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Students' Perceptions of Teacher Professional Competence: How Does It Correlate with Elementary School Student Learning Achievement?

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Abstract
This research aims to determine the correlation between students' perceptions of Teacher Professional Competence (TPC) and science learning achievement. This research is a quantitative approach with correlation research. The population is 107 students, and there is a sample of 85 students in 5th grade at SD Negeri 3 Parepare, South Sulawesi. Data collection used student perception questionnaires about TPC and student learning achievement tests. The data analysis techniques are correlation analysis and significance testing. The results show that students' perceptions of TPC are relatively high. Apart from that, students' science learning achievements are classified as good. From the results of the correlation analysis, the sig value is obtained. 0.002 < 0.05 or H_0 is rejected, and H_1 is accepted, with a correlation coefficient value of 0.328. The conclusion is that a significant positive correlation exists between students' perceptions of TPC and science learning achievement.

Keywords: *learning achievement, professional competence, teacher professional*

Introduction

Law of the Republic of Indonesia Number 14 of 2005 concerning Teachers and Lecturers explains, "Competency is a set of knowledge, skills, and behavior that must be possessed, internalized, and mastered by teachers or lecturers in carrying out professional duties". In this regard, teachers must have teaching competencies as professionals. Teacher competency can be seen from an educator's ability to apply concepts and work principles as an educator, implement strategies and approaches that attract students' attention, and be disciplined, honest, and consistent (Rusilowati and Wahyudi, 2020; Siregar, 2016). In line with that, Utami and Hasanah (2019), stated that teachers must have and master basic abilities or competencies in carrying out their duties to encourage students to learn.

Teachers must have competence to support the learning carried out, one of which is professional competence. Teachers' ability to master learning material profoundly and widely can be called professional competence (Azhar and Nafisah,

2018; Rusilowati and Wahyudi, 2020). The mastery in question includes school learning materials that embrace the field and the systems and methods of the field. In this regard, professional competence is related to mastering the basics of education, teaching subjects, creating learning plans, and developing evaluation tools and learning processes (Maimunah, 2019; Rusilowati and Wahyudi, 2020).

Professional competence is needed by teachers in the learning they carry out. Teachers with professional competence can implement learning strategies and deliver material well to students. They are oriented toward the learning they have mastered and the student's potential, which must be developed. Learning supported by the Teacher Professional Competence (TPC) will motivate students to learn and improve (Amtu et al., 2020; Backfisch et al., 2020; Gusmiati and Sulastri, 2023).

One subject requiring strong professional competence from teachers is science learning. The learning process still has problems and challenges in science learning classes. J. Sari et al. (2022) stated that one of the problems that occur in science learning is that teachers have not been able to implement learning effectively in the classroom, have difficulty determining students' learning interests, and are still confused about providing educational materials that should be given to students. Different students. In line with this opinion, Ariani (2023) explained that the minimal use of learning methods and media applied by teachers during learning activities is also a problem because it can cause learning to become boring for students. Magfira et al., (2023) also mentioned problems that occurred in science learning, namely that at the beginning of implementing science learning, teachers had difficulty combining science and social science content into integrated learning. Thus, the professional competence of a teacher is needed in teaching science in elementary school as a solid basis for solving these problems.

The science learning process, which is still hampered and has various problems, will undoubtedly give rise to unfavorable perceptions among the students who take part in the learning. If students produce good perceptions regarding the learning, a sense of satisfaction and pleasure will emerge within the students. However, if students' perceptions regarding the learning carried out are not good, students will feel less happy with the learning that has been carried out. This students perception can also affect student learning achievement (Nur'aini and Ruslau, 2023; Tao et al., 2022). Various literature shows an influence between student perception variables regarding TPC and learning achievement variables (Afrina et al., 2022; Bachtiar and Hakim, 2020;

Blömeke et al., 2022; Lauermann and Ten Hagen, 2021). In line with this conclusion, research by Khairat et al., (2018) confirms the existence of a significant correlation between student perception variables regarding TPC and learning achievement variables. Meanwhile, Dimyanti (2018) research shows that TPC can influence student learning achievement. Misnawati (2018) research shows that student learning achievement decrease when TPC is lacking and indicates a correlation between TPC and student learning achievement.

