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The Influence of Tri-Nga Integrated Deep Learning Approach on Students' Conceptual Understanding and Learning Motivation

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Abstract. Education is a conscious and planned process to create a learning atmosphere and learning process so that students actively develop their potential, both in terms of intellectual, spiritual, social, and skills, so that they become individuals with character and are able to contribute to community life. This study aims to test the hypothesis of the effect of the Tri-Nga integrated Deep learning approach on the understanding of concepts and learning motivation of fifth grade students in Mathematics Education. The population of this study was all fifth grade students at SD Kalikotes District, Klaten Regency which consists of 6 schools. The number of fifth grade students is 243 students. The type of research used by the researcher is quasi-experimental research or pseudo-experiment. The data collection technique used is observation and pretest posttest in the form of multiple choice to measure conceptual understanding and essay questions to measure student learning motivation. The data analysis technique used in this study is descriptive analysis and statistical analysis. The results of this study concluded that the data obtained from the analysis using the Manova test, showed that there was a significant difference in the ability to understand concepts and learning motivation of fifth grade students in Mathematics after the implementation of the Tri-Nga integrated Deep Learning teachings approach. This is indicated by the Hotelling's Trace significance value of 0.007 for conceptual understanding and 0.000 for learning motivation, both of which are below the significance level of 0.05. Students who follow learning with this approach show better conceptual understanding and higher learning motivation than students who do not use it. This increase occurs because the Tri-Nga integrated Deep Learning approach is able to encourage students to understand the material in depth (ngerti), feel the meaning of learning (ngrasa), and apply it in real life (nglakoni), so that they become more active, motivated, and easy to solve learning problems.

Keywords: Deep Learning, Concept Understanding, Student Learning Motivation

1. INTRODUCTION

Education is a conscious and planned process to create a learning atmosphere and learning process so that students actively develop their potential, both in terms of intellectual, spiritual, social, and skills, so that they become individuals with character and are able to contribute to community life. Nafiah et al., (2024) Education essentially aims to form humans who are not only intellectually intelligent, but also have strong character, are curious, and are able to apply knowledge in real life.

However, in reality, in the practice of learning in schools, there are still many students who study only to meet the demands of grades. They tend to memorize without understanding the concept in depth, which has an impact on weak reasoning and critical thinking skills. Shallow understanding of concepts causes students to forget easily, are unable to relate one

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material to another, and are less able to solve problems in real contexts. Putri, (2024) Education must develop critical thinking, creativity, communication, and collaboration skills—known as the 4Cs. These skills are essential for students to be able to compete in the dynamic modern era.

Sumarni et al., (2016) One of the causes of low understanding of student concepts is the learning approach which is still teacher-centered and oriented towards memorization. In conditions like this, learning becomes a passive activity that does not arouse students' curiosity and emotional involvement. For this reason, a learning approach is needed that is able to encourage students to learn deeply, reflectively, and meaningfully. Nurhakiki et al., (2024) Emphasizing that learning is not only enough to hone cognitive aspects. It is necessary to strengthen character, values, and local wisdom in learning so that students have a positive attitude towards the knowledge they are learning and a strong motivation to continue learning. In the context of Indonesian culture, the teachings of Tri-Nga (Ngerti - understanding, Ngrasa - feeling, Nglakoni - practicing) are a legacy of values that are very relevant to current educational goals. This teaching can strengthen the Deep learning approach by holistically touching the intellectual, emotional, and behavioral aspects of students.

Along with the changing learning paradigm, the pedagogical approach also needs to shift from teacher-centered to student-centered learning. Raup et al., (2022) An effective learning process occurs when students actively construct their own knowledge through social interaction and real experiences. Silva et al., (2018) Therefore, learning models such as Problem-Based Learning (PBL), Inquiry-Based Learning, and Deep Learning approaches are very relevant to use in the context of 21st century learning. This approach not only improves conceptual understanding, but also encourages students to think critically, work together, and solve problems creatively.

Based on the observation results obtained in Kalikotes District, Klaten Regency, which consists of 6 schools, especially in grade V, there are still many students who have difficulty in understanding lesson concepts, especially in subjects that require high conceptual understanding such as Mathematics. Surface learning, where students only memorize information without understanding its meaning, is still widely found at various levels of education. This has implications for low critical thinking skills and problem-solving skills.

