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IMPLEMENTATION OF THE UNDERSTANDING BY DESIGN (UbD) APPROACH TO ENCHANCE STUDENT'S LEARNING IN EARTH AND SOLAR SYSTEM TOPICS AT SMPN 1 RENGAT

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ABSTRACT

This research aimed to describe students' learning interest through the implementation of the Understanding by Design (UbD) approach and to determine whether there was a significant difference in learning interest between students taught using UbD and those taught using conventional learning. The study employed a quasi-experimental method with a nonequivalent post-test only control group design involving two classes of 7th grade students at SMPN 1 Rengat. The experimental class was taught using the UbD approach, while the control class received conventional instruction. Descriptive analysis showed that the experimental class achieved a higher average interest score categorized as very high, compared to the control class in the high category. All indicators of learning interest such as enjoyment, attention, participation, and curiosity of student were higher in the UbD class. Inferential analysis using an independent sample t-test confirmed that there was a statistically significant difference in students' learning interest between the two groups. These results suggest that the UbD approach effectively enhances students' interest in learning, especially in science topics such as Earth and the Solar System, and can be considered as an alternative teaching strategy to increase student engagement in the classroom.

Keywords: *Understanding by Design (UbD) Approach, Learning Interest, Earth and Solar System Topics*

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BACKGROUND

Education is a process of teaching and learning that aims to enable students to understand, comprehend, and develop into more critical thinkers, and is used as a means to improve their lives (Dwianti et al., 2021:675-676). The important role of education is to improve and develop human resources (Taufik, 2021). The National Education System Law Number 20 of 2003 Article 1 paragraph 1 states that the definition of education is "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, control, personality, intelligence, noble character, and the skills needed by themselves, society, the nation, and the state."

There are several branches of knowledge studied in education at the junior high school level, one of which is Natural Sciences (IPA). IPA is the knowledge obtained by humans in understanding the universe through observation and proper procedures, leading to accurate conclusions (Erawati, 2019:20). According to Samatoa in (Salim Nahdi et al., 2018:10), Science is a subject that discusses natural phenomena systematically based on experiments and observations conducted by humans. The success of science learning does not only depend on educational facilities and infrastructure, curriculum, or methods, but also on the selection of appropriate learning strategies that can motivate students in science learning (Erawati, 2019:20).

This lesson is expected to meet the learning needs of students with diverse characteristics, thereby achieving the learning objectives. The achievement of learning objectives is influenced by students' interest or motivation in studying the material presented by the teacher (Imawati & Maulana, 2021:88). Learning interest is the tendency to consistently pay attention to and remember information. Learning interest indicates that an individual finds joy in the topic being studied. Therefore, when students have an interest in learning a topic, it means that they will feel happy and interested in that topic (Amaliyah, 2022:10).

According to Susanto (Lia Saputri, 2015:66), the learning process will run smoothly if accompanied by interest. In learning activities, interest in learning may affect student learning outcomes. Therefore, it is important for teachers to create learning that suits the interests and needs of students. In the current science learning process, conventional learning methods such as lectures are still widely used, where learning activities are only one-way, dominated by teachers, and tend to make students passive because they only wait for explanations from teachers, then take notes and memorize them (Puspaningrum, 2015:343).

Based on the results of interviews conducted by researchers on March 10, 2025, at SMP N 1 Rengat with seventh-grade students, it was found that students' interest in science subjects was still relatively weak. This was due to students feeling bored with the learning process used by teachers. Teachers tended to still use conventional learning methods, giving assignments directly but providing brief and superficial explanations. After students complete the questions, teachers only collect and give grades, without providing feedback or inviting students to further discuss the assignments they have done. In addition, interviews with seventh-grade science teachers also revealed that many students do not pay attention during class, and some even appear sleepy in class. This condition

has resulted in weak learning outcomes of 69.6%.

There are research results from observations and interviews with teachers and students at a school in Bandung in the 3rd of elementary school, where students' interest in learning is still relatively weak, with uninteresting lessons causing many students to feel bored and uninterested in their studies (Naldi et al., 2023:5225). Another study found that students' interest in learning, which affects learning outcomes, was categorized as weak at 36.8% (Gustina, 2020:5). In line with the above research results, Nur Asiah said that science learning is generally carried out through a conventional approach. Lectures, assignments, and exercises still dominate the teaching and learning process in schools without considering students' interest in learning (Nur Asiah, 2011:3).

