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The Effect of Rode Learning Model on Enhancing Students Communication Skills

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ABSTRACT

Communication skills in physics learning are essential to life talents that can be used to solve problems in everyday life. The Read Outline Discussion Evaluation (RODE) model is a learning tool designed to help students improve their communication skills. This research was conducted in the Elementary School Teacher Study Program with Basic Science 2nd material and involved 100 students. This study focuses on improving students' writing communication skills before and after the teaching process with the RODE learning model to determine the effectiveness of the RODE learning model. This study used one group pretest-posttest design (O1-x-O2). Before being applied to the RODE learning model, the average score of the indicators of students' written communication skills was at a low level (1, 24), and it had a score of 3.68 (high level) after the RODE learning model was implemented. This result shows that the RODE model significantly impacts students' written communication skills in the high category for both classes. In addition, students' written communication skills improved in the high category, N-gain significantly increased in the high criteria, and consistent N-gain was observed in the Elementary School Teacher Study Program.

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INTRODUCTION

Physics can assist people in resolving difficult life situations. Unfortunately, after studying physics, many students found physics to be uninteresting and difficult to comprehend (Barrett, 2011; Halliday *et al.*, 1972; Serway & Jewett, 2008; Zia, 2017; Zulfa & Rosyidah, 2020). Physics teachers must deliver relevant physics content to motivate students to learn to compete in the global marketplace. In the competitive era of globalization, physics teachers must have exceptional expertise in various 21st-century abilities, one of which is communication. It will be difficult for physics students to compete in the twenty-first century if they do not have a vital life skill of communication.

According to Kusuma *et al.* (2020), One of the demands and problems for the education process is students' ability to communicate effectively. According to Etkina *et al.* (2006), among the scientific abilities developed by physics education research groups are the ability to represent physical processes in various ways, the ability to compile and test qualitative or quantitative relationships, the ability to modify qualitative or quantitative relationships, the ability to design experimental investigations, the ability to collect and analyze data, and the

ability to modify qualitative or quantitative relationships. In addition, graduates must have excellent communication skills and be able to work in a team environment. Physics is a branch of study that deals with natural phenomena' material structure, phenomena, and interactions (Overton & Randles, 2015). Communicating in physics learning is an essential component of living talents that are useful in solving difficulties in daily life. In physics, students must comprehend and explain phenomena, objects, and events, record observation data into tables, create and analyze graphs, ask questions, test explanations, and communicate ideas (Zhou *et al.*, 2013). As a result, lecturers must promote physical learning to prepare students to compete in the global period of the twenty-first century.

Students' communication skills become one of the demands and challenges of the educational process. Practical communication skill becomes one of the demands of the 21st-century learning framework that students must have in addition to mastering knowledge, skills, expertise, and proficiency (Greenhill & Petroff, 2010). In line with The National Science Standard's advice that communication and scientific arguments be one of the main things, students need to learn (Etkina *et al.*, 2006). Preliminary studies showed 62. 5% of the sample had communication skills that were in the low category. This finding is consistent with PISA findings, which show that Indonesian students struggle with scientific knowledge, communication skills, explanations, and arguments based on evidence and critical analysis (Carolin *et al.*, 2015). This finding suggests the need for a learning model that can be used to activate and train student communication skills.

Previous research on efforts to improve communication skills has revealed that Problem Based Learning models and Problem-Solving learning models are the most commonly used models. As a result, the researchers want to look into the benefits and drawbacks of Problem Based Learning and Problem-Solving models for improving student communication skills. The theoretical and empirically studied strengths and weaknesses of innovative learning models, physics learning characteristics, and communication skills formed the basis for designing the RODE learning model, which is a more efficient and optimal learning model for training student communication skills (Kusuma *et al.*, 2020). Kusuma *et al.* (2020) Also suggest that the RODE learning model has a solid theoretical and the most recent empirical foundation sufficient to support its use. The RODE learning model allows students to collaborate on new ideas and solve problems. Students can practice communication skills to aid in adapting to dynamic change. Opportunities for success for students are more open when they have excellent communication skills rather than mastering conceptual knowledge (Kusuma *et al.*, 2020). This innovation is expected to be a viable alternative for teaching students communication skills. As a result, a RODE model for training students' communication skills will be developed in this study. The purpose of this study is to analyze the effectiveness of the RODE learning model in improving students' written communication skills.

