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The influence of self-efficacy, achievement motivation, and scientific literacy on the effectiveness of educational practices

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Abstract:

This type of research is ex post facto research. The calculation of the sample size uses a table by Stephen Isaac, which is calculated by the Krecjie and Morgan formula (1970). From a sample of 330, a sample of 172 is needed (with a 5% error chance). Data analysis techniques are used using descriptive statistics and parametric statistics. The results of the analysis show that the effect of PLP 1 on microteaching, as seen in Pair 1, is 6.632 with a significance level of 0.000 (p value <0.05), then H0 is rejected and Ha is tested. The effect of microteaching on PLP 2 is seen in pair 2, where the t value is 1.126 with a significance level of 0.262 (p value> 0.05), then H0 is accepted. Ha is not tested. The effect of PLP 1 on educational practice is seen in pair 3, where the t value is 8.465 with a significance level of 0.000 (p value <0.05), then H0 is rejected and Ha is tested. The effect of microteaching on educational practice is seen in pair 4, where the t value is -4.287 with a significance level of 0.000 (p value <0.05), and H0 is rejected. Ha is tested. The effect of PLP 2 on educational practice is seen in pair 5, and the calculated t value is 10.749 with a significance level of 0.000 (p value <0.05), so H0 is rejected. The alternative hypothesis is tested.

Keywords: Self-efficacy, achievement motivation, science literacy, educational practice

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INTRODUCTION

The success of any country depends on various elements, one of which is the quality of future generations. Implementation of education to prepare students to be able to face the future (Hirschman & Wood, 2018). To improve the ability of learners, learning activities must facilitate their being active and having many experiences. (Rifa Hanifa Mardhiyah; Sekar Nurul Fajriyah Aldriani; Febyana Chitta et al., 2021). Critical thinking, problem solving, metacognition, communication, collaboration, creativity, and literacy skills are developed through learner-centered learning. Professional development begins when prospective teachers become students in education. Universities need to prepare student teachers to become qualified and professional educators before teaching in the classroom. (Student et al., 2021). In the provision of pedagogic skills, namely understanding students, learning to learn, goals, contexts, and how to assess the achievement of goals, of course, teachers must master the content of teaching materials. Several theoretical courses related to subjects in elementary school (mathematics, science, social studies, civics, Indonesian language, and mathematics) are studied, including both basic and advanced concepts, materials, and practices of developing learning in elementary schools. Prospective elementary teachers should not only master the theory that will be taught in elementary schools but also the related advanced materials. Mastering theoretical courses is not always optimal. The results of Safriana's research (2019) state that the pedagogical content knowledge (PCK) ability of prospective teacher students is still very low, there are still misconceptions about the material, and they are less able to apply it in microlearning. Mastery of information technology is a must. 21st century education is characterized by the introduction of information technology that is growing rapidly. (Aslamiah, Abbas, & Mutiani, 2021).

To develop 21st century skills, both teachers and learners must be familiar with information technology. Technology in education can be used to facilitate effective learning. (Elitasari, 2022). 21st century competencies and science literacy are very important for everyone and need to be understood more widely. Elementary school teachers or prospective teachers must have good science literacy skills in order to develop science literacy skills in students. According to Maulina, Widyastuti, Maulina, and Mayasari (2022) the fundamental factor in determining teacher professionalism is the capacity to organize, implement, and assess teaching and to help students improve literacy and numeracy skills. Science literacy is the ability of students to use scientific ideas and apply them in real-world situations, as well as understand scientific phenomena and describe them using scientific data. (OECD, 2016). Science literacy is the ability to use knowledge to identify questions, create new knowledge, provide scientific explanations, draw conclusions based on scientific evidence, and develop a reflective mindset in discussions about issues and ideas related to science (OECD, 2019).