Based on the explanation above, one approach that can be applied to increase students' interest in learning is the Understanding by Design (UbD) approach. UbD emphasizes deep conceptual understanding, not merely memorization or mastery of skills. Through UbD, teachers can design learning that begins with setting clear learning objectives, then developing assessments and designing learning activities that support the achievement of those objectives (Dávila Rubio, 2017:140-143).

This shows that Understanding by Design is a backward design, in which teachers usually determine the objectives, then the steps of the learning process, and finally the evaluation. However, UbD places evaluation or assessment before the steps in the learning process (Ferinda et al., 2024:58-59).

The application of the UbD approach enables more active and interactive learning, as it is oriented toward exploration and problem-solving and is effective in increasing students' interest in learning (Ferinda et al., 2024: 65). By using UbD, teachers can design learning according to the needs and interests of students, making the learning process more interesting and suitable for application to material on the Earth and solar system, which can make students interested in the material being presented.

The Earth and Solar System material in Grade 7th science education discusses the characteristics of planets, the Earth's rotation and revolution, natural and artificial satellites, and natural phenomena caused by the movement of celestial bodies, such as the alternation of day and night and seasonal changes.

Based on the explanations provided, by using the UbD approach, it is hoped that students will develop a high interest in learning, thereby gaining a deeper understanding of the subject matter. Therefore, the researcher is interested in applying the Understanding by Design approach to the Earth and Solar System curriculum in Grade 7.

In an effort to improve the quality of science learning, especially in Earth and Solar System subjects in 7th grade junior high school, teachers are required to be able to select and apply learning approaches that are appropriate and relevant to students' needs. One approach that is believed to foster students' interest in learning is the Understanding by Design (UbD) approach.

In this context, students are expected to build deep understanding through the six learning facets developed in UbD: explaining, interpreting, applying, having

perspective, showing empathy, and self-knowledge. These facets are integrated into the teaching modules and designed to encourage active student involvement in the learning process.

This research was motivated by the importance of stimulating students' interest in learning, which is a key factor in academic success. Learning interest reflects the extent to which students feel happy, interested, attentive, and participate in the learning process. Students with high learning interest tend to show a positive attitude toward the subject matter and have intrinsic motivation to understand the material more deeply. Therefore, it is important to know the extent to which the UbD approach can influence students' learning interest, especially on the topic of Earth and the Solar System.

The benefits of this research are divided into several aspects. For the researcher, this research serves as a means of self-development and experience in applying innovative learning approaches, as well as part of fulfilling the final requirements for obtaining a bachelor's degree in education. For teachers, the results of this research can be used as input for developing learning strategies that can increase student interest, especially in Earth and Solar System material. For students, the application of the UbD approach is expected to be an effective means of increasing their enthusiasm and interest in learning.

In this research, several terms need to be defined operationally to avoid differences in interpretation. Understanding by Design (UbD) is defined as a backward design-based learning approach, in which teachers design learning by first determining the desired learning outcomes, then developing appropriate assessments, and finally designing a learning process that supports the achievement of these goals. In the context of this study, UbD was applied to class VII D as an experimental class, using a teaching module based on six facets of understanding. Meanwhile, student interest in learning refers to the motivation and tendency of students to be actively involved in the learning process, which is shown through feelings of enjoyment, interest, attention, and participation. This interest in learning was measured using a non-test questionnaire containing 25 statements

RESEARCH METHOD

This method of research uses an experimental method with a type of quasi experiment research. The research method aims to find the effect on something that is given treatment on others under conditions that can be controlled (Sugiyono, 2017: 107). This type of research is based on learning will take place naturally, so students do not feel they are in an experiment being conducted by researchers.

