teacher, aiming to give students space for independent activities, creativity, and building their own experiences—not limited to productive activities in practice, including aesthetic formation, socialization, and exploration (Fauser et al., 1996). Practical learning achieves excellence in human service (Halldearn, 2008).

Teacher professional development focuses on education policy and reformation. Educational reformation is related to pedagogical reformation, it can later be implemented in practical learning (Fauser, 1996). The acquisition of knowledge in practical learning will depend on the policy maker (teacher) who formulates the design for the implementation of practical learning (Zaiotti, 2012). Teachers must always keep abreast of the times when at any given time technology greatly affects the pace of development in education.

By practicing directly in his development to become a professional teacher, a person will build his knowledge and skills in response to the challenges of the times to meet the needs of students. Teachers must be actively involved in improving the quality of students through questions and critical reflection, become mentors in learning practices, and become coaches whose job is to manage students in the learning process (Fleer et al., 2021).

Bourke, Ryan, & Ould, (2018) mention that in some countries the professional standard is based on the overall readiness of teachers evaluated from accreditation. The more one institution/agency is accredited, the more teachers and components of the institution/agencies are depicted that their performance is good, by the scores obtained. All components can determine how professional a person is in carrying out their functions in an institution/agency (Akkary, 2019). In practical learning conditioning is carried out by the teacher, the practice is conditioned by a formal setting and occurs in everyday life (Zaiotti, 2012).

The conditioning planned by the teacher to students in practical learning must embrace academic values such as inquiry, reflection, risk-taking, collaboration, and intellectual growth as the design characteristics of a professional educator (Young & Baker, 2004). The implementation of practical learning emphasizes an empirical approach (Li, 2011). Empirical studies require a lot of experience and knowledge in learning that is based on the adjustment of the 21st century. This is in line with the opinion of Evens et al., (2018) which explains that teacher knowledge must be able to assist in aligning themselves with learning in the 21st century.

In everyday learning, practical learning activities are considered to create opportunities for learning and student knowledge contributes to the success and achievement of the implementation of practicum learning (Veintie, 2013). In practical learning, what is called a practical procedure is needed as a design that contains general knowledge which can later be used as a basis when the teaching and learning process takes place (Török & Péni, 2020).

Learning in it will involve teachers and students. According to Haug & Mork, (2021), every teacher should be able to examine what is considered useful in the development of teacher professionalism, especially in adapting to the demands of 21st century skills, associated with educational reformation. Teachers participate in professional development programs designed to support teachers in bridging the gap between visionary reformation and classroom practice/implementing learning.

If the procedure is deemed insufficient to become the basis for research, practical tools can be prepared to operationalize the conceptual framework that has been built/designed (Smith et al., 2020). As professional teachers and practitioners, practical skills are a core component of learning at the tertiary level, both undergraduate and postgraduate (Sadideen & Kneebone, 2012).

Practical learning is considered important to optimize the learning objectives of the material in a course. In practical learning, there is a combination of skills and knowledge which sometimes includes other suggestions as an effort to increase the relevance of the theory and accommodate various learning styles (Lee et al., 2005). The conditioning of a professional teacher in practical learning allows students to understand the difficulty of theoretical concepts in the classroom which then becomes superior because they deal directly with the environment/objects that exist in certain materials.

Practical learning in the realm of education is a learning that facilitates students to gain experience so that later these students can design the practical concepts that they have obtained in lectures to be implemented in the field for students, as one of the conditioning of a teacher who has professional competencies. All forms of experience that students get in the teaching and learning process require students to learn by doing, they participate in laboratory practice.

The structure of thought and theory acquired in class is reformatted by students, linked to possibilities and facts, and then reconstructed into a series of practical plans of their own. When students apply what they have learned in the classroom theoretically, there will be personal and academic development. This makes students able to implement their practical conditioning in the field, students are more prepared because they have gained professional experience in lectures (Lee et al., 2005).

Institutions (Schools) and Professional Development Needs

The professional development of teachers is very important to improve the quality of schools, the way teachers teach, and student achievement (Akkary, 2019; Maher, 2020). This makes professionalism the main focus of education reformation. Professionalism is closely related to the use of Information and Communication Technology (ICT). Teachers are expected to be able to keep up with the times in their knowledge of education.

Professional improvement efforts are not only located in the teacher as a person, but also schools must carry out improvements in various aspects as supporting teachers in their professional development. Schools as the basic unit of change, provide an active role for teachers in implementing improvements and building the capacity of teachers who will later lead the learning process.