Based on the interview results, this learning model does not encourage students to develop critical thinking skills. Because they are only accustomed to receiving information passively, students have difficulty analyzing, evaluating, or linking the information obtained

to other situations. As a result, they become less independent in learning and tend to rely on teachers as the main source of knowledge, without trying to dig deeper from various other sources.

Another implication of surface learning is the weak ability of students to solve problems. Without a good understanding of concepts, students often experience confusion when faced with questions or problems that are non-routine or contextual. They are not used to thinking flexibly, developing solution strategies, or evaluating various possible solutions. Therefore, there needs to be a change in learning strategies that emphasize understanding, active involvement, and the development of high-level thinking.

One approach that can be used to overcome these problems is the Tri-Nga integrated *Deep Learning approach* . Puskurjar explains the definition of Deep Learning as an approach that glorifies by emphasizing the creation of a learning atmosphere and a conscious learning process (mindful), meaningful, and joyful through intellectual processing (intellectual), heart processing (ethics), feeling processing (aesthetics), and sports (kinesthetic) in a holistic and integrated manner. With deep learning, it is hoped that students will be able to understand that learning is a necessity for themselves in the future. Furthermore, this model is expected to be able to solve several problems that are currently occurring in the educational environment such as morality, character and learning motivation.

In addition, Deep Learning aims to provide a more meaningful and enjoyable learning experience for students. *Deep learning* has three main elements, namely 1) Mindfull Learning, realizing that students' circumstances are different. 2) Meaningfull Learning, encouraging students to think and be involved in the learning process and 3) Joyfull Learning, prioritizing satisfaction and deep understanding.

This is where the importance of implementing the *Deep learning approach* of integrating the Tri-Nga teachings (Ngerti, Ngrasa, Nglakoni) is one of the Javanese cultural teachings that teaches a complete learning process, namely understanding intellectually (Ngerti), absorbing emotionally (Ngrasa), and practicing it in real action (Nglakoni). When this teaching is integrated into a learning approach such as Deep learning, the learning process becomes more touching on cognitive, affective, and psychomotor aspects in a balanced manner.

Deep learning that focuses on mindful learning can be linked to the principle of Ngerti in the Tri-Nga teachings. Mindful learning invites teachers and students to realize that each individual has a different way of learning, background, and needs. In the context of Ngerti,

students are expected not only to know superficially, but to truly understand the information thoroughly. Teachers are also required to teach the material in a way that is relevant and understandable according to the students' abilities, so that the knowledge gained becomes more meaningful.

Furthermore, meaningful learning in in-depth learning is in line with the Ngrasa principle in the Tri-Nga teachings. Here, students not only know a concept, but also feel the connection between the material being studied and real life. Students are invited to think critically, express opinions, and find meaning from the learning process they are undergoing. Thus, the learning process is no longer passive, but becomes a living activity and awakens personal and emotional awareness in students.

Finally, joyful learning can be associated with the Nglakoni principle. Once students understand and feel the meaning of what is learned, they will be more motivated to practice the knowledge in everyday life. Joyful learning creates a positive environment that supports students to try, practice, and apply knowledge without feeling forced. This reflects Nglakoni as a stage of application or real action from the results of understanding and learning experiences obtained in depth.

The integration of Tri-Nga teachings in the learning process plays an important role in strengthening conceptual understanding and increasing students' learning motivation. The teachings of Ngerti, Ngrasa, Nglakoni provide a comprehensive approach to the learning process that not only emphasizes the cognitive aspect, but also touches on the emotional side and real action. When these values are applied in learning activities, students are invited to understand the material more deeply, not just memorizing, but truly understanding the meaning of each concept learned.

At the Understand stage, students are directed to understand the subject matter intellectually. This is in line with mindful learning in the Deep learning approach, where teachers pay attention to differences in students' abilities and backgrounds. With this approach, students have a greater opportunity to build a strong understanding of concepts because learning is designed according to their needs and learning styles. When students truly "understand," they not only know the facts, but also understand the relationships between concepts logically.

The Ngrasa stage emphasizes the process of internalizing values and feelings towards what has been learned. This is closely related to meaningful learning, where students are

actively and emotionally involved in learning. When students can feel the relevance of the material to their lives, understanding the concept becomes more meaningful and not easily forgotten. This sense of connection is what triggers the emergence of intrinsic motivation, where students are driven to learn because they feel what they are learning is important and beneficial to them.

