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Study of Teachers' Ability in Managing Science Learning in Elementary Schools in Manado City

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ABSTRACT

This study aims to explain the relationship individually and together between creativity, professional competence, pedagogical competence, and teacher achievement motivation with teachers' ability in managing science learning in elementary schools in Tomohon City. The research sample was Civil Servant/State Civil Apparatus teachers who were certified as professional teachers. The research method used was a survey and correlational design. Research data were collected by questionnaire and processed using simple and multiple correlation analysis techniques. The results of the study include teacher creativity having a positive and significant relationship with teachers' ability in managing science learning; teacher professional competence is positively and significantly related to teacher ability in managing science learning; teacher pedagogical competence is positively and significantly related to teacher ability in managing science learning; teacher achievement motivation is positively and significantly related to teacher ability in managing science learning; and creativity, professional competence, pedagogical competence, and teacher achievement motivation are positively and significantly related simultaneously to teacher ability in managing science learning. After discussing the research results, it was continued by drawing research conclusions and putting forward suggestions, including that this research can be developed by other researchers to test variables that function as mediator and moderator variables using the structural equation model (SEM).

Keywords: competence, creativity, managing science learning, pedagogic, professional, teacher ability

INTRODUCTION

In essence, the emergence of problems with the identified phenomena related to managing science learning certainly has a root cause. One of the root causes of the problem is that the ability of elementary school teachers has not been optimally developed, either by the principal or by the teachers themselves as learning managers. The ability of teachers referred to in this study is the ability of teachers to work as managers in effectively managing science learning in elementary schools. The ability of teachers referred to is shown in three main dimensions. First, the technical ability dimension, namely the ability of teachers to be able to apply the knowledge or special skills they have. Managing learning requires special skills, and teachers can develop this technical ability dimension, both in the workplace and through training programs implemented in schools or provided by the wider school. Second, the human relations dimension, namely the ability of teachers to work together and motivate, both individually and in groups. This ability requires sensitivity to problems and attention. Teachers who have technical skills, but not human relations skills, will definitely find it difficult to manage learning. Therefore, it is important for teachers to recognize feelings and sentiments, motivate, and communicate their feelings to other teachers in a positive and inspiring way.

As previously stated, the teacher's ability referred to in this study is the teacher's work ability as a manager in effectively managing science learning in elementary schools. Therefore, the managerial ability theory (Gore & Begum, 2012) is used as a framework for measuring teacher ability. Meanwhile, the work ability theory is used as a framework for thinking about the correlation between variables, namely individual characteristics (Baik, Choi & Farber, 2020; Demerjian, Lewis-Western & McVay, 2019; Guan, Li & Ma, 2018; Alavinia, et al., 2009). Although theoretically called the interaction of individual/person characteristics (internal) and the environment (external) (Kristof-Brown, 2020) correlates with teacher ability, this study focuses more on the correlation between individual/person characteristics and teacher ability in managing science learning in elementary schools.

The individual characteristics of teachers, as well as their abilities, are very complex because they encompass many aspects, dimensions, and indicators. Teacher creativity is an individual characteristic that correlates with the teacher's ability to manage science learning. Teacher creativity can be assessed from its characteristics, including teachers having flexibility in working, having a sense of optimism, respect for fellow teachers and students, and being agile in completing work. In addition, teacher creativity can be shown in humorous attitudes and behaviors, inspiring fellow teachers and students, and being disciplined in carrying out tasks. Furthermore, teacher creativity is seen from the image of a responsive person, and having empathy for the problems experienced by fellow teachers and students at school. The image of teacher creativity has the potential to strengthen the closeness of its relationship

with the teacher's ability to manage learning. If the opposite happens, it will tend to weaken the correlation between teacher creativity and the teacher's ability to manage learning.