School institutions must be able to observe and review a reflection of the implications of learning carried out by a teacher where things that are less or have not been achieved optimally can be carried out for continuous improvement (Powell & Coughlan, 2020). This is an institutional effort to assist the needs of teachers in developing their professionalism.

Teacher Professional Learning and Development

Teachers participate in several types of professional development, including activities to improve knowledge, skills, and attitudes. Teachers play a central role in educational progress (Hadar & Brody, 2018). Teachers should actively contribute to their personal and professional development to enhance student learning. Learning practice is a teacher's professional identity (Richter et al., 2021). Teachers are not only able to manage classes, but also teachers must be able to direct students' self-development broadly such as through workshops, conferences, and seminars (Akkary, 2019).

These activities, however, do not necessarily lead to teacher learning and changes in knowledge, practices, and attitudes, and consequently in improving student achievement. Teachers must be good at reconstructing knowledge and context based on student characteristics. The pattern of teacher instruction on students and self-confidence is an implication of the development of teacher professionalism (Haug & Mork, 2021; Nolan & Molla, 2017). Teachers must also be very confident in implementing anything in the learning they lead (Lorenz et al., 2021).

Effective professional development provides teachers with an extended learning experience to reflect on their practices and learning processes and the enabling conditions that enhance their ability to collaboratively find sustainable solutions to problems in the context of their work. Effective teacher professionals must be developed and designed with the understanding that professional learning is influenced by socio-cultural conditions and the surrounding organization.

Professional teachers must have good performance, be authoritative, have a strong learning framework, have a strong pedagogy, and respond to all student needs (Borg et al., 2018). Student needs include how teachers interact in class with students (Gholami et al., 2020). Teachers must be skilled in classroom management (Prilop et al., 2021). Managerial professionalism raises professional judgments (Ro, 2020).

Effective professional development for successful change is context-dependent and aligned with school improvement priorities, a complex system of research, development, evaluation, and planning that takes into account what is known about how adults learn, and provides a collaborative environment for active knowledge construction. Teacher professionalism is closely related to teacher pedagogy (Rodrigues et al., 2018).

The results of teacher professionalism can be in the form of a description of the results in the form of products, scores from a test, or notes that represent the learning

process (Segal, 2019). Teachers must be good at developing assessment skills to evaluate students' abilities (Christoforidou & Kyriakides, 2021). Comments in the evaluation of learning are intended to refocus students' attention, including pedagogical reformation efforts (Fauser, 1996).

Teacher learning and professionalism are considered important for the future of institutions where teachers teach (Hadar & Brody, 2018). When teachers are involved in the learning process, classroom learning is manifested as changes in knowledge, skills, and attitudes that help improve student learning (Borg et al., 2018). Change starts in the teacher's beliefs, which leads to changes in behavior and practice, which then leads to better student learning.

Effective learning is supported by good knowledge and skills in domains such as planning, classroom management, explanation and instruction, questioning techniques, and assessment for learning (Borg et al., 2018). Professional development can also be implemented in collaboration between teachers of one subject by developing shared material (Durksen et al., 2017).

Pedagogical Innovation in Teacher Education

Innovative pedagogy is needed as a means to actualize the vision and adapt to the 21st-century education system (Ungar & Forkosh-Baruch, 2018). Such efforts have none other than the aim of facilitating the preparation of students for the new challenges arising from 21st-century education. Innovative pedagogy is defined as a series of educational activities that are planned and then present new ideas in a defined context. The aim is extensively to improve learning skills in interactive situations.

The adjustment of teachers to 21st-century learning needs creates a relevant curriculum with optimal function, focusing on interests and skills that support students' future. Learning process, knowledge-based evaluation, using ICT. The implementation of learning adapted to 21st-century education encourages students to be actively involved in learning such as asking questions, gathering sources of information, processing information, and creating new knowledge that is relevant to students according to the context of 21st-century life. The purpose of this conditioning is none other than to develop higher-order thinking skills, creativity, and independent learning, facilitating personal growth and social engagement as well as strengthening the teacher as a facilitator.

Discussion

Regarding the professionalism and skills of teachers in designing practical learning utilizing natural resources, based on very appropriate articles, after being studied in depth by the author, several facts were found as below.