In the Educational Personnel Education Institution (LPTK), especially in the PGSD Study Program at UAD, the development of science literacy for prospective teacher students is facilitated through a series of courses in the field of science. These courses are Basic Science, Advanced Science, and Science Learning Materials in Elementary School. The ability to engage in educational practice is developed through the courses Science Learning Program Development in Elementary School, Micro Teaching Practice, Introduction to School Field (PLP 1), and PLP 2. The mastery of science literacy of PGSD students as prospective teachers should be able to make their ability to practice education better. Aspects of competence in science, namely explaining scientific phenomena, evaluating and designing scientific investigations, and interpreting scientific data and evidence. Aspects of science knowledge consist of content knowledge, procedural knowledge, and epistemic knowledge. The attitude aspect refers to developing further science knowledge, pursuing a career in science, and using scientific concepts and

methods in life (OECD, 2019). Someone who has science literacy is someone who uses science concepts and has science process skills to assess in making daily decisions when dealing with other people, society, and the environment, including social and economic development. (Arohman & Priyandoko, 2016).

PISA (Program for International Student Assessment) is a program to measure the achievements of 15-year-old students in mathematics, science, and reading literacy. The assessment conducted by PISA is conducted every three years with a focus on a country's education. (Hewi & Shaleh, 2020). Countries participating in the PISA assessment since it was first implemented in 2000 continue to grow; recorded until 2018, as many as 41 to 79 countries participated in the PISA assessment under the Organization for Economic Co-operation and Development (OECD, 2019). The 2018 PISA report compares the reading, math, and science skills of students in all PISA participating countries using tests on 600,000 15-year-old students in 79 high- and middle-income PISA participating countries. In the reading proficiency category of PISA 2018, Indonesia ranked 74th out of 79 participating countries. In the math skills category, Indonesia ranked 73rd out of 79 countries, while in the science skills category, Indonesia ranked 71st out of 79 countries. Of the 79 countries that participated in PISA, Indonesia ranked 71st. The low PISA results show that students aged 15–16 have not been able to understand the concepts and processes of science that have been learned to be applied in everyday life. Some topics or discussions developed in the assessment are contextual and easily found in real life, such as air quality in everyday life (Rusilowati, 2018). The implementation of a curriculum that requires integrated learning is one of the government's policies, with the aim of ensuring that students are able to understand a topic holistically and integratively.

When teaching science in primary schools, it is essential for teachers to have an adequate level of scientific knowledge. In order for learners to also successfully develop scientific knowledge, teachers must use the scientific method (Agustiani, Rustaman, & Wulan, 2020). Education that prepares prospective elementary school teachers needs to identify their ability to prepare prospective teachers, in this case, PGSD students. To prove the readiness and ability of the institution, an assessment is carried out of the readiness of its students to carry out learning oriented towards developing scientific literacy skills. An assessment of the ability of educational practice and mastery of science literacy of prospective elementary school teachers and other influencing factors is very important to do. According to the article (Agustiani et al., 2020), there are two factors that influence students' science literacy: internal (psychological) factors that come from within and external factors (outside themselves). (Agustiani et al., 2020). One of the influential internal factors is student achievement motivation.

Achievement motivation is an important internal factor that affects learners' performance in school and can determine academic success, learning behavior, and future goal orientation. (Meece, Anderman, & Anderman, 2006). Achievement is also related to self-confidence, persistence in the face of challenges, and the way of learning chosen to share with peers (Caprara et al., 2006). (Caprara et al., 2008) and performance expectations (Kosheleva, Amarnor, & Chernobilsky, 2015). for another, are negatively correlated with anxiety and depression. Learners spend most of their learning time in school. Academic success and school satisfaction are very important, which may be influenced by adolescent achievement motivation, affecting academic achievement and integration, so some researchers pay attention to them. Individuals who are simply confident in doing things successfully and have the ability to succeed can have higher achievement motivation. Positive traits are key to achieving motivational achievement. One important factor in assessing academic performance can be pursued through attitudes and study habits. Arieta, Gementiza, and Saco (2017) highlighted the important role of study habits in learners' lives. The success or failure of each learner depends on their learning habits. In addition, learning success also depends on ability, intelligence, and effort. Goal orientation and satisfaction, or emotions, are part of hope and self-efficacy (Lyndon et al., 2017). (Lyndon et al., 2017).