In addition to professional competence, teachers are also required to have pedagogical competence. Teachers who are unable to master pedagogical competence will potentially weaken the correlation with the teacher's ability to manage learning. For example, communication between teachers and students is hampered, and the way of teaching students is less interesting. Therefore, teachers are not only required to teach material alone, but must also understand the characteristics of each student, from intellectual, emotional, physical, spiritual, to moral. Teachers must be able to arouse students' learning motivation. In addition, teachers must be able to carry out learning activities that are educational and able to process student learning and develop the potential possessed by students, such as critical, creative, and innovative thinking skills. The description of the advantages of pedagogical competence has the potential to strengthen the closeness of the relationship with the teacher's ability to manage learning. If the opposite happens, namely the teacher's low level of pedagogical competence, then it will tend to weaken the correlation between the teacher's pedagogical ability and the teacher's ability to manage learning.

Based on the results of the analysis that have been described in the background of the problem, it appears that creativity, professional competence, pedagogical competence, and achievement motivation as individual/person characteristics of teachers are suspected to be related to the ability to manage science learning. On that basis, the researcher is interested in conducting a study entitled: Study of Teacher Ability in Managing Science Learning in Elementary Schools in Tomohon City.

METHOD

Referring to the formulation of the problem and the purpose of the study shows that this study is relevant to use a quantitative research approach. Quantitative research is an approach for testing objective theories by examining the relationship among variables (Creswell, 2014). This means that quantitative research is an approach to testing objective theories through the study of relationships or correlations between variables. This study examines the relationship between creativity, professional competence, pedagogical competence, and achievement motivation with teachers' abilities in managing science learning.

One type of research method that is relevant to use for a quantitative approach is the survey method. According to Creswell (2014) that a survey design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population. This means that a sample research design provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population.

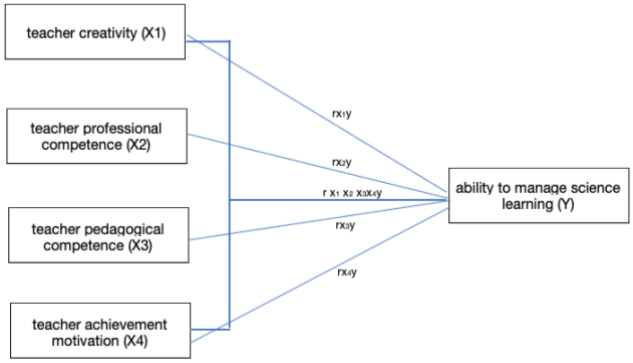

Figure 1. Research Design.

Figure 1 follows the formulation of the problem and the purpose of the study. It seems that this study is relevant to use a correlational research design. Research that applies a correlational design intends to find and discover the relationship between independent variables and dependent variables. Independent variables include teacher creativity (X1), teacher professional competence (X2), teacher pedagogical competence (X3), and teacher achievement motivation (X4). The dependent variable is the ability to manage science learning (Y). The correlation between the independent variables and the dependent variables.

RESULTS AND DISCUSSION

This section describes the results of the requirements test, the results of the descriptive analysis, and the results of the inferential analysis

Normality Test: The normality test was carried out using the one-sample Kolmogorov-Smirnov test method. The results of the normality test (attached) can be seen at the existing significance price (Asymp. Sig), and if the Asymp. Sig. > α (0.05), then the variable data is considered to be normally distributed

Linearity testing in this study was carried out by comparing the significance value with 0.05. The rule is that if the probability value α = 0.05 is greater than or equal to the probability value Sig. or 0.05 ≥ Sig, then it can be stated as having a linear pattern (Riduwan and Sunarto, 2010). See Table 1.

Table 1. Linearity test

10	Probabilitas Sig.	Probabilitas α
X1 terhadap Y	0.002	0.05
X2 terhadap Y	0.000	0.05
X3 terhadap Y	0.000	0.05
X4 terhadap Y	0.000	0.05

Based on the data in Table 1, the results of the linearity test can be explained as follows.