ARTICLE	RESULT
1. Rima Karami-	This study discusses the impact resulting from the application of teacher
Akkary, Evaluating	professionalism in practical learning projects with collaborative actions based
teacher professional	on the cultural context. The project operates in 8 Arab countries in the Middle

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learning in the Arab region; the experience of TAMAM project. ELSEVIER: Teaching and Teacher Education, 85(2019), 137-147.	East, North Africa, and the Gulf region namely Lebanon, Jordan, Kingdom of Saudi Arabia, Sudan, Sultanate of Oman, Palestine, and Qatar. The project was implemented in 46 schools with the implementation of 11 projects supporting the improvement of the competencies needed by teachers. The research uses a multiple case study design to identify cases of teacher learning in science classrooms. The most basic data used diagnostic checklists, focus group interviews, individual interviews, and questionnaires. Data on team learning was collected, from reflection papers, research journals, progress reports, and meeting reports (the data were used for researchers to understand how learning occurred. Finally, the data that became the focus of researchers were diagnostic checklists, questionnaires, focus group interviews, and individual interviews. Results Research after practical learning on science teachers (based on social, cultural, and historical context) is that there is professional development of teachers (knowledge, skills, and attitudes) and improvement of the quality of institutions/schools. Giving an active role to teachers in practical training can support competency improvement including the capacity of teachers to lead the process. In addition, teachers contribute to personal and professional growth by enhancing student learning, through workshops, conferences, and seminars. Thus, not only professional development (knowledge, skills, and attitudes) but also teachers must be able to support students to achieve an increase in student achievement. Effective professional development provides a learning experience for teachers so that teachers can reflect on their knowledge in practice, plan, implement, make fact-based decisions, evaluate, and collaboratively teachers in the form of improvement initiatives. The results of the study indicate that in the Arab region/regions that participate in research with a limited scope, the relevance is very low, so it needs to increase/improve professionalism with the concept
2. Margarita Christoforidou, Leonidas Kyriakides. (2021). Developing teacher assessment skills: The impact of the dynamic approach to teacher professional development. ELSEVIER: Studies in Educational Evaluation.	The sample in this study were mathematics teachers totaling 178 people from 117 different schools. The results of the study stated that teacher professionalism affected student learning outcomes. Assessment is a powerful way to improve teacher performance/professionalism. Teacher competence and how to develop it is a core issue in teaching quality and effectiveness. High professional competence is believed to lead to effective teaching practices, resulting in increased student learning. Competence involves the idea of improvement. Practical training is an initiative to help teachers become more competent. Professional development is related to competency standards. In this study, tests were carried out at the beginning and the end of the study.
3. Ryan Dunn, John Hattie, Terry Bowles. (2018). Using the Theory of Planned Behavior to explore teachers' intentions to engage in ongoing teacher professional	In this study, data were collected using questionnaires and surveys, involving 152 teachers who were involved in playing an active role in improving professional abilities, namely the initiative of learning mathematics with practicum. The study was carried out for two weeks until the survey was carried out. Research participants consisted of various educational levels from Diploma to doctoral degrees with teaching experience from 1 to more than 20 years. The teaching level of the participants starts from grade 1 Elementary, Junior High School, and Senior High School. This study discusses predictors of teacher

<i>learning.</i> ELSEVIER: Studies in Educational Evaluation.	intention to use professional learning in the classroom by applying certain methods. Predictor variables are attitudes toward behavior, subjective norms, and perceived behavioral control. All of them have significance and correlation to the intention/behavior of teachers in implementing teacher professionalism in teaching. The results showed that the three predictor variables were significantly correlated with the behavioral intentions of teachers' professionalism in teaching. Teacher behavior in teaching is influenced by internal and external factors.
4. Jimmi Copriady, Kutkemri Zulnaidi, Masnaini Alimin, Sri Wilda Albeta. <i>In-</i> <i>service training and</i> <i>teaching resource</i> <i>proficiency amongst</i> <i>Chemistry teachers:</i> <i>the mediating role</i> <i>teacher</i> <i>collaboration.</i> CePress: Heliyon, 7(2021), 1-8.	This paper aims to determine the degree of collaboration, in-service training, and natural resource utilization capabilities among Chemistry teachers by investigating the role of collaboration intermediaries in the training and teaching of natural resource competencies. A total of 184 chemistry teachers participated in the subject teacher forum (MGMP) in Riau Indonesia. Respondents participated in surveys, questionnaires, and training. Questionnaires were used to evaluate teachers' perspectives on collaboration, in-service training, and learning skills using natural resources. Surveys are used to collect sample information using a questionnaire that allows respondents to answer independently. The research uses quantitative methods. The results showed a high level of collaboration on training and skills based on the use of natural resources in practical learning among Chemistry teachers. Based on the MANOVA test, there is a significant difference in teacher competence based on gender. Male teachers were significantly more proficient than female teachers. However, in terms of collaboration, gender did not affect in-service training. This research encourages certain parties to design effective collaborations between chemistry teachers. This research also offers new insights for Chemistry teachers to continue to master natural resource learning both nationally and internationally. Effective collaboration and discussion will improve the teacher's socio-cognitive. The research time used the MGMP forum meeting once a month with the time for filling out the questionnaire.