The research design in this quasi experiment uses the Nonequivalent Post-test Only Control Group Design, divided into two groups with the aim of knowing the difference in student learning interest between the control class and the experimental class, where the experimental class is given treatment in the form of applying the UbD approach, while the control class is given conventional learning treatment. The design of the study can be seen in table 1 below:

Table 1. Research Plan

Group	Treatment	Posttest
Experiment	X	O_1
Control	-	O_2

(Sugiyono, 2017: 48)

Description:

O_1 : questionnaire score in the experimental class

O_2 : questionnaire score in the control class

X: treatment using UbD Approach

The population in this study were all seventh grade students of SMPN 1 Rengat in the 2024/2025 school year consisting of 6 classes. which amounted to 190 students. The sample is part of the population selected for study. In this study, the sample consisted of two classes, namely experimental and control classes. The sample selection was carried out using the Simple Random Sampling technique by drawing lots for the experimental class and control class (Amruddin et al., 2022: 106). Based on the results of these tests, VII D class was obtained as the experimental class and VII F class as the control class with a total of 61 students in both classes.

The data collection method used in this study was a student interest questionnaire. The research data was collected by giving a questionnaire which was conducted after the implementation of learning. In filling out the interest questionnaire is done individually in the classroom which consists of 25 statement items. This questionnaire was given to both classes which was made based on learning interest indicators.

The research instrument used in this study is a questionnaire of learning interest of seventh grade junior high school students for earth and solar system material. After carrying out the data collection process, the next step taken by the researcher is to analyze the data that has been obtained. In this study, researchers used descriptive analysis data analysis techniques and inferential analysis

According to Sugiyono (2019: 147) Descriptive analysis is one of the techniques for analyzing data by describing or describing the data that was previously collected. This descriptive analysis aims to see an overview of student learning interest analyzed using the UbD approach in experimental classes and conventional learning in control classes. The scoring of learning interest is based on a Likert scale where there are 2 types of positive and negative questions, consisting of 4 scales with answers often, always, sometimes and never. for positive statements the score is given from a value of 4 to 1 and for negative statements the score is reversed to 1 to 4.

To calculate the percentage of learning interest for each statement obtained by each student using the formula in the equation below and the Likert scale :

$$P=f/N\times100\%$$

Description:

P : Percentage number

f : Frequency (number of student answers)

N: Maximum Score

The data that has been presented is then recapitulated and the criteria are distinguished in table 2 :

Table 2. Categories of Student Learning Interest

Rentang (%)	Keterangan
$80 < S \leq 100$	Very High
$60 < S \leq 80$	High
$40 < S \leq 60$	Medium
$20 < S \leq 40$	Low
$0 < S \leq 20$	Very Less

(Sugiyono, 2011:137)

Furthermore, inferential analysis is carried out, inferential analysis is an analytical technique used to analyze sample data and the results are applied to a clear population and the sampling technique from the population is carried out randomly.

Next Inferential analysis was conducted to determine the difference in the

level of student interest in learning after applying UbD in experimental classes and conventional learning in control classes through hypothesis testing. Before conducting hypothesis testing, normality test and homogeneity test were conducted first.

Normality test is a test that has the aim of knowing and measuring whether the data obtained from the population is normally distributed or not. In this study, the Kolmogrov-Smirnov test technique was used which was assisted using the SPSS application. This Kolmogrov Smirnov test is used to test whether two samples come from populations that have the same or different distributions (Amruddin et al., 2022: 159). The normality test criteria are as follows: If significant, (Sig.) ≥ 0.05 then the data is normally distributed and if significant, (Sig.) < 0.05 then the data is not normally distributed.

Homogeneity test is a test that has the aim of knowing whether some population variants are the same or not, meaning to test whether or not two samples that have been normally distributed before are homogeneous. The criteria are as follows: If significant, (Sig.) Based on Mean ≥ 0.05 then the data is homogeneous and If significant, (Sig.) Based on Mean < 0.05 then the data is not homogeneous.