Based on the literature review described in the previous paragraph shows how essential TPC is to achieve maximum student learning achievement. To teach science and science in elementary schools, teachers need to design science learning in such a way that students are more enthusiastic about the learning carried out by the teacher; this is because students will better understand science learning if it is done interactively and focuses on students. In this regard, Israwaty et al., (2023) stated that several aspects of learning need to be improved to create a quality learning atmosphere. Both in terms of the quality of educators, methods, models, and media used during learning. In this way, teachers can better guide students during learning activities so that students can quickly digest the material taught and improve their learning achievement. In this regard, Fatah et al., (2023) stated that the success of science learning is influenced by the competence of educators when planning lessons that will be used for teaching.

Implementing science and technology in elementary schools is needed to foster a sense of curiosity in students regarding events in nature and social events around them. Science learning also sharpens students' scientific attitudes and abilities in critical thinking, analytical skills, and decision-making abilities. The scientific attitude instilled in students can be used to recognize their various problems and overcome them (Sartika et al., 2023).

Based on the description of the problem and the study of several studies described in the previous paragraphs, it is essential to carry out further studies regarding students' perceptions of TPC and its correlation with student learning achievement, especially in science learning in elementary schools. This study has not been widely researched, especially on the science and social sciences (called IPAS), a new subject in the Kurikulum Merdeka implemented in Indonesia. Of course, this will be new research to complement the limited literature on science learning. For this reason, it is essential to carry out this research to answer several problem formulations:

1) what is the description of students' perceptions of TPC in 5th grade at SDN 3 Parepare? 2) what is the description of the science learning achievement? Moreover, 3) is there a correlation between students' perceptions of TPC and student science learning achievement?

Based on observations conducted before and during the research process, the science learning process at SDN 3 Parepare demonstrates characteristics of ideal science instruction. For instance, teachers have attempted to implement a student-centered approach grounded in inquiry and connected to real-life experiences. Although the learning process still tends to rely on textbook explanations, teachers are making efforts to initiate lessons by tapping into students' natural curiosity and questions about the surrounding world. When students are encouraged to ask questions, make predictions, and test their ideas through exploration, they begin to develop critical thinking skills. Furthermore, teachers have made considerable efforts to implement the 5E learning model (Engage, Explore, Explain, Elaborate, Evaluate). However, not all students are fully able to engage with each phase of the model, indicating the need for increased efforts to foster active student participation in constructing their own understanding. In several learning sessions, it was also observed that teachers sought to facilitate direct, hands-on activities that are essential for developing science process skills. Through simple experiments and observations, students practiced key skills such as careful observation, classification, drawing conclusions, prediction, accurate measurement, and communication of findings.

In addition, teachers appeared to make efforts to connect science learning with students' daily lives and local environments. For example, on one occasion, the teacher guided students to explore plant growth in the school garden and observe weather changes in the surrounding area to help them see the relevance of science in their own context. This form of contextual learning enhances both memory retention and students' motivation to learn. However, the implementation of such activities faces certain limitations, as SDN 3 Parepare is located in the city center, where access to open natural environments is restricted.

Other observations indicate that teachers also attempted to utilize technology and visual media to enrich science instruction, particularly in visualizing abstract concepts and encouraging interactive exploration. Although the use of technology was limited to PowerPoint presentations and video materials, students responded

enthusiastically, which helped improve their understanding and clarified the information they received.

Method

The approach will use a quantitative approach with a type of correlation research. According to Ibrahim et al. (2018) correlational research focuses on finding correlations and the magnitude of the correlation between the variables studied. Correlational research does not discuss cause and effect but only describes a correlation between the variables studied. According to Rukminingsih et al. (2020) correlational research is non-experimental research that uses data from pre-existing variables to assess the correlation between two or more variables. In correlational research, there is no manipulation of variables.

