

PRESERVICE TEACHERS' READINESS IN IMPLEMENTING DIFFERENTIATED SCIENCE LEARNING OF INDEPENDENT CURRICULUM

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Abstract: This research is motivated by integrating natural and social sciences into science lessons of independent curriculum. This change significantly impacts the preservice teachers' readiness in elementary school to implement science learning through an independent curriculum. This research investigates the preservice teachers' readiness to teach natural sciences in an independent curriculum. This descriptive study involves eight elementary school preservice teachers from one of the LPTK in Bandung. The eight preservice teachers were selected based on purposive sampling. The instrument used in this study was a validated self-efficacy questionnaire. The data obtained were analyzed using descriptive statistics. The findings from this study indicate that preservice elementary school teachers are not fully prepared to be able to implement differentiated science learning. The results of the further investigation showed that this was due to the incomplete understanding of preservice elementary school teachers regarding pedagogical aspects, one of which was curriculum changes. The perceptions of preservice elementary school teachers about the diversity of student characteristics are also not by the principles of differentiated learning. This study concludes that preservice elementary school teachers need further information regarding the idea of an independent curriculum in differentiated science learning and guidance in preparing and implementing the lesson. Comprehensive understanding and differentiated science learning practices of independent curriculum need to be provided to preservice elementary school teachers. Therefore, this content needs to be taught to preservice elementary school teachers at LPTK.

Keywords: Preservice teachers' redness, independent curriculum, differentiated learning.

INTRODUCTION

The curriculum must also be aligned with the learning profile of students because individual characteristics will change over time according to generation. In Indonesia, the

curriculum often changes from simple to 2013 (Sumarsih et al., 2022). In 2021, the Ministry of Education, Culture, and Technology triggered a concept of learning independence to overcome the learning loss due to the COVID-19

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pandemic. The Merdeka Belajar Program was initiated so educators and learners can have independence and freedom of thought to implement educational programs. In addition, to legalize the program in 2022, the Ministry of Education and Culture issued Decree number 262/M/2022, which revealed an idea for curriculum regeneration that can maximize students' potential, namely the independent curriculum (Ministry of Education and Culture, 2022).

This curriculum has the principle that learners have independence or freedom to study subjects of interest and talent. In other words, each learner will learn different lessons according to their learning profile and needs (Abdullah, 2022). The analysis of several experts shows that the independent curriculum is good for learning because, in practice, it is directly centered on developing learners' competencies and core subjects. So, the implementation of independent curriculum learning will be gradual to provide an enjoyable learning experience, not in a hurry, directed, and meaningful for students (Sumarsih et al., 2022).

Implementing this independent curriculum emphasizes two important aspects: the existence of differentiated learning and early assessment of learning.

Differentiated learning is prioritizing the implementation of learning in favor of students according to their preferred field. This is very important to do, considering that when learners learn the field they like, their level of understanding also increases. In this independent curriculum, several things are adjusted, including integrating natural and social sciences that are converted into science. The merging of Science and social studies is very appropriate for several reasons; students not only build the concept of science as knowledge but can foster a more sensitive and authentic attitude towards social aspects. Contextual learning and integration can train system thinking skills and holistic learners so that Science and social science content are not separated and as if the moon is different. Moreover, to strengthen the profile of Pancasila students who help students in the elaboration of character and morals.

Integration of natural science and social science can be the key to overcoming the problem of lack of awareness of the environment because all human integration and events in nature can be described scientifically and understood by natural science. In contrast, various phenomena in social aspects of society, such as religious

diversity, cooperation, and diversity, are explained in social science. This integration will provide learners with an understanding of how to utilize the wealth of Natural Resources cleverly, precisely, and wisely (Kemendibudristek, 2022). This is to the theory of zone proximal development proposed by Vygotsky that learners have actual abilities that vary according to the region between levels of development. So, in implementing learning, teachers must anchor teaching by accommodating the needs of different learners. In addition, Vygotsky's theory explains that in a teaching and learning activity, the teacher has a role to be able to dialogue with students who do not understand. In this case, it means that the teacher must deliver the learners so that they can identify, reflect, and retell what is being discussed (Rahmawati & Purwaningrum, 2022).