Then, at the Nglakoni stage, students are encouraged to practice what they have understood and felt into real actions. This process is closely related to the psychomotor domain, where students demonstrate their understanding through practice or application in everyday life. In the context of joyful learning, this application is carried out in a pleasant atmosphere, so that students do not feel burdened, but feel proud and confident because they are able to use their knowledge in real life. This not only strengthens the concept, but also increases self-confidence and the desire to continue learning.

Thus, the integration of Tri-Nga teachings into learning approaches such as Deep learning greatly contributes to students' conceptual understanding and learning motivation. The learning process becomes more holistic and contextual, touching on intellectual, emotional, and practical aspects. Students not only become individuals who know (ngerti), but also care (ngrasa), and are able to act (nglakoni). This is the main goal of meaningful education, namely to form humans who are knowledgeable, feel, and act wisely.

In addition to understanding the concept, learning motivation is also an important factor in determining the success of learning. Many students show low interest in learning, get bored quickly, or do not have a strong drive to learn in depth. In fact, motivation is the main foundation that encourages students to be active in the learning process and achieve optimal results. The integration of the deep learning approach with the Tri-Nga teachings is believed to be able to foster learning motivation because students are not only invited to think, but also to feel the meaning of the learning process and implement it in everyday life.

Based on the description, it is important to examine how the implementation of the Deep learning approach integrated with Tri-Nga teachings can improve students' conceptual understanding and learning motivation. This research is expected to contribute to the development of holistic and contextual learning models, and be able to form students who are not only academically smart, but also have strong characters and high learning enthusiasm.

2. METHOD

The type of research used by researchers is quasi-experimental research or pseudo-experiments. The use of quasi-experimental research was chosen because the classroom situation as a place to condition the treatment does not allow for such tight control as in a real experiment, namely having a control class but not fully controlling the external variables that affect the implementation of the experiment. The use of quasi-experimental research is because in reality it is used by researchers to collect research data. The research design used in this study is a pretest-posttest control group design, namely by conducting experiments in two classes, namely the control class and the experimental class. The control class is a class that is not given treatment or a class that does not use the Indonesian realistic mathematics approach but with conventional learning. The experimental class is a class that is given treatment using the Indonesian realistic mathematics learning approach. Then the results of the pretest and posttest in the two groups of subjects are compared

The population of this study was all fifth grade students at SD Kalikotes District, Klaten Regency consisting of 6 schools. The number of fifth grade students was 243 students. The data collection techniques used were observation and pretest posttest in the form of multiple choice to measure conceptual understanding and descriptive questions to measure students' learning motivation. The test was used to measure the effect of the Tri-Nga integrated Deep learning approach on students' conceptual understanding and learning motivation. These pretest posttest test questions will be given to students in the control class to measure whether there is an increase or not in both the experimental and control classes compared to knowing the significance of the increase in both. The data analysis technique used in this study is descriptive analysis and statistical analysis. The research structure used by the researcher is as follows:

Table 1 Quasi-Experimental Research Design

Group	pretest	Treatment	posttest
E	O_1	X	O_2
K	O_3		O_4

3. RESULT AND DISCUSSION

This study aims to test the hypothesis of the influence of the Tri-Nga integrated Deep learning approach on the conceptual understanding and learning motivation of fifth grade students in Mathematics Education. This study compares the use of the Tri-Nga integrated Deep learning approach with learning that is usually used by teachers in the classroom. Data on students' conceptual understanding abilities were obtained from the posttest that had been completed by students in class. Meanwhile, data on students' learning motivation were obtained from the results of questionnaire responses obtained from students during the activity.

1) Description of Learning Implementation

The implementation of the Tri-Nga integrated Deep learning approach was applied to grade V students with a total of 20 people. The implementation of the Deep learning approach is considered to be able to improve understanding and motivation, students' enthusiasm in working on practice questions in a more enjoyable form so that it can improve student learning outcomes. This activity certainly begins with observing students' initial abilities, to find out the extent of students' understanding of the learning material. This study first conducted a pretest at the first meeting to determine the initial abilities of students in this study. Then continued with the learning process activities for three days, at the end of the learning activities students were given practice questions.