1) Teacher Ability in Managing Learning (Y) on Teacher Creativity (X1)

The results of the linearity test of teacher ability in managing learning (Y) on teacher creativity (X1) are that the probability value α = 0.05 is greater than the probability value sig. = 0.002 or 0.05 > 0.001. This means that the data has a linear pattern, so it meets the requirements to be continued for correlation analysis.

2) Teacher Ability in Managing Learning (Y) on Teacher Professional Competence (X2)

The results of the linearity test of teacher performance (Y) on teacher professional competence (X1) are that the probability value α = 0.05 is greater than the probability value sig. = 0.001 or 0.05 > 0.001. This means that the data has a linear pattern, so it meets the requirements to be continued for correlation analysis.

3) Teacher Ability in Managing Learning (Y) on Teacher Pedagogical Competence (X3)

The results of the linearity test of teacher performance (Y) on teacher pedagogical competence (X3) show that the probability value α = 0.05 is greater than the probability value sig. = 0.001 or 0.05 > 0.001. This means that the data is linear, so it meets the requirements to be continued for correlation analysis.

4) Teacher Ability in Managing Learning (Y) on Teacher Achievement Motivation (X4)

The results of the linearity test of teacher performance (Y) on teacher achievement motivation (X1) show that the probability value α = 0.05 is greater than the probability value sig. = 0.001 or 0.05 > 0.001. This means that the data is linear, so it meets the requirements to be continued for correlation analysis.

Descriptive Analysis Results

Based on the results of the simple correlation analysis shown in table 4.4, the correlation coefficient obtained for the relationship between teacher creativity (X1) and teacher ability in managing learning (Y) is 0.183, which means that there is a positive and very low relationship between teacher creativity and teacher ability in managing learning. The correlation of teacher creativity with teacher ability in managing learning with the two-tailed method (sig. 2-tailed) obtained a significance value of 0.000 and compared with the probability of 0.05, it turns out that the probability value of 0.05 is greater than the significance probability value or 0.05 ≤ 0.000, then H0 is rejected and Ha is accepted, which means significant. Thus, it is proven that "there is a positive and significant relationship between teacher creativity and teacher ability in managing learning."

The relationship between professional competence and teacher ability in managing learning

Based on the results of the simple correlation analysis obtained for the relationship between teacher pedagogical competence (X3) and teacher ability in managing learning (Y) is 0.634, which means there is a positive and strong relationship between pedagogical competence and teacher ability in managing learning. The correlation of teacher pedagogical competence with teacher ability in managing learning with the two-tailed method (sig. 2-tailed) obtained a significance value of 0.000 and compared with the probability of 0.05, it turns out that the probability value of 0.05 is greater than the

probability value of significance or 0.05 ≤ 0.000, then H0 is rejected and Ha is accepted which means significant. Thus, it is proven that "there is a positive and significant relationship between pedagogical competence and teacher ability in managing learning.

The relationship between achievement motivation and teacher ability in managing learning

Based on the results of the simple correlation analysis shown in table 4.4, the correlation coefficient obtained for the relationship between achievement motivation (X4) and teacher ability in managing learning (Y) is 0.936, which means that there is a positive and very strong relationship between achievement motivation and teacher ability in managing learning. The correlation of teacher achievement motivation with teacher ability in managing learning with the two-tailed method (sig. 2-tailed) obtained a significance value of 0.000 and compared with the probability of 0.05, it turns out that the probability value of 0.05 is greater than the significance probability value or 0.05 ≤ 0.000, then H0 is rejected and Ha is accepted which means significant. Thus, it is proven that "there is a positive and significant relationship between achievement motivation and teacher ability in managing learning.

The Relationship Between Teacher Creativity and Teacher Ability in Managing Learning

Based on the results of the study it shows that there is a positive and significant relationship between teacher creativity and teacher ability in managing science learning. The results of this study imply that the more teacher creativity is increased, the more it will increase teacher ability in managing science learning in elementary school.