This is important to be done by preservice elementary school teachers who become important actors in implementing teaching and learning in an ideal future. Because the teacher will develop a learning strategy, for the preparation of the learning steps to be right, teachers must understand the potential and characteristics of learners; this is called the pedagogic aspect in

TPACK. Implementing TPACK integrates scientific insights into technology, education, and fields of study and their utilization in learning needed in the 21st century (Suprpto et al., 2021). Preservice teachers who choose the ability of TPACK will certainly be able to combine technology and teaching skills to apply teaching and learning activities to the learning profile of students. Using technology in the learning process will help students better understand the subject matter, especially in this IPAS. It is common knowledge that some material science is abstract. The teacher's task is to design learning according to the level of students' understanding. So that teachers can transform abstract learning into more concrete, contextual, and realistic. The ideal teacher will be able to stimulate children's interest in learning to develop students' skills and understanding up to the stage of implementation (Gozali et al., 2023).

In implementing the independent curriculum and understanding TPACK, preservice teachers must understand the principle of differentiated learning in this science learning. In differentiated learning, implementing learning combines all the differences to create ideas, find information, and reveal what

they have learned. In other words, differentiated learning means creating versatile and more effective classes according to the learning profile of the learners, which means providing the opportunity to capture content and process ideas to the learners. The module explains that in making decisions on differentiated learning processes tailored to the learning profile of learners. In practice, differentiated learning is important to do in the independent curriculum. Because this curriculum promotes the creativity of students and teachers. The scheme is present in this differentiated learning, and the one who knows the needs of the learners is the teacher himself. However, in Indonesia alone, only a few conduct research in collecting perceptions and teaching practices of preservice teachers related to this differentiated learning. This is important because it involves the continuity of teaching and learning activities.

Based on the findings of research conducted by Miqwati, Susilowati, and Moonik (2023), it is evident that student learning outcomes in science subjects still need to improve. This is because teaching and learning activities are only carried out in the form of lectures, thereby reducing

student motivation. To overcome this, more progress is needed that can further develop student learning outcomes. Differential learning is one way to do this. This separate learning is the soul of the free education program (Marlina & Kusumastuti, 2020).

Research conducted by Alfaeni (Prihatin & Sugiarti, 2022) shows that teachers have received training on the independent curriculum. However, teachers still need to implement learning by the components of the independent curriculum. At the same time, the special gathering related to the perception of understanding and learning practices in the preservice teachers themselves does not exist. At the same time, preservice teachers are important agents of educational change and progress. Then, the researcher intends to diagnose the readiness of preservice teachers related to differentiated learning by using questionnaires and observations. Based on the explanation above, there is a problem, namely the understanding and implementation of the practice of preservice primary school teachers in implementing differentiated Science Learning in the independent curriculum. This study seeks to broaden the horizons of preservice teachers and the world of

education. It can be used as one of the bases in policy-making regarding implementing differentiated learning in the independent curriculum, especially in this science subject.

METHOD

The method uses descriptive research to explain or record current conditions (Morissan, 2012). In this study, we will discuss the readiness of preservice elementary school teachers in implementing differentiated Science Learning in an independent curriculum that is adjusted to readiness indicators adapted to theory according to Bandura (Mawaddah, 2021). In this theory, the readiness indicator is divided into three dimensions, where each dimension has an indicator, namely the ability, having high aspirations, and persistence in achieving the desired goals. Participants in this study were preservice elementary school teachers studying at one of the LPTK in Bandung who had attended microteaching courses. The sample selection of participants in this study was based on purposive techniques. Purposive is a sampling technique in research tailored to the purpose and topic of research. The purpose of the study was to

describe the readiness of preservice primary school teachers to implement differentiated science learning. Of course, the selection of this sample must be adjusted to the principle of differentiated learning, namely learning that pays attention to the needs of learners in terms of learning profile, interests and talents, and readiness to learn learners.