At the initial observation stage in the classroom to get an initial picture of the class conditions, students' needs and the level of students' understanding of concepts and students' motivation to learn towards learning. At this stage (understand/comprehend phase), students are invited to understand the mathematical concepts behind their observations. The teacher guides students to discuss learning activities. Students are invited to discuss and the teacher explains the material taught to students.

At the stage (the nglakoni/doing phase), students and teachers conduct questions and answers related to the material being studied in order to achieve the planned learning objectives and students practice the concepts that have been understood in various creative tasks. At this stage, students develop creativity and problem solving. So through this activity, students hone their ability to observe, analyze, and use data to solve real problems.

2) Description of Students' Concept Understanding Ability

The data obtained on students' conceptual understanding in the control and experimental classes were analyzed descriptively to see the average obtained from each class used in the study. The students' conceptual understanding ability test was obtained at the end of the meeting, students answered several questions given. The descriptive analysis of the data on the conceptual understanding ability of the control and experimental classes can be seen in the following table:

Table 2. Description of Concept Understanding Ability Data

Class	Amount Student	Mark Highest	Mark Lowest	Average
Experiment	28	100	76	86.71
Control	28	90	70	81.75

Based on table 2 above, it can be seen that the students' conceptual understanding ability in the experimental class and control class has increased. In the experimental class, the average posttest score was 86.71 with the lowest score of 76 and the highest of 100. While in the control class there was an average of 81.75 with the lowest score of 70 and the highest of 90.

3) Description of Student Learning Motivation

Student learning motivation was obtained from taking a questionnaire at the last meeting. The data obtained on student learning motivation in the control class and the experimental class were analyzed descriptively to see the average obtained from each class used in the study. Descriptive data analysis on student learning motivation in the control class and the experimental class is in the following table:

Table 3. Description of Learning Motivation Data

Class	Amount Student	Mark Highest	Mark Lowest	Average
Experiment	28	90	77	83.47
Control	28	86	72	79

Based on table 3, it can be seen that students' learning motivation in the experimental class and control class has increased. In the experimental class, the average posttest score was 83.47 and for the control class the average was 79.

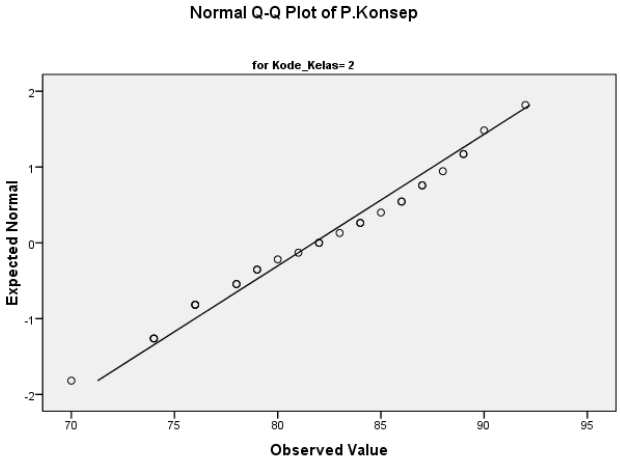
The next step is to conduct a prerequisite test, carried out before the hypothesis test is carried out. The prerequisite test consists of normality and homogeneity tests. The results of the normality test and data homogeneity test were carried out on the concept understanding ability test instrument and the student learning motivation questionnaire.

Table 4. Multivariate Normality Test

Variables	Condition	Significance (p)	Condition	Category
Concept Understanding	K.Control	.636	(p) > 0.05	Normal
	K.Experiment	.659	(p) > 0.05	Normal
Motivation to learn	K.Control	.202	(p) > 0.05	Normal
	K.Experiment	.517	(p) > 0.05	Normal

Based on the table above, it shows that the normality test of each variable, namely conceptual understanding and learning motivation in the control and experimental classes has a significance value above 0.05, which means that the data distribution is normally distributed. Meanwhile, the results of the multivariate outliers in the experimental and control classes are presented in the following figure:

Figure 1. Multivariate normality test of experimental class (Post)



Based on the scatter-plot graph above, it can be seen that the plotting points always follow and approach the diagonal line. Therefore, it can be concluded that the test data of students' conceptual understanding ability and learning motivation questionnaire in the experimental class after being given treatment are normally distributed.