After the pre-requisite test is carried out and it is proven that the processed data is normally distributed and homogeneous, then proceed with testing the proposed hypothesis can be accepted or rejected. Hypothesis testing in this study used the Independent T-Test test. The Independent T-Test test is used to determine the significant difference between the experimental class and the control class, with the following hypothesis:

H_o = There is no significant difference in the level of student interest in learning between the experimental class that applies the UbD approach with the control class that applies conventional learning on the material of the earth and solar system class VII SMPN 1 Rengat

Ha = There is a significant difference in the level of student interest in learning between the experimental class that applies the UbD approach with the control class that applies conventional learning on the material of the earth and solar system class VII SMPN 1 Rengat

Decision-making criteria in this study based on inferential analysis are:

1) If significant, (Sig.) ≥ 0.05 then H_o is accepted. This means that there is no significant difference in the level of student interest in learning between the experimental class that applies the UbD approach and the control class that applies conventional learning in the material of the earth and solar system of class VII SMPN 1 Rengat.

2) If significant, (Sig.) < 0.05 then H_o is rejected. This means that there is a significant difference in the level of student interest in learning between the experimental class that applies the UbD approach and the control class that applies conventional learning in the material of the earth and solar system class VII SMPN 1 Rengat.

After the analysis is carried out, conclusions will be drawn from the results of the research conducted. If the average score of learning interest results in classes that apply the UbD approach is higher than the average score of learning interest results of classes that apply conventional learning, it can be concluded that there is an increase in student interest in learning after applying the Understanding by Design approach to earth and solar system material.

RESULT AND DISCUSSION

Research Result

The presentation of the results of this study consists of 2 types of analysis, namely descriptive analysis and inferential analysis. Before analyzing the data, a pre-requisite test is carried out. Data from the normality and homogeneity test results can be seen in appendix 8. In accordance with the data normality test with the Kolmogorov-Smirnov technique with the help of SPSS version 30, a significance value> 0.05 was obtained. So the data in the experimental class and control class are normally distributed. After the normality test was carried out, a homogeneity test was carried out using the Levene Test technique. Based on the Test of Homogeneity of Variances, a significance value of 0.107 is obtained, where the significance value is greater than 0.05, so it can be concluded that the variance of the daily test scores between the experimental and control classes is homogeneous. The results of this prerequisite test indicate that the data qualify for further analysis. The presentation of the research results is as follows:

Descriptive Analysis

Descriptive analysis serves to describe the learning interest of students in class VII D and VII F SMPN 1 Rengat on earth and solar system material. Data on student learning interest results were obtained from the results of questionnaire scores after the implementation of learning with the Understanding by Design approach in class VII D which was the experimental class and conventional learning in class VII F. In summary, the descriptive analysis of data on each indicator of learning interest by Slameto on the material of the earth and solar system can be seen in Table

Based on the data, the average percentage of the experimental class is higher than the control class. All indicators of student interest in learning in the experimental class are in the very high category. The details of the indicators of student interest in learning in the experimental class that have the highest average value are feelings of pleasure and the indicator that has the lowest average is participation. Although participation is the indicator with the lowest score, the value is still in the very high category.

No	Indicator of Learning Interest	Experiment Class		Control Class	
		Average Score	Category	Average Score	Category
1	Feelings of Pleasure	93,81	Very High	83,87	Very High
2	Student Interest	85,28	Very High	73,12	High
3	Attention in Learning	88,33	Very High	74,46	High
4	Participation	84,86	Very High	66,94	High
Class Average		88,30	Very High	74,97	High

Meanwhile, the control class showed that only one indicator was in the very high category, namely feeling happy which was also the indicator with the highest average

and the indicator that had the lowest average was participation. This shows that conventional learning has not been fully able to increase students' interest, attention, and participation in the learning process.

Therefore, based on table, it can be concluded that the average value of the class by applying the Understanding by Design approach is 88.30 with a very high category while the average of the class applying conventional learning is 74.97 with a high category. This difference indicates that the use of the Understanding by Design approach has a positive impact on increasing student interest in learning, especially in terms of feelings of pleasure, attention, and active participation during learning.