The sample selected in this study is eight people, each with the knowledge and skills by the principle of differentiated learning. Samples have followed the curriculum and learning courses, the development of students, learning strategies in elementary school, classroom management in elementary school, and educational psychology. In addition to increasing readiness, the sample in this study has also carried out teaching practices in teaching courses and participated in campus teaching activities and independent learning programs created by the Ministry of Education and Culture, namely teaching devotion in elementary schools for one semester. In this study, participants will be asked to fill out a self-efficacy questionnaire by giving a Mark (o) on the choice of answers to the circumstances that preservice teachers experience. This questionnaire uses a Likert scale with five

categories: five strongly agree, four agree, three undecided, two disagree, and one strongly disagree.

In addition, the preparation of this readiness instrument is also adjusted to the science teaching efficacy belief in the instrument (STEBI-B) (Deehan, 2017). STEBI-B is used as a research instrument to evaluate and improve the implementation of science teaching for preservice teachers so that their readiness can be determined. This instrument has been proven valid and reliable in measuring pre-service teachers' personal and general beliefs in science teaching. In addition, the preparation of this readiness instrument is also adapted to the science teaching efficacy blur instrument (STEBI-B) (Deehan, 2017). STEBI-B is used as a research instrument to evaluate and disseminate the implementation of science teaching for preservice teachers so that readiness can be known. This instrument has been proven valid and reliable in measuring preservice teachers' confidence, personally or generally, in science teaching.

RESULT AND DISCUSSION

In a study on the readiness of preservice classroom teachers to implement differentiated learning in an

independent curriculum, information was obtained from self-efficacy questionnaires concerning the implementation of differentiated learning. Preservice elementary school teachers who attend microteaching courses in one of LPTK Bandung are the intended participants in this study. According to Bandura's theory, the readiness of preservice elementary school teachers to implement science learning is different from the readiness of an independent curriculum, which is divided into three dimensions (Deehan, 2017; Mawaddah, 2021), which is confident in the ability, have high aspirations and persistence.

The Data obtained showed that the average for female participants showed a percentage of understanding of 77%. In comparison, male participants showed a percentage of understanding of 74%, where both percentages are equally included in the category of high readiness. The percentage shows that preservice primary school teachers are confident in their abilities and have high aspirations and persistence in implementing differentiated Science Learning in the independent curriculum. The results of the questionnaire to eight

people sampled in this study can be illustrated in Figure 1.

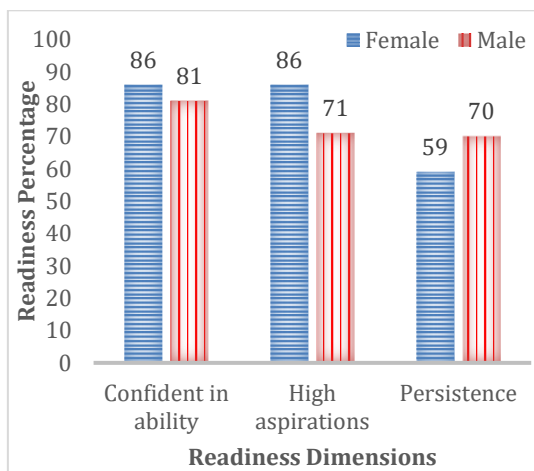


Figure 1. The average results of the Self-efficacy questionnaire on the implementation of IPAS differentiated learning

Figure 1 shows that on the dimension of confidence in the ability, female participants showed a percentage of 86% while male participants showed a percentage of 81%. The results showed that on the dimension of confidence in ability, preservice teachers for elementary school were included in the high and very high categories. In this case, it means that preservice primary school teachers already have the desire to try new things, have a very strong desire to implement the inclusion of Science Learning by the learning needs of students, are ready to not wishy-washy in making decisions, ready for change, can assess themselves positively, optimistic

and have a very high loyalty to apply differentiated science learning to independent curriculum.