Figure 2. Multivariate Normality Test of the Control Class (Post)

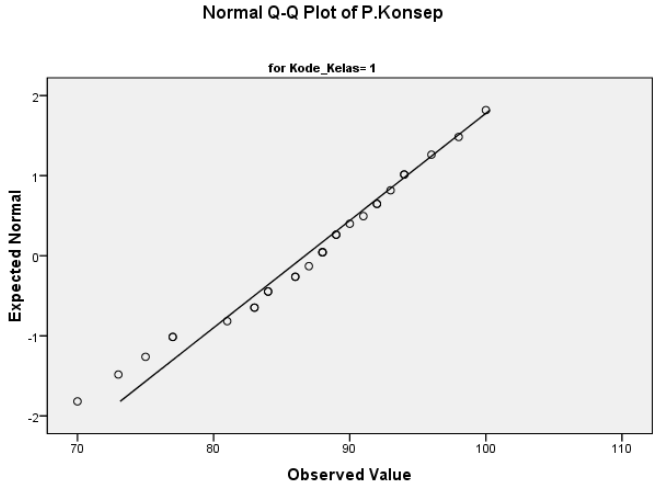


Table 5. Multivariate homogeneity test

Box's M	Significance (p)	Condition	Category
2.007	.588	(p) > 0.05	Homogeneous

The homogeneity test conducted as a whole showed a significance value of 0.588, which means it is above 0.05 so the data is said to be homogeneous.

Table 6. MANOVA test of the influence of the Deep Learning approach on Concept Understanding and Learning Motivation

Dependent variable	*F*	*Sig.*
Conceptual Understanding Ability	7,760	.007
Motivation to learn	17,623	.000

It can be seen from the table above that the ability to understand the concept obtained a Sig. value of 0.007 > 0.05 so that H0 is rejected. It can be said that there is a difference in the ability to understand the concept in students who learn using the Deep learning approach. While the students' learning motivation obtained a Sig. value of 0.000 > 0.05 so that H0 is rejected. It can be said that there is a difference in learning motivation in students who learn using the Deep Learning approach.

Table 4. Hypothesis testing using MANOVA test

	Value	**F**	**Sig.**
Pillai's Trace	.262	9.395	.000
Wilks' Lambda	.738	9.395	.000
Hotelling's Trace	.355	9.395	.000
Roy's Largest Root	.355	9.395	.000

The results of the simultaneous hypothesis test using the MANOVA test show that each indicator has a significance value of 0.000 which is below 0.05. This shows that there is a significant influence in the Deep learning approach on the understanding of learning concepts and student learning motivation in both the control and experimental classes.

Based on the results above, the influence of the Tri-Nga integrated Deep learning approach on the Conceptual Understanding of Class V Mathematics students. This study has tested the conceptual understanding ability of class V students in Mathematics. The results of the analysis before and after treatment showed a significance value of 0.007> 0.05 . There is a difference in the ability to understand concepts in students who learn using the Tri-Nga integrated Deep learning approach. The results of this study are in line with (Karmila et al., 2024) that the results of the descriptive analysis show that there is an influence of the use of the PBL model on student learning outcomes in Mathematics in the very good category, and the implementation of the learning process carried out by students is in the good category. Student learning outcomes after being given treatment are in the very good category. In line with the findings (Latif, 2022) overall the results of the study show that the use of PBL learning is also able to improve Mathematics learning achievement. Easy implementation and fast results in the assessment process make this model feasible to apply.

Based on the results of the statement above, it can be concluded that the implementation of the Tri-Nga integrated Deep learning approach is a solution to overcome the low learning outcomes of students in Indonesia and is very helpful for student learning motivation. Mathematics learning aims to help students develop logical, analytical, and systematic thinking skills. One of the things that is expected is the concept of understanding in student learning (Magdalena et al., 2020) .

Sulistyorini, (2014) Good conceptual understanding is an understanding of the concept as a fairly important capital in solving problems, understanding realizes the accuracy of receiving communication, presenting communication results in various presentations, and organizing without the intention of changing the meaning of

understanding, knowledge, and the ability to find it. (Masnur, 2017) because in realizing the objectives of learning, a deeper understanding is needed for students. This conceptual understanding emphasizes that every material taught to students is not just memorization, but also for practice that students will do (Juliani et al., 2021) .