RESEARCH METHOD

This research was conducted in the Elementary School Teacher Study Program (PGSD) at FKIP Lambung Mangkurat University Program with Basic Science 2nd material and involved 100 students. This study focuses on the effectiveness of RODE learning models by comparing the improvement in students' communication skills before and after the teaching process with the RODE learning model. The Written Communication Skills Test Instrument consists of ten items that refer to indicators of communication skills such as (1) creating tables/ graphs/ chart results of experiments/ observations, (2) interpreting tables/ graphs/ charts of experimental/ observation data results, and (3) formulating conclusions. The student's written communication skills test instrument has been validated and received input from three experts in education, physics, and research and evaluation of education. As a result, it has a validity score mode on aspects of content, construct, and language of a written communication assessment sheet of 3.67 with Very Valid criteria and a *percentage of agreement* value mode of 85.71%, and a *Cronbach*

Alpha Coefficient of 0,983 includes Excellent Reliability (Arikunto, 2016; Borich, 1994; Fraenkel et al., 2012; Hunaidah et al., 2019; Siswanto et al., 2017).

One-group pretest-posttest (O1-x-O2) methodology is used in this investigation. Giving a pretest is the first stage in the learning process (O1). Next, a pretest on written communication abilities must be completed by each student. After the pretest, the lecturer applies the Rode model and its learning tool for four meetings in each class (x). Finally, the learning process concludes with a post-test (O2). Students' written communication skills are analyzed based on pre and post-test scores. The score levels for written communication skills are based on indicators of creating tables/graphs/charts of experimental/observation results, interpreting tables/graphs/data charts of experimental/observation results, and formulating conclusions. The final rubric for the communication skills score has a range of 0-4. Pretest and post-test results data for each indicator of communication skills are then categorized using Table 1.

Table 1. Rubric category student communication skills

Scoring Range	Criteria
$2{,}66 < x \leq 4$	High
$1{,}33 < x \leq 2{,}66$	Moderate
$0 \leq x \leq 1{,}33$	Low

The student is stated to have communication skills (complete) if their score falls inside the medium requirement, which is determined by their score > 1, 33 for written communication. N-gain analysis was used to determine the level of development in the student's written communication skills before and after utilizing the RODE learning model (Hake, 1998; Limatahu et al., 2018). N-Gain was calculated using a formula

$$\langle g \rangle = (S_{post}-S_{pre})/\ (S_{max}-S_{pre})$$

$\langle g \rangle$: N-Gain Score
S_{post} : Post-test Score
S_{pre} : Pretest Score
S_{max} : Maximum Score

Furthermore, using the criteria in table 2, the N-gain calculation results are transformed.

Table 2. Rubric category student communication skills

***N-gain* Score**	***Normalized Gain* Criteria**
$0.70 < N\text{-}gain$	High
$0.30 \leq N\text{-}gain \leq 0.70$	Moderate
$N\text{-}gain < 0.30$	Low

The results of the pretest, post-test, and n-gain that had been gathered and the usefulness of the RODE learning model in enhancing students' written communication skills were all assessed utilizing nonparametric statistical methods (Limatahu et al., 2018; Prahani et al., 2016; Trihendardi, 2012).

RESULTS AND DISCUSSION

The mean score of students' written communication skills obtained from two classes, namely class D and class B, is presented in Figure 1.