This is important for a preservice teacher to have because the education scheme will continue to evolve, so preservice teachers must be proficient in data, imaginative, useful, and understand that as a preservice teacher who is connected to the universe of education, especially towards change strategies in the implementation of the education system (Nurjanah, 2021). Erlina (2021) justified this by explaining that preservice teachers must be ready to implement learning-based projects with agreed categories to develop creative learning plans. The recommended strategy to improve the quality of teaching and the perception of teachers' professional status, job satisfaction, and self-efficacy that contribute to continuing education is to foster the professionalism of preservice teachers.

On the high aspiration dimension, female participants showed a percentage of 86%, included in the very high readiness category. In comparison, male participants showed a percentage of 71%, which was included in the high understanding category. The results show that in the dimension of high aspirations,

not all preservice teachers have it. The percentage means that some preservice teachers have hopes for a better future, have a desire to implement effective learning, have hopes for achievement, are ready to provide the best for the students they teach, have good motivation to teach, know the condition of students, are ready to make changes and always give their best in imagining differentiated Science Learning in elementary school.

According to research by Isrokaton and Fitriani (2022) regarding the readiness of PGSD students to become competent elementary school teachers, PGSD students who participate in this study can be said to be ready. To teach, but only based on what they have learned in college. This percentage is consistent with the findings of the study. Instead, preservice teachers need to have much experience before they are considered competent because they need to be skilled, adept at recognizing situations, and adaptable. This is also confirmed by research from Haqqi et al. (2018), who found something similar, specifically that there is a major area of strength between interest in becoming an elementary school teacher and preparation to become a preservice teacher for elementary

school depending on the interest or aptitude to become a classroom teacher.

This aspect of high aspiration consists of several things, namely having hopes for a better future, wanting to complete a successful pickup, having hoped to achieve achievements, being ready to give the best to students, having a high motivation to teach, knowing the state of learners, ready to make changes and consistently provide the best. That way, an upcoming primary school teacher should have the skills to become an expert educator. This is in line with the findings of research conducted by Soule and Warrick (2015), which states that the significance of teacher readiness will significantly affect students' ability to achieve educational goals. Valen (2020) states that the preparation to become an educator is what happens to the planned educator students seen from their capacity, and what prepares them to complete their basic obligations as educators should be seen through the mastery of the educator's skills. Competence also measures teachers' ability to fulfill their responsibilities as teachers and educators (Hendri et al., 2021; 2018; Isjoni et al., 2018; Kamarudin et al., 2020).

If an elementary school preservice teacher wants to become a teacher, he will easily have this high ideal dimension. According To Haqqi (2018), there is a significant relationship between the readiness of preservice teacher students and their interest in becoming teachers. In addition, Hidayah (2020) also revealed that preservice educators should be prepared if they have internal interests to cultivate a vocation as an educator. According to a recent study by Diana (2021), preservice teachers will express interest in becoming teachers if the candidate's circumstances are by the teaching profession.

On the persistence dimension, the questions in the questionnaire were made to lead negatively so that female participants showed a percentage of 59% belonging to the medium category. In comparison, male participants showed a percentage of 70%, which percentage was included in the high category. This result shows that some preservice teacher primary schools in the low category have persistently implemented differentiated Science Learning in the independent curriculum. In contrast, the percentage that shows the high category means that preservice primary school teachers still need to fully have persistence in

implementing differentiated Science Learning in this independent curriculum. The dimension of persistence has several indicators, namely knowing the advantages and disadvantages of oneself, persevering in providing understanding, persevering in answering questions, taking the time to learn new things according to the needs of learners, and taking the time to learn new things according to the needs of learners.