Another internal factor, including students' readiness to take action, is known as self-efficacy. Self-efficacy reflects the level of ability and confidence to be able to achieve goals. Students with stronger self-efficacy will find it easier to maintain composure when performing certain activities. The goal of the learning process is to achieve ideal learning outcomes and science literacy skills. Therefore, learners who work diligently and have a high level of self-efficacy in achieving success will give their best effort in class. For learners who already have a high sense of confidence and science literacy, this will certainly be a good thing. Learners will not be able to progress in achieving achievement if they do not have self-efficacy in their daily lives. (Al Sultan, Henson, & Fadde, 2018) explained that the internal characteristics of self-efficacy regulate learning, so it can be said that one of the psychological factors that affect students' science literacy is self-efficacy. Continue to have faith that you can overcome obstacles, and make every effort to persevere no matter what. (Riyadi, Sunyono, & Efkar, 2018). A person will be better able to maintain their composure when facing challenging tasks or situations if they have a high level of self-efficacy. Someone with low self-efficacy will give up quickly, be more prone to stress and depression, and have a limited view of optimal actions. However, those who have a high level of self-efficacy in their abilities will be persistent in their efforts to face challenges (Riyadi et al., 2018).

Student academic achievement is one measure of learning success. The initial ability of new students from various educational backgrounds (school of origin), of course, is enough to determine their learning achievements. The initial assumption is that the abilities possessed by new students are certainly equivalent, as high school graduates, of course, do not have significant differences, but these conditions need further examination and study. When high school graduates register and are accepted as students in higher education, they will receive academic and non-academic services. For PGSD study program students, they are educated and prepared to become professional educators at the elementary school level. According to Maulina et al. (2022) explained that the fundamental factor in determining teacher professionalism is the capacity of students in organizing, implementing, and assessing teaching, as well as in helping students improve literacy and numeracy skills.

The identification of problems found during field observations includes students' mastery of basic theoretical skills as well as advanced materials that are not as expected. Many obstacles are experienced by students in the implementation of learning practices. There is limited insight from educators into the meaning of science literacy and its development strategies. Efforts to develop science literacy on campus have not been supported by the participation of various components on campus for students. The quality of low self-efficacy in students is likely to lead to psychological and academic problems. There are psychological and academic problems that arise from diversity among students. There are some students who are less eager to achieve. Decreased student motivation to learn. Scientific attitudes and courage in making decisions still have to be developed by students. Understanding science is often not applied in student life.

Based on the explanation above, the researcher wants to conduct research with the title "The Effect of Self-Efficacy, Achievement Motivation, and Science Literacy on the Effectiveness of Educational Practice." The reason for conducting this research is because the internal factors of students do have more influence on educational practice. The problem formulations found include: 1) Is there a tendency for self-efficacy to affect the effectiveness of educational practice? 2) Is there a tendency for achievement motivation to affect the effectiveness of educational practice? 3) Is there a tendency for student science literacy to affect the effectiveness of educational practice? 4) Is there a tendency for self-efficacy, achievement motivation, and science literacy (together) to affect the effectiveness of educational practice?. Based on the formulation of the problem, the purpose of this study will be to describe and explain each formulation of the problem.

METHODS

Research Design

The research method applied in this study is ex post facto. The data collection methods used include questionnaires and documentation. The approach used in this research is a quantitative approach. The quantitative approach is research whose analysis focuses more on numerical data (numbers) processed using statistical methods. This research is only applied to 6th semester students (2020 batch students), because the type of research is ex post facto, so the facts have already happened, and 6th semester students already have microteaching, PLP1, and PLP 2 grades.