The variables are students' perceptions of TPC as the independent variable and learning achievement as the dependent variable. The population in this study was 107 students from 4 5th grade study groups at SDN 3 Parepare, with 85 students taken in each class using proportional random sampling.

This research will collect data using questionnaires and student learning achievement tests. A questionnaire on student perceptions about TPC was developed by researchers based on the perception indicators according to Walgito (Nuraini et al., 2021) which consists of three indicators, namely acceptance, understanding, and assessment. Apart from that, the questionnaire is also linked to indicators of TPC according to the Regulation of the Minister of National Education of the Republic of Indonesia No. 16 of 2007, which for elementary school teachers has indicators: 1) Mastering the material structures, concepts and scientific thought patterns that support the subjects being taught, 2) Mastering the competency standards and essential competencies of the subjects/fields being taught creatively, 3) Developing learning materials being taught creatively, 4) Developing professionalism sustainably by carrying out reflective actions, 5) Utilizing information and communication technology to communicate and develop oneself.

The instrument developed by the researcher has gone through a validation process, but is limited to Content Validity which measures the extent to which the items in the instrument cover all aspects of the concept to be measured. In this case, the researcher did it with Expert judgment, namely asking a teacher competency expert to assess the feasibility and suitability of the instrument content. Then the expert provides

a Content Validity Ratio, namely giving an assessment, then concluding its feasibility. The result is that the student perceptions about TPC measurement instrument is considered feasible for research data collection. The researcher did not conduct empirical validity by testing it, because he had limited time. This is a weakness and limitation of this study.

The data obtained was then processed using descriptive and inferential statistics with the help of SPSS software. Descriptive statistical analysis is useful for describing data that has been collected without making conclusions that apply to the public. While inferential statistics are used to test the research hypothesis.The statistical hypothesis in this study is:

Ho: $\rho = 0$: There is no relationship between students' perceptions of teacher professional competence and student science learning achievement.

H1: $\rho \neq 0$: There is a relationship between students' perceptions of teacher professional competence and student science learning achievement.

Results and Discussion

Students' Perceptions of TPC

A descriptive statistical analysis was conducted to describe students' perceptions of TPC. The following is a summary table of the data.

Table 1 Descriptive Statistics on Students' Perceptions of TPC

Statistik	Score
Mean	76.15
Median	76
Modus	80
Range	35
Standard Devition	6.498
Max Score	95
Min Score	60

If categorized based on the students' perceptions of TPC categorization standards, then the students' perceptions of TPC can be described in Table 2.

Table 2 Categorization Standards, Then The Students' Perceptions Of TPC

No.	**Interval**	**categorization**	**N**	**%**
1	25-43	Low	0	0%
2	44-62	Very Low	2	2%
3	63-81	High	67	79%
4	82-100	Very High	16	19%
	Total		**85**	**100%**

Based on descriptive analysis of student perception questionnaire data about TPC, the criteria for student perception about TPC fall into 4 categories: low category, relatively high category, high category, and very high category. Of the 85 students, there were 2 students with perceptions of TPC in the relatively high category. There were 67 students with perceptions of TPC in the high category. There were 16 students with perceptions of TPC in the very high category. With an average score of 76.15, students' perceptions of TPC can be categorized as High.

Perception is a complex cognitive process that forms a picture of reality. Each person's perception of an object can be different because each person's perception will be influenced by various factors such as experience, learning processes, and different knowledge. In this regard, students' perceptions of TPC are impressions or assessments given by students related to the teacher's mastery of the material, which helps students understand the learning material presented by the teacher based on their observations during the activity (S. Y. Sari et al., 2022). In this regard, to achieve learning goals in schools, teachers need professional competence to make it easier for students to understand the material and form their competencies (Antera, 2021; Karlen et al., 2020; Murkatik et al., 2020; Rusilowati and Wahyudi, 2020). Teacher competency must be improved programmatically and continuously through various professional development systems (Karlen et al., 2020; Wenzel et al., 2023). In line with this opinion, Asmarani (2014) stated that to address the low professional competence of teachers, genuine efforts are needed from teachers and school principals. These efforts include attending training and conducting classroom action research from the teachers and the school principals' perspectives by providing guiandce and supervision to teachers.