Implementing differentiated Science Learning is inseparable from the application of TPACK in it. So that the percentage results are in line with research conducted by Arbiyanto et al. (2018), which shows that the TPACK knowledge of preservice teachers is sufficient but needs to be improved again; this is also confirmed by Anwar (2016), who explained that the readiness of preservice teacher students in carrying out practices according to PCK is still very minimal. However, this persistence means that preservice teachers are always ready to learn new things to improve the ability of TPACK to become professional teachers.

Based on this, it can be stated that preservice teachers for elementary schools already have three dimensions of readiness in implementing differentiated

Science Learning in the independent curriculum, but it still needs improvement. Teaching is based only on material, physical, and psychological readiness. However, teaching experience in the field is also needed to provide learning in favor of students according to the expectations of an independent curriculum and the principle of differentiated learning. Especially in the implementation of Science Learning Because Science Learning has a very important goal in scoring students who can wisely make social decisions that do not hurt the surrounding environment. It has also been explained in the book *The Science Teaching Blur Instruments* (Deehan, 2017) that the analysis related to

science teaching readiness can help teachers and preservice teachers to reflect on the process of teaching science personally. Preservice teachers can also determine their capacity to deliver a sustainable science education. Moreover, some questions that cannot be answered will encourage preservice teachers to find out for themselves the purpose and purpose of the question.

Data related to the results of self-efficacy questionnaires for preservice teachers in primary school in implementing differentiated science learning can be described in detail, based on the readiness of each preservice teacher in primary school, as shown in Table 1.

Table 1. Self-efficacy questionnaire results

Participants	Readiness Dimension Percentage (%)		
	Confident in ability	High aspirations	Persistence
M-01	82	54	63
M-02	91	88	80
M-03	68	62	56
M-04	82	80	80
F-01	97	94	56
F-02	82	71	60
F-03	71	88	66
F-04	100	91	63

BAs shown in Table 1, preservice teachers in primary school must be fully prepared to implement science learning in the independent curriculum. Based on unstructured interviews, this is due to the lack of teaching practices directly in the

field, which directly affects the knowledge of preservice primary school teachers on how to implement science learning in the independent curriculum. In line with the research of Rohman, Istiningsih, and Hasibuan. (2021), which

states that no matter how good the mastery of Theory is during the lecture, knowledge will only increase if you carry out practice directly in the field. Therefore, good pedagogical competence is needed to improve preservice teachers' knowledge. With pedagogical competence, teachers will have professional teaching abilities so that student learning management will run effectively (Aldriani & Jusmaya, 2019).

Teachers must understand what self-study means before incorporating science learning into self-directed curricula. This is intended to maintain the role and function of the teacher in the learning process. There are four policies in the Merdeka curriculum: school-administered national standardized school exams, minimum character and skill assessments, simplified lesson plans, and a zoning system for new student admissions. As a strategy, self-directed learning is very important for students and teachers, especially opportunities to think, develop independent and inventive learning, and opportunities for satisfaction. The teacher acts as a driving teacher, learning facilitator, innovative

teacher, character teacher, creative teacher, and independent teacher in its implementation (Daga, 2021).

CONCLUSION

The data obtained through self-efficacy questionnaires distributed to eight preservice teachers in primary schools shows that preservice teacher primary schools already have all dimensions of readiness of teacher Primary Schools in implementing differentiated Science Learning in an independent curriculum. Meanwhile, the dimension of readiness of preservice teacher in Primary School is high aspirations, persistence, and confidence in their abilities. However, not all preservice primary school teachers have this dimension of readiness. This happens because of the lack of direct teaching practice, so preservice elementary school teachers still feel confused about the decisions to be taken when certain situations in the teaching and learning process suit the needs of students, ranging from interests, talents, readiness, and learning profiles.

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