Participant

The population of this study was 7th semester students in the 2022–2023 academic year, totaling 330 students. Data is taken from the sample, which is part of the population that will be used as research respondents. The sampling process begins with calculating the sample size. The calculation of the sample size used the Krecjie and Morgan formula (1970), which has been made into a table by Stephen Isaac. From a sample of 330, a sample of 172 is needed (with a 5% error chance). The sample was taken by random sampling. The sample was taken randomly, with as many as 172.

Data Analysis

The data analysis technique used in this research is quantitative-descriptive analysis. For variable data that is interval in nature, descriptive data analysis can be done completely. These include: number, minimum, maximum, measures of central tendency (mean, median, mode, etc.), frequency distribution tables, graphs, and trends. Descriptive statistical analysis is applied univariately to each variable studied. The variables in this study are self-efficacy, achievement motivation, study habits, science literacy, and student characteristics (gender, regional origin, length of study).

RESULTS

The findings of the research results from the scores obtained based on the results of the respondent's questionnaire are processed into values on a scale of 100.

From the data, it can be explained that the maximum value of 100 is achieved by self-efficacy, scientific literacy, and PLP1. In other variables, in order from the highest, it can be stated starting from the micro-teaching variable (96), educational practice (94.3), PLP 2 (92) and achievement motivation (90.79). In terms of average self-efficacy, achievement motivation, and science literacy, they are less than 75. While the values of PLP1, microteaching, PLP 2, and educational practice have an average value of more than 85 on a scale of 100, To see the tendency of the data, ideal criteria are used, which are determined based on the ideal mean and ideal SD. The ideal criteria for each variable can be examined in the Table 2.

The findings of the research that have been conducted on the self-efficacy variable are known to have an objective mean of 59.84 in the high ideal category (55 to 64), it can be concluded that the self-efficacy variable has a high tendency. Furthermore, for the achievement motivation variable, it is known that the objective mean of 54.16 is in the high ideal category (55 to 64); it can be concluded that the achievement motivation variable is in the medium ideal category (52 to 61); it can be concluded that it has a moderate tendency. The same thing is true for the science literacy variable, which also has a moderate tendency because the objective mean is 34.04. is in the medium ideal category (33 to 38), so the tendency of respondents' science literacy is in the medium category.

Next, the PLP 1, Microteaching, and PLP 2 variables have a very high tendency, as seen by comparing the objective mean with the ideal criteria. The following table 4 shows the results of testing the effectiveness of educational practices using the paired sample test.

TABLE 1. *Description of Research Result Data (on a scale of 100)*

No	Variable		Minimum	Maksimum	Range	Mean
1	Self-efficacy	X1	51	100	49	74,8
2	Achievement Motivation	X2	52,6	90,79	38	71,52
3	Scientific Literacy	X3	50	100	50	72,71
4	PLP 1	X4	70	100	30	88.6
5	Micro teaching	X5	70	96	26	85.7
6	PLP 2	X6	71.5	92	20.5	85.5
7	Educational Practice	Y	70.5	94.3	23.8	86.6

TABLE 2. *Categorization Criteria Based on Ideal Values*

Variable	Very Low	Low	Medium	High	Very High
Self-efficacy	20 – 34	35 s/d 44	45 s/d 54	55 s/d 64	65 s/d maks
Achievement Motivation	19 – 42	43 s/d 51	52 s/d 61	62 s/d 70	71 s/d maks
Scientific Literacy	12 s/d 26	27 s/d 32	33 s/d 38	39 s/d 44	45 s/d maks
PLP 1	0 s/d 24	25 s/d 41	42 s/d 49	50 s/d 74	75 s/d maks
Micro teaching	0s/d 24	25 s/d 41	43 s/d 49	50 s/d 74	75 s/d maks
PLP 2	0 s/d 24	25 s/d 41	43 s/d 49	50 s/d 74	75 s/d maks
Educational Practice	0 s/d 24	25 s/d 41	43 s/d 49	50 s/d 74	75 s/d maks