Student Science Learning Achievement

A descriptive statistical analysis was conducted to describe student results in science lessons. The following is a summary table of the data.

Table 3 Descriptive Statistics on Student Science Learning Achievement

Statistic	Score
Mean	86.29
Median	87
Modus	88
Range	30
Standard Devition	30.329
Max Score	98
Min Score	68

If categorized based on categorization standards, then the student science learning achievement can be described in Table 4 below.

Table 4 Categorization On Student Science Learning Achievement

No.	Interval	Categorization	N	%
1.	≤78	Very Low	7	8%
2.	79-82	Low	9	11%
3.	83-86	Moderate	24	28%
4.	87-90	Good	30	35%
5.	91-100	Very Good	15	18%
	Total		85	100%

Based on detailed data on the science learning results of 5th grade students at SDN 3 Parepare, it can be concluded that the science learning results of 85 students are in 5 categories, namely very poor, poor, sufficient, reasonable, and very good. There are 7 students with science learning results in the inferior category. There are 9 students with science learning results in the poor category. There are 24 students with science learning results in the sufficient category. There are 30 students with science learning results in the excellent category. Also, 15 students with science learning results were in the outstanding category. With an average score of 86.29, the average student learning achievement can be categorized as Good.

This research shows that science learning achievement are influenced by student perception variables regarding TPC and variables that influence learning achievement. This can be seen from the analysis of students' science learning achievement, where there are several students with high learning achievement but with low perceptions of TPC. This aligns with opinion (Bunyamin, 2021) which states that several factors can influence learning achievement: student: student physiology, student psychology, and external factors around students. According to opinion (Melvin and Surdin, 2017) students' psychological factors influencing their learning achievement are personality aspects such as behavior, habits, needs, desires, drives, feelings, and self-control. External factors such as teacher competence can influence students (Pingge and Wangid, 2016). A study also concluded that a teacher's ability to teach science positively impacts student learning outcomes, or in other words, a science teacher's performance and competence correlates with their student's academic achievement (Ali et al., 2020; Rehman and Naz, 2019). A teacher's ability to teach science will certainly build perceptions in their students, potentially impacting student learning achievement (Russell and Martin, 2007).

The Correlation between Student Perceptions of TPC and Science Learning Achievement

Inferential statistical analysis was used to determine the correlation between students' perceptions of TPC and learning achievement. The results of inferential statistical analysis aim to answer the research hypothesis that has been formulated. Table 4 shows the output or results of inferential statistics via SPSS software.

Tabel 5 *SPSS Data Analysis Output*

Variabel	**R**	**Sig**	t_{count}	t_{table}	**Coefficient of Determination**	
					$\mathbf{R^2}$	**100%**
students' perceptions of TPC and learning achievement	0.328	0.002	3.178	1.988	0.107	10.7%

Based on the SPSS Data Analysis Output table, it can be seen that the correlation coefficient (R) of the student perception variable regarding TPC with student learning outcomes is 0.328. The correlation coefficient with a value of 0.328 is between 0.200 – 0.399, which shows that the strength of the correlation between the independent and dependent variables is at a low level of correlation. The student perception variable regarding TPC contributes to the increase in results. The student perception variable regarding TPC increased student learning achievement by 10.7%. The significance value of 0.002 is smaller than 0.05, which means there is a significant correlation between the student perception variable regarding TPC and the student learning achievement variable.

Based on correlation analysis, a significance value of 0.002 was obtained, which is smaller than the probability value of 0.05 (0.002 < 0.050), so H_0 was rejected, which means there is a significant correlation between students' perceptions of TPC and the science learning achievement of 5th grade students at SDN 3 Parepare. Students' perceptions of TPC have a positive correlation with students' science learning achievement, although the level of correlation is relatively low, namely 0.328. The contribution of the student perception variable regarding TPC to the science learning achievement variable is 10.7%, while other factors influence 89.3%.