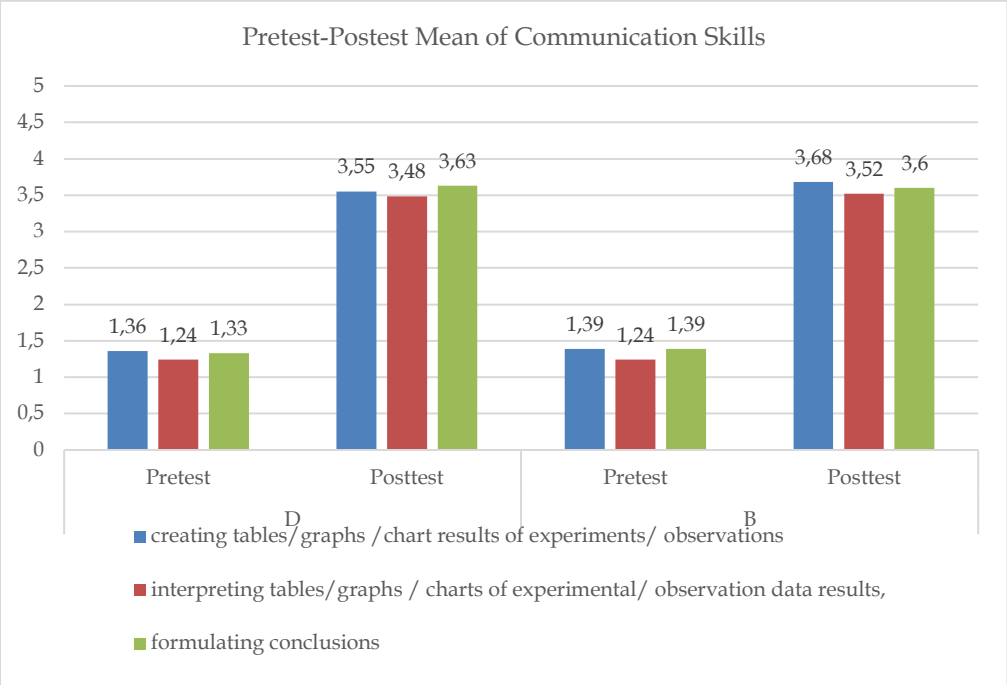

Figure 1. Pretest post-test mean score of students communication skills

According to Figure 1, the mean score of students' written communication skills in creating tables/graphs/chart results of experiments/observations, interpreting tables/graphs/chart results of experiments/observations, and formulating conclusions are the criteria before being applied to the model RODE are Low level (1.24) and Moderate level (1.39). However, once the model RODE is implemented, mastery of students' written communication skills is a high criterion for being with a score of 3.48 and 3.68. This result suggests that RODE learning models impact students' written communication skills.

N-gain analysis was also employed to compare student writing abilities before and after applying the RODE learning model, which strengthened the analysis of the improvement in the mean score of students' written communication skills. Table 3 presents the outcomes of the N-Gain analysis.

Table 3. The pretest and post-test score of students' written communication skills

Classes	Indicators	*Pretest*		*Posttest*		<g>	Criteria
		Score	Criteria	Score	Criteria		
D	Creating tables/graphs/chart result of experiments /observations	1,36	Moderate	3,55	High	0,83	High
	Interpreting tables/graphs/chart result of experiments /observations	1,24	Low	3,48	High	0,81	High
	Formulating conclusions	1,33	Moderate	3,63	High	0,86	High
B	Creating tables/graphs/chart result of experiments /observations	1,39	Moderate	3,68	High	0,88	High
	Interpreting tables/graphs/chart result of experiments /observations	1,24	Low	3,52	High	0,83	High
	Formulating conclusions	1,39	Moderate	3,60	High	0,85	High

Table 3 shows the pretest and post-test scores of student written communication skills (after using the RODE learning model) for each indicator of student written communication skills classified as middle and high criteria. The average value of the N-gain for classes D and B is more significant than 0.80, indicating that student written communication skills have improved

in high criteria. Furthermore, the results of an inferential statistical test that begins with a normality test pretest and post-test scores can be used to determine the significance of the impact of RODE learning models.

Table 4 shows that the pretest and post-test scores of third-grade students' written communication skills are generally not distributed because the scores are not normally distributed between both (pretest and post-test) or one of the scores. As a result, the Wilcoxon test was used to assess RODE's effectiveness in improving students written communication skills. Table 4 summarizes the Wilcoxon test results.