The similarity that can be found in the literature review of teacher professionalism and practice in the articles above is on the purpose of research, where all research has the aim of increasing professionalism by conditioning training/practice/application of certain methods and models/other conditioning that has the same goal. The difference is, that not all articles have a sample of science/science teachers. Articles 1 and 4 have a sample of science teachers, and articles 2 and 3 have a sample of mathematics teachers. The difference also lies in how researchers collect data.

Article 1 collects data from a practical project and also uses diagnostic checklists, focus group interviews, individual interviews, and questionnaires. Collected data on team learning, reflection papers, research journals, progress reports, and meeting reports are used for researchers to understand how learning occurs. Article 2 data is obtained by assessing certain competencies that the teacher must achieve based on certain criteria after the practical learning is carried out Article 3 data was obtained using a post-practicum survey. Article 4 data was collected using surveys and questionnaires.

The research in article 1 explains that the capacity building program under study has contributed to professional learning where practical learning can meet professional challenges and needs. With practice, there are targets for substantial changes in thought habits and the acquisition of relevant attitudes and skills. Research shows that ideas, beliefs, awareness, and interests are not sufficient factors for professional improvement. Contextual, cultural, and organizational conditions become a special scope for someone to be able to receive professional development. Instructors in training must build trust with participants through mentoring relationships. An evaluation model with a responsive, flexible, and comprehensive context can capture the complexity of the impact, and the progress of the participants' achievements as well.

In Article 2, data analysis which is implemented in training for a long period, is enriched with other elements of the approach that are more relevant to the needs of teachers who can improve professional competence. Critical reflection guided by practical learning describes the focus and competence to achieve effective professional competency development. In article 3 it is illustrated that the factors that influence the teacher's intention to engage in professional learning are that there is a strong relationship between antecedent beliefs and intentions (behavior).

Intention (behavior) is controlled based on subjective norms and attitudes. Behavioral control is the strongest predictor of intention (behavior). The relationship between control and intention depends on the type of behavior and the nature of the behavior. Behavioral control requires skills and resources. The nature of teacher professional learning is focused on what is needed such as instructional, the role of school culture, strategies, teacher knowledge, resources, materials, time, collaboration, individual, class, grade level, and others.

Article 4 explains that effective collaboration and discussion will improve the teacher's socio-cognitive. Collaboration is the teacher's effort to solve problems and overcome challenges. Sharing expertise through face-to-face meetings/via technology can guide each other between teachers to adapt to current advances and trends. Educators must equip themselves with the latest knowledge in line with the rapid changes in the field of education. This study emphasizes the importance of self-development through continuous education to improve professional competence.

Conclusion

Teachers should always carry out self-development so that they always perform optimally in providing knowledge and become facilitators for students. Professional development of teachers is very important to improve the quality of schools, teaching and learning processes, and student achievement. Professionalism can be developed by opening discussions and exchanging arguments with competent academics according to their fields, including participating in practical training.

Practical learning is one of the real efforts or attitudes of a professional teacher, aiming to give students space for independent, creative, and constructive activities. their own experiences—not limited to productive activities in practical learning including aesthetic formation, socialization, and exploration. Based on the articles analyzed, all articles show the results that practical learning can improve teacher professionalism.

Effective professional development provides a learning experience for students as prospective teachers so that later when they can implement what they have learned and they can reflect on their knowledge in practice, plan, implement, make fact-based decisions, evaluate, collaboratively find sustainable solutions to problems in their profession as teachers in the form of initiatives repair. Ideas, beliefs, awareness, and interest are not enough factors for professional improvement. Contextual, cultural, and organizational conditions become a special scope for someone to be able to receive professional development.

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