TABLE 3. *Tendency of Each Research Variable*

Variable	Mean	SD	Mean Objective	Trend
Self-efficacy	50	10	59.84	High
Achievement Motivation	47.5	9.5	54.16	Medium
Scientific Literacy	30	5.83	34.04	Medium
PLP 1	50	16.67	88.85	Very High
Micro teaching	50	16.67	85.65	Very High
PLP 2	50	16.67	85.41	Very High
Educational Practice	50	16.67	86.54	Very High

TABLE 4. *Effectiveness Test Results of Educational Practices Paired Samples*

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% CIf Lower	Upper			
Pair 1	PLP 1 - MT	2.89633	5.81039	.43674	2.03441	3.75824	6.632	176	.000
Pair 2	MT - PLP 2	.23718	2.80445	.21080	-.17884	.65319	1.125	176	.262
Pair 3	PLP 1 - PP	2.00938	3.15798	.23737	1.54092	2.47783	8.465	176	.000
Pair 4	MT - PP	-.88695	2.75255	.20689	-1.29526	-.47864	-4.287	176	.000
Pair 5	PLP2 - PP	3.13350	3.87818	.29150	-3.70879	-2.55821	-10.749	176	.000

TABLE 5. *Comparison of Means between Variables*

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PLP 1	88.6328	177	6.16552	.46343
	Micro Teaching	85.7364	177	3.93901	.29607
Pair 2	Micro Teaching	85.7364	177	3.93901	.29607
	PLP 2	85.4993	177	3.29589	.24773
Pair 3	PLP 1	88.6328	177	6.16552	.46343
	Educational Practice	86.6234	177	3.89448	.29273
Pair 4	Micro Teaching	85.7364	177	3.93901	.29607
	Educational Practice	86.6234	177	3.89448	.29273

Interpretation of the results of the variable effectiveness test on educational practice: The effect of PLP 1 on Micro Teaching, seen in Pair 1, the t value is 6.632 with a significance level of 0.000 (p value <0.05) then H0 is rejected, Ha is tested. It can be concluded that there is a significant influence of microteaching on PLP 1. The effect of microteaching on PLP 2 is seen in pair 2, where the t value is 1.126 with a significance level of 0.262 (p value> 0.05), then H0 is accepted. Ha is not tested. It can be concluded that there is no significant effect of micro-teaching on PLP 2. The effect of PLP 1 on educational practice is seen in pair 3, where the t value is 8.465 with a significance level of 0.000 (p value <0.05), then H0 is rejected and Ha is tested. It can be concluded that there is a significant influence between PLP 1 and educational practices. The effect of microteaching on educational practice is seen in pair 4, where the t value is -4.287 with a significance level of 0.000 (p value <0.05), and H0 is rejected. Ha is tested. It can be concluded that there is a significant influence of microteaching on educational practice. The effect of PLP 2 on educational practice is seen in pair 5, and the calculated t value is -10.749 with a significance level of 0.000 (p value <0.05), so H0 is rejected. The alternative hypothesis is tested. It can be concluded that there is a significant effect of PLP 2 on educational practice.

When considering the order of magnitude of the average can be stated from the highest First, PLP 1, second Micro teaching, third Educational practice, and fourth is PLP 2. PLP 1 is carried out in semester 4 by carrying out relatively simple activities of observation and introduction to the school and the culture that exists in it. There was a decrease during PLP 2, considering that the activities carried out during PLP 2 were more complex than PLP 1 and micro-teaching activities.