Although it is still rare to find research in the literature about research that connects teacher ability in managing science learning in elementary school, it can generally be explained from the theory that teacher ability in managing learning does not just appear, but there are internal and external factors that are related. Empirically, it has also been found in previous studies. For example, research by Pishghadam & Shayesteh (2012) shows a significant relationship between teacher creativity and teacher success in the classroom. Basically, discussing teacher success cannot be separated from the teacher's ability to manage learning.

Theoretically, teacher ability in managing learning in this study is built from the theory of teacher ability as a learning manager. As a learning manager, teachers are expected to apply managerial work skills (Alcantara et al., 2016) or conceptualized as managerial skills (Balcerzyk & Zukovskis, 2024). In this regard, the assessment of managerial abilities from experts and previous researchers has developed rapidly. Some conceptualize managerial abilities as including communication, coordination, decision-making, planning, organizing, and evaluation. However, the ability of teachers to manage learning in this study refers to Silva's (2021) view, which states that managerial ability is a complete understanding of the needs and goals of the institution and is a series of qualities and attributes in the personality of the manager that enable effective management. The managerial abilities in question are developed operationally as follows:

a) Technical skills with indicators that include: task management and implementation of activities/projects, and information and communication technology.
b) Human skills with indicators that include communication and team building.

c) Conceptual skills with indicators that include strategic planning, problem solving, and change management.

Then, teacher creativity in this study, which has been empirically proven to be related to teachers' ability to manage science learning in elementary schools, is based on the theory of creative teacher characteristics from Alali (2020), which consists of the following four dimensions.

a) Creative planning for teaching
b) Creative teaching methods and strategies
c) Creative presentation for teaching
d) Comprehensive assessment.

However, in its development, the theory of creative teacher characteristics is not only limited to these four dimensions, but can also be studied from the theory developed by Beaulieu (2022) with three indicators of creativity, namely (1) perception of creativity, (2) self-perception of creativity, and (3) perception of creativity in education. Meanwhile, according to Raymundo (2020), the indicators of creativity are (1) developing and implementing new ideas, (2) being open and responsive, (3) showing originality and creativity, and (4) seeing failure as an opportunity to learn. Therefore, the characteristics of creative teachers used as references in this study can be expanded and combined with the characteristics of creative teachers studied and developed by previous experts or researchers. In addition, the results of this study provide an understanding that if there is an increase in teacher creativity, there will be an increase in the teacher's ability to manage learning. The results of this study imply that if the principal and teachers program improvements in teacher abilities in managing science learning, it is hoped that this will be followed by improving teacher creativity in elementary schools.

The Relationship Between Teacher Professional Competence and Teacher Ability in Managing Learning

Based on the results of the study it shows that there is a positive and significant relationship between teacher professional competence and teacher ability in managing science learning. The results of this study are supported by theories and previous research results. For example, the theory of factors as independent variables that correlate with teacher ability in managing learning as an integral part of the concept of teaching quality from Suparta (Warisno, 2020) is the competence possessed by teachers. One of the teacher competencies in question is teacher professional competence as an independent variable.

In addition, the results of this study provide an understanding that if there is an increase in the professional competence of teachers, then there is an increase in the ability of teachers to manage learning. The implication of the results of this study is that if the principal and teachers program the improvement of teachers' abilities in managing science learning, then it is expected to be followed by improving the professional competence of teachers.

The Relationship Between Teachers' Pedagogical Competence and Teachers' Ability in Managing Learning

Based on the results of the study it shows that there is a positive and significant relationship between teacher pedagogical competence and teacher ability in managing science learning. The results of this study are in line with the theory and results of previous studies. For example, the theory of factors as independent variables that correlate with teacher ability in managing learning as an integral part of the concept of teaching quality from Suparta (Warisno, 2020) is the competence possessed by teachers. One of the teacher competencies in question is teacher pedagogical competence as an independent variable.