Inferential Analysis

Inferential analysis in this study used the help of SPSS version 30, where the inferential analysis in this study included normality, homogeneity and hypothesis testing. The normality test is carried out with the Kolmogorov-smirnov test in determining whether the data is normally distributed or not, the following analysis results using SPSS version 30 are shown in table 4

Table 4. Results of SPSS-assisted Normality Test Analysis 30

No	Class	Significant Value	Decision
1	Experiment	0,096	Normally distributed data
2	Control	0,090	Normally distributed data

Based on the table above, it is obtained that the significance value of the experimental class and control class ≥ 0.05, namely 0.096 for the experimental class and 0.90 for the control class, it can be concluded that the data on the results of students' learning interest in both classes are normally distributed. The homogeneity test results of both classes have the same variance (homogeneous) with a significance value ≥ 0.05, which is 0.668. So that after fulfilling the prerequisite test, then proceed with hypothesis testing using the independent sample t-test. The value is to find out whether there is a significant difference in student interest in learning between the experimental class and the control class.

Based on the output of the independent sample t-test on the row of equal variences assumed, the significance value is 0.000 which is (Sig.) ≤ 0.05. based on the criteria, if the significance value (Sig.) ≤ 0.05 then Ha is accepted and H0 is rejected, which means that there is a significant difference in the level of student interest in learning between the experimental class that applies the Understanding by Design approach and the control class that applies conventional learning to the material of the earth and solar system in class VII SMPN 1 Rengat. In line with research (Ferinda et al., 2024: 66) that the results of his research there is a significant difference in student interest in learning between classes that apply the Understanding by Design approach and classes that apply conventional learning.

Discussion of Descriptive Analysis Results

Researchers obtained research data by carrying out the learning process directly in two classes that became the subject of the study, namely the experimental class and the control class. In the learning process, researchers used ATP and teaching modules that have been designed based on the Understanding by Design (UbD) approach which aims to build students' understanding in a deep and structured manner (Dávila Rubio, 2017: 140).

The experimental class received treatment in the form of applying the UbD approach in learning Earth and Solar System material. Meanwhile, the control class used conventional learning. The UbD approach designs learning starting from the end goal (expected results), determining evidence of understanding, and compiling activities that can support the achievement of these goals. After the learning process was completed in both classes, the researcher gave a questionnaire instrument consisting of 25 statement items that were the same for both classes. This instrument is used to measure student interest in learning, as well as being the basis for collecting research data.

Based on data analysis of student learning interest scores in experimental and control classes in table 4, it shows that there are differences from each indicator. Discussion of each indicator of learning interest can be seen as follows:

1. Feeling Happy

The Feeling Happy indicator is an important part of student interest in learning which reflects positive emotions during the learning process. When students feel happy , they tend to be more actively involved, show enthusiasm, and feel comfortable with the subject matter and methods used by the teacher. This is in line with the opinion of Hidi & Ann Renninger (2006: 112-113) which states that interest accompanied by feelings of pleasure will encourage someone to continue learning and digging deeper information.

In this indicator, the measurement results were carried out through several statement items in the questionnaire, namely at numbers 9, 13, 16, 19, 21, 23, and 25. Based on the diagram, it can be seen that the average percentage of students' feelings of pleasure in the experimental class is consistently higher than the control class. For example, in number 9 (I enjoy learning about the Earth and Solar System), the experimental class obtained a percentage of 99.17%, while the control class was only 91.94%. This shows that students felt more enthusiastic about learning in the experimental class. The same thing can also be seen in number 19 (I feel happy when solving questions/tasks on Earth and Solar System material) which indicates that students in the experimental class feel more motivated when working on tasks.

Furthermore, in statement number 23 (I feel challenged to work on Earth and Solar System problems) the experimental class showed a higher response, indicating that the learning applied was not only fun but also fostered curiosity and intellectual challenge. While on negative statements such as :

- Number 13: “I am bored following Earth and Solar System learning”

Based on the results, the experimental class shows a higher percentage than the control class, indicating that the UbD approach is able to reduce students' negative emotions, such as boredom, saturation, pressure and laziness during the learning process. In general, all indicators showed a tendency that students in the experimental class felt higher learning pleasure. The overall average percentage of this indicator shows the dominance of students' positive emotions towards the learning process, which is one of the factors driving their increased interest and engagement.