DISCUSSION

There is a very high tendency in PLP 1, microteaching, PLP 2, and educational practice variables. Furthermore, a high tendency was obtained in the self-efficacy variable. Finally, a moderate tendency was obtained in the variables of achievement, motivation, and science literacy. The results showed that there was no effect of self-efficacy on the effectiveness of educational practice. Research (Yanita Janti Murtiningsih, 2014) in conclusion states that there is a significant influence between mastery of educational courses (learning, learning evaluation). In research, self-efficacy affects interest in becoming a teacher (Yunanto & Sawiji, 2023). Lasmawan (2019) stated that the disruption era has implications for the meaning and practice of education, requiring a change in the mindset of educators, classroom innovation, a revolution in learning models, and massive and structured changes in education policy. Research (Kadek, Ayu, Ngurah, & Agustika, 2023) in discussion state that the self-efficacy variable has a strong impact on learning motivation. Findings Others have said that self-regulation is a notion in boosting motivation in individuals (Yundani, 2022). According to the research findings of (Cahyani et al., 2020) motivation learning among students who participate in daring or online learning is declining in the face of the Covid-19 viral pandemic. Distance learning allows instructors, lecturers, and parents to control teaching and learning activities (KBM) from home. This Distance Learning was initially carried out for around 14 days, although more may have been added according to the scenario and conditions surrounding the creation of COVID-19 (Zaharah & Windarti, 2020). This study's findings are consistent with prior research, which found that self-efficacy had an impact on learning motivation (Sari & Wulandari, 2021). High self-efficacy will make pupils more confident in their attempts to achieve positive learning results (Hines & Lynch, n.d.). Overall, self-efficacy has a significant beneficial impact on enhancing learning motivation. Someone with self-efficacy. Those who are high will have higher learning motivation. The stronger a person's self-efficacy and drive, the higher learning will be.

It is hoped that educational practices will be able to produce educators who are more literate in digital technology and have teaching and learning skills, namely the skills to teach students how to learn properly and become independent learners. Thus, it is not enough with self-efficacy, achievement motivation, and scientific literacy, as it turned out in this study that their contribution to educational practice was also small. Learning skills and experiences in undergoing lectures that use active learning, problem-based learning, or project-based learning are likely to provide meaningful experiences for students to be applied and developed further when carrying out educational practices and when becoming teachers in the future.

Prime research on factors that influence student learning outcomes in practical learning includes perceptions of mastery of teaching methods, perceptions of learning media, and student learning motivation from perceptions of mastery of teaching methods, perceptions of learning media, and student learning motivation together on the learning outcomes of practical learning practices. (Sugiarto & Sin, Gusril, 2023) stated that the factors that influence PPL achievement are the ability to plan learning, teaching skills, and socializing skills. The abilities mentioned (Sugiarto & Sin, Gusril, 2023) in the PGSD UAD Study Program are obtained from various learning planning courses and learning practices in five elementary school subjects (Science, Social Studies, Civics, Mathematics, and Language). In accordance with their subject areas, students practice a lot of planning and practicing when taking these courses. Art and sports courses, with their practical activities, further enhance students' readiness to carry out educational practice activities.

CONCLUSION

The tendency between each variable is determined in terms of students' internal factors on the influence of educational practices, namely having a very high, high, and moderate

influence. The very high tendency consists of PLP 1, PLP 2, and microteaching. This is because students directly practice in the field to take part in real learning activities in schools. Then, for the high tendency, there is a self-efficacy variable where, with high inner confidence, students are able to complete complicated tasks with enthusiasm. The moderate tendency is in achievement motivation and scientific literacy. The development of teaching practice skills is not enough with self-efficacy, achievement motivation, and scientific literacy; they must be supported by experience in mastering the concepts of basic and advanced teaching materials, the ability to develop materials into teaching materials that are relevant to the characteristics of students, and the implementation of the chosen learning strategy. Subject characteristics also require the suitability of the learning applied.

Based on the conclusions previously described, several suggestions can be made for prospective elementary school teacher students who are expected to be able to hone their educational practice skills, armed with good self-efficacy, high achievement motivation, and science literacy skills. Students must develop their experience through various courses in the PGSD study program. Mastery of basic and advanced teaching material concepts; practice in designing, implementing, and evaluating learning. Each subject area in elementary school requires specific strategies that are different from one another.

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