Table 4. Wilcoxon test results of student writing communication skills

Inferential Statistical Test	Classes	Written Communication Skills	Asymp. Sig.	Conclusion
Wilcoxon	D	O1-O2	0.00	There is an increase in written communication skills
	B	O1-O2	0.00	There is an increase in written communication skills
Kruskal Wallis	Class D – Class B	*N-gain* written communication skills	0.427	Consistency of N-gain

Table 4 shows the average scores of written communication skills of students of class D and class B showing a grade of 0.00 with a significance level of $p < 0.05$, Which means significant. Figure 1 and Table 4 show that RODE learning models have a significant impact on improving students' communication skills in high criteria. The success of the RODE learning models can be attributed to the fact that communication skills are emphasized throughout the model, beginning with *reading* (Phase 1), *Outline* (phase 2), *Discussion* (phase 3), and *Evaluation* (phase 4). In addition, according to the findings of Kulgemeyer & Schecker (2013); Kulsum & Nugroho (2014); Oktaviani & Nugroho (2015); Qodry *et al.* (2016); Sarwi *et al.* (2013) these stated students are given space to take responsibility for learning and building their knowledge through collaborative processes with their colleagues, building motivation to learn in completing learning tasks, exchanging ideas and ideas in completing the tasks given. These findings are inextricably linked to the RODE learning model's design, which trains students' written communication skills. Table 4 revealed no significant difference in N-gain of student communication skills between PGSD Classes D and B after using the RODE Learning Model. The results demonstrated that using the RODE Learning Model consistently improved student communication skills.

The role of the RODE Learning Model and the right lecture tools in improving student communication skills cannot be separated from the consistency of improving student communication skills. After implementing the RODE Learning Model, most students report improving their communication skills. Based on Slavin (2018), the RODE Learning Model is consistent with Vygotsky's social constructivist theory and has two main implications: 1) Social learning; students learn by interacting with more capable adults and peers. 2) Zone of Proximal Development; Students learn best when the concept is in their development zone. Furthermore, the rationality of the phase of the RODE model is supported theoretically and empirically by several research findings of Arends (2012); Brookhart (2010); Kulsum & Nugroho (2014);

Moreno (2010); Stavropoulou & Stroubouki (2014); Wangsa *et al.* (2017); Woolfolk (2017) are inextricably linked to the success of the RODE learning model in training and improving student communication skills.

Learning activities must be designed to generate curiosity, appropriate and stimulate student learning interests, connect the knowledge and experiences that students have with the material taught, and make students actively involved in learning, among other implications of motivation theory in the RODE learning model (Eggen & Kauchak, 2015; Moreno, 2010; Slavin, 2018). Behavioral learning theory has implications for modeling procedural behaviors, teaching new behaviors and attitudes, motivating students to learn behaviors already present, modifying inhibitory behaviors, focusing attention, invoking emotions, and giving practice to desired behavior in learning (Arends., 2012; Slavin, 2018; Woolfolk, 2017). The implications of connectivism theory in the design of the RODE learning model support the *Read* phase of the model, where students are tasked with investigating and reading information sources and connecting them with prior knowledge to be used to develop knowledge, understanding, and completing learning tasks. Additionally, the connectivism theory's openness concept promotes the *Outline* and *Discussion* phase, when students are urged to investigate the thoughts and opinions of their peers and engage in the learning process (Carreño, 2014; Corbett & Spinello, 2020; Downes, 2012). The principles of behavioral learning theory are applied in the *Evaluation* phase so that during this phase, the lecturer gives rewards (praise) and rankings based on the assessments given by students, with particular attention paid to awards for student activities that refer to clear performance (Arends., 2012; Slavin, 2018). Students make claims about the worth of something and explain their reasoning at this stage. Lecturers' and students' participation in the evaluation process and cooperation are required for evaluation activities (Brookhart, 2010; Stavropoulou & Stroubouki, 2014).

Using supporting learning theories and recommendations from previous research findings in the design of the RODE learning model can overcome the shortcomings of the Problem Based Learning and Problem-Solving learning models in terms of improving students' communication skills. This result is consistent with the research findings, which show a significant improvement in students' written communication skills in the high category and consistent N-gain in both the limited test and the broad trial groups.

CONCLUSION

RODE's learning model application successfully increased students' writing communication skills in learning because the data revealed significant increases in the students writing communication skills in the high category. In addition, the student writing communication skills improved in high categories, N-gain improved significantly in high criteria, and consistent N-gain was observed in both restricted test groups and extended trials at the Elementary School Teacher Study Program. The limitations of this research are that the RODE learning model is applied to the student level of the elementary school teacher education program with kinematics material. For further research, the RODE learning model can be tested on high school students and junior high school students on other physics materials.

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