The Relationship Between Teacher Achievement Motivation and Teacher Ability in Managing Learning

Based on the results of the study it shows that there is a positive and significant relationship between teacher achievement motivation and teacher ability in managing science learning. The results of this study are in line with the theory and results of previous studies. For example, the theory of interaction between individual or personal characteristics (internal) and the environment (external) (Kristof-Brown, 2020). Referring to this theory, teacher achievement motivation is an individual or personal characteristic of the teacher that interacts with the teacher's ability to manage learning. In addition, Amelia et al. (2024) research results, namely that there is a positive and significant relationship between achievement motivation and teacher ability in managing learning as part of the concept of teacher performance in learning. The construction of this understanding concerns the conceptual performance from a behavioral perspective, which is measured, among other things, by the teacher's ability to manage learning.

The Joint Relationship Between Creativity, Professional Competence, Pedagogical Competence, and Teacher Achievement Motivation with Teacher Ability in Managing Learning

Based on the results of the study it shows that there is a positive and significant relationship between creativity, professional competence, pedagogical competence, and teacher achievement motivation with teacher ability in managing science learning. The results of this study can be explained based on the theory of interaction between individual or personal characteristics (internal) and the environment (external) (Kristof-Brown, 2020), with teacher ability. Research on teacher ability has been conducted by previous researchers (Meutiawati, Fitriawany & Sabaruddin, 2024; Mongdong, et al., 2023; Wardani, et al., 2023; Huzaefah, Burhanuddin & Mahyudi, 2023; Putri & Dafit, 2022; Kasli, et al., 2022). Their research emphasizes the ability of science teachers in designing spiritual attitude instruments for junior high school students, developing creative dialogues in elementary school learning, implementing performance assessments in differentiated learning, compiling lesson plans for Indonesian language subjects using the independent curriculum, implementing questioning skills in elementary school, and using a core cooperative model with a blended learning method to improve student learning outcomes. If we examine the previous studies, it is very different from this study, namely, examining the ability of teachers to manage science learning in elementary school settings in the context of Tomohon City. As previously stated, the teacher's ability referred to in this study is the teacher's work ability as a manager in effectively managing science learning in elementary school.

Therefore, it is relevant to use the theory of managerial ability (Gore & Begum, 2012) as a framework for thinking to measure teacher ability. Meanwhile, the theory of work ability is used as a framework for thinking about the correlation between variables, namely individual characteristics (Baik, Choi & Farber, 2020; Demerjian, Lewis-Western & McVay, 2019; Guan, Li & Ma, 2018; Alavinia, et al., 2009). However, this study focuses more on the correlation between individual or personal characteristics and teacher abilities in managing science learning in elementary schools. The description of individual or personal characteristics of teachers related to teacher abilities in managing science learning in elementary schools includes teacher creativity, teacher professional competence, teacher pedagogical competence, and teacher achievement motivation related to teacher abilities in managing science learning in elementary schools.

CONCLUSION

Referring to the research results and discussion of the research results, the following conclusions can be put forward in this study. Teacher creativity is positively and significantly related to the teacher's ability to manage science learning in elementary schools. This means that if there is an increase in teacher creativity, there will be an increase in the teacher's ability to manage science learning in elementary schools. Teachers' professional competence is positively and significantly related to teachers' ability to manage science learning in elementary schools. This means that if there is an increase in teachers' professional competence, there will be an increase in teachers' ability to manage science learning in elementary schools. Teachers' pedagogical competence is positively and significantly related to teachers' ability to manage science learning in elementary schools. This means that if there is an increase in teachers' pedagogical competence, there will be an increase in teachers' ability to manage science learning in elementary schools. Teacher achievement motivation is positively and significantly related to teacher ability in managing science learning in elementary school. This means that if there is an increase in teacher achievement motivation, there will be an increase in teacher ability in managing science learning in elementary school. Teacher creativity, professional competence, pedagogical competence, and achievement motivation are positively and significantly related simultaneously to teacher ability in managing science learning in elementary school. This means that if there is an increase in teacher creativity, professional competence, pedagogical competence, and achievement motivation, there will be an increase in teacher ability in managing science learning in elementary school.

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