The Effect of Implementing the Tri-Nga Integrated Deep Learning Approach on Students' Learning Motivation for Grade V Mathematics Subjects

The results of the analysis of learning motivation data on students after the implementation of the Tri-Nga Integrated Deep Learning approach have a significance value of 0.000> 0.05 . This shows that there is a difference in learning motivation. Purwanto, (2017) Learning activities by implementing the Tri-Nga Integrated Deep Learning approach can not only help students but also help teachers in the learning process, especially assessment. Interesting and more varied concepts make students feel more enthusiastic in taking final grades or assessments during learning and can provide new learning experiences in the classroom (Gunarsa, 2013) .

The Influence of the Deep Learning Approach on Students' Understanding of Concepts and Learning Motivation for Grade V Mathematics Subjects.

The results of the data analysis of students' conceptual understanding and learning motivation have a significance value of 0.000 which is below 0.05 . This shows that there is a significant influence in the application of the Tri-Nga Integrated Deep Learning approach on students' conceptual understanding and learning motivation in both the control and experimental classes.

Astuti & Octaviani, (2023) Conceptual understanding is one of the skills or Mathematical skills that are expected to be achieved in learning Mathematics, namely by demonstrating an understanding of the Mathematical concepts being studied, explaining the relationship between concepts and applying concepts or algorithms flexibly, accurately, efficiently, and appropriately in solving problems (Wahyuni, 2022) . The role of teachers in implementing conceptual understanding is to help students develop their potential to the maximum. Chotim et al., (2016) The potential of students that must be developed is not only related to intelligence and skills, but also to all aspects of personality and achievement. An important consideration for improving achievement in the classroom is to provide teachers with better resources, materials, and training in assessing students and building good communication. Teachers are not only required to have an understanding or ability in the field of learning and teaching but also in motivating students (Silva et al., 2018)

The Tri-Nga integrated Deep Learning approach has succeeded in providing a positive influence on conceptual understanding and learning motivation so that there is an increase in student learning outcomes. This approach actively involves students in learning. This finding is in line with research (Almulla, 2020) that students consider Tri-Nga teachings to make learning more enjoyable, improve mastery of the material, and increase student motivation and activeness in learning. Therefore, the learning process of elementary school students becomes more enthusiastic and motivated to learn.

The implementation of the Tri-Nga integrated Deep learning approach encourages students to understand concepts and motivation to learn independently. Apriani & Wangid, (2015) Through the Tri-Nga integrated Deep learning approach, they can also think more critically, It is easier to carry out learning tasks with the specified time and is quite easy for teachers to operate when acting as admins/examiners/question makers and is also quite easy for students when working on questions. This is in line with research (Sofiana et al., 2024) that the Deep learning approach can create a pleasant learning atmosphere but does not eliminate or reduce students' understanding of the material.

Based on the statement above, it can be concluded that the influence of using the Tri-Nga integrated Deep learning approach on students' conceptual understanding and learning motivation has a positive impact so that it can improve student learning outcomes. In addition, it can encourage students to think critically in solving the problems they face .

4. CONCLUSION

Based on the results and discussion above, it can be concluded as follows:

There is a significant difference in the ability to understand concepts in grade V students in Mathematics subjects during the learning process using the Tri-Nga integrated Deep Learning approach. This can be seen from the Manova test where the Hotelling's Trace significance value is 0.007. The ability to understand concepts in grade V students who use the Tri-Nga integrated Deep Learning approach is better than students who do not use the Tri-Nga integrated Deep Learning approach.

There is a significant difference in the learning motivation of fifth grade students in the Mathematics subject of fifth grade in learning using the Tri-Nga integrated Deep learning approach. This can be seen from the Manova test which shows a Hotelling's Trace significance value of 0.000. Students' learning motivation gets an average of xx and is included in the xx category. This can happen due to the influence of the Gtri-Nga integrated Deep learning

approach during learning. So that students have the desire to compete in class and get the motivation to study harder and more easily solve problems.

There is a change in the ability to understand concepts and learning motivation of fifth grade students in Mathematics after students learn using the Tri-Nga integrated Deep learning approach. This is proven by the Manova test where the Hotelling's Trace significance value is 0.000. The ability to understand concepts and learning motivation can increase because students use Tri-Nga integrated Deep learning during the learning process.

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