The correlation between students' perceptions of TPC and student learning achievement arises from students' responses to TPC during learning. TPC is demonstrated by the teacher's mastery of learning material. Professional competence can influence the teacher's skills in delivering the material. By having professional

competence, teachers can better understand the learning material given to students and can plan good learning for students. Students will experience difficulties in receiving learning material if the teacher's skills in delivering learning material are lacking.

Students' perceptions of TPC can be seen from students' responses to the learning process. TPC is related to the teacher's ability to master the learning material delivered to students. This ability is needed in the learning process so teachers can design optimal learning for students to achieve learning goals. Especially in the subject of science, which is a subject that has just been implemented in 5th grade, science learning requires the teacher's professional skills in the learning process in order to help and improve students' understanding of the sciences learning material. Students will then assess the teacher's professional competency to produce student perceptions. Student perceptions occur because they receive stimulation during the learning process. This perception will create a response from within the student towards ongoing learning. For example, students will feel bored quickly. They will not like learning, which can be caused by the teacher's inappropriate choice of learning strategies and complex learning material for students to understand. Thus, students' responses to the TPC during the learning process result in students being less enthusiastic about learning activities. The student's response will impact the learning achievement obtained by the student. If students' perceptions of the TPC are good, then the learning achievement obtained by students will also be good.

The results of this research prove that there is a correlation between student perceptions of TPC and student learning achievement. The results agree with research by Rahman et al, (2023) who obtained research results that students will assess teacher professionalism; if the student's perception of the TPC is positive, then the teacher's presence will be responded to positively, too. Vice versa, if students' perceptions of the TPC are negative, then the teacher's presence will also be responded to negatively by students. The assessments or perceptions students produce regarding TPC are significantly related to student learning achievement. In this regard, research conducted by Rini et al., (2017) concluded that the teacher's expertise in teaching determines the learning achievement obtained by students. Teachers who have good competence will influence the development of student learning achievement. This condition is a response to psychological conditions that assess teachers with positive perceptions or views so that they have an impact on student learning achievement.

The research results above also align with J. Sari et al., (2022) which found a

significant positive correlation between student perceptions of TPC and student learning achievement. In this regard, according to Hartaji (2018) students' perceptions of TPC are the assessments students produce of teachers regarding their mastery of broad and in-depth learning material, which can help students achieve competency standards. Furthermore, research conducted by Firdaus (2020) concluded that if students' perceptions of TPC increase in a positive direction, then this will result in student learning achievement also increasing conversely if students' perceptions of TPC are assessed to have changed in a negative direction. Then, student learning achievement will also decrease. Therefore, one of the factors that can improve student learning achievement is to increase TPC in the learning process.

Conclusion

The conclusions obtained from the results of this research are: 1) With an average score of 76.15, the student's perception of TPC in science and science subjects is classified as high; 2) With an average score of 86.15, the average students' science learning achievement can be categorized as Good, and 3) There is a significant positive correlation between students' perceptions of TPC and science learning achievement for 5th grade at SDN 3 Parepare. This means that the higher the student's perception of the TPC, the higher the student's learning achievement. The student perception variable regarding TPC increased student learning achievement by 10.7%.

Several recommendations can be given based on the results of this research. Teachers are advised to improve their professional competence in the learning process further and pay more attention to each student because each student will learn differently. This must be done to help students understand and improve their learning achievement. Diversity in the delivery of learning material through various activities and good mastery will foster better perceptions and further encourage maximum student learning achievement. For other researchers or readers interested in conducting similar research, it is best to use this research as a reference that further strengthens the literature on the importance of building good perceptions in students, including regarding TPC, to maximize student learning achievement. Other researchers are also recommended to conduct further research on TPC and its impact on quantitative and qualitative learning processes and outcomes in elementary schools, such as teacher activity and involvement in building their competence.

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