The high score in the experimental class cannot be separated from the use of interestingly designed Learner Worksheets. The Learner Worksheets in this study contain learning activities that are designed not only to be informative, but also prioritize student comfort in learning so that students

feel unburdened and enjoy the process, this is reinforced by the findings (Yahya et al., 2023: 268) which states that interesting Learner Worksheets can increase student interest in learning and students' positive attitudes towards learning, in line with the application of Understanding by Design which is not only about transferring information, but also about guiding students to understand concepts deeply and be able to apply them in real life contexts (Nadhifa, 2024: 1).

2. Student Interest

Interest is one of the main indicators in learning interest that shows attention and curiosity about the subject matter. Students who are interested will usually be more focused, active in activities, and show a desire to understand more about the material being taught. This interest can arise if learning is presented in a way that is interesting, interactive, and relevant to everyday life.

According to (Slameto, 2010: 180), it is related to the student's thrust towards interest in an object, person, activity in the form of an affective experience stimulated by the activity itself. For example, enthusiasm in participating in lessons, enthusiasm in participating in learning, not delaying assignments from teachers, diligently working on assignments given by teachers and doing assignments on time. In this study, the attraction indicator is measured through several items in the questionnaire to determine the extent to which students show interest in the learning process that takes place.

Based on the measurement results through a questionnaire that includes several statement items, it can be seen that student interest in the experimental class shows a consistently higher average percentage compared to the control class. This can be seen from the results in statement item number 1 “I look for new information about the Earth and Solar System material that I learn” which shows that experimental class students are more encouraged to learn independently outside the classroom. This shows high activeness and curiosity.

As for question number 12 “I consistently follow the learning of Earth and Solar System material every time there is a meeting” and question number 15 “I have a desire to know more about my learning material” show that the level of student curiosity is higher in the experimental class than the control class. This indicates that students in the experimental class experienced a higher level of interest in the learning process and reflects that the Understanding by Design (UbD) approach can encourage student interest in learning seen from the high percentage of the experimental class.

In the experimental class, students were actively involved through questions given by the teacher and discussion in groups, thus increasing their interest in learning and assessment. This interest arises because the material is linked to real life and makes learning interesting. In the experimental class, the score category was very high. In contrast to the control class that uses conventional learning, students tend to be passive and less motivated, thus affecting student interest and is in the high category.

3. Attention in Learning

Attention in learning is an indicator that reflects the extent to which students focus their minds and concentration on the material presented. Students who have high attention tend to understand lessons more easily, and are active in class activities. In

this study, the indicator of attention in learning is measured in several items in the questionnaire

Based on the measurement results through a questionnaire which includes several statement items, it can be seen that student attention in the experimental class consistently shows a higher average percentage compared to the control class. For example:

- In item number 2 “I record important things learned on Earth and Solar System material during learning” the percentage of the experimental class shows that most students in the experimental class are accustomed to recording important points during learning.

Likewise, the negative statements, numbers 5 and 17, (“I never take notes on the material when participating in Earth and Solar System learning”) and (“I don't care if my test scores are bad on Earth and Solar System material”) show that experimental class students take notes more often during learning and they care more about their learning outcomes. From the results of the analysis per item, it indicates that students in the experimental class experience a higher level of attention to the learning process and reflects that the UbD approach can encourage student attention to learning seen from the high percentage of the experimental class. While the control class has not shown a high consistency of attention.

In the learning process in the experimental class, students seemed more active and focused on the material presented. This increase in attention is influenced by the presentation of interesting material, making the learning process feel more fun. In addition, on the sidelines of learning, students in the experimental class were given ice-breaking. This activity makes students more excited, refocused with better attention. This shows that the indicator is in a very high category.

In contrast, in the control class that applied conventional learning, students looked more passive and showed a lower level of interest in learning, especially in paying attention to the material presented. In line with the research conducted by (Sherly Zakia & Sugeng Pradikto, 2025: 120) said that this conventional learning tends to be monotonous, too serious and less attractive to students. This causes the classroom atmosphere to be boring and makes students lose focus so that they no longer pay attention to the lesson.

4. Participation

Participation is an important component in measuring student learning interest that reflects active involvement in the learning process. Students who have high participation will show consistent participation in various learning activities, both in class discussions, questions and answers, and group activities. Good participation is also characterized by students' positive contribution in creating a conducive and interactive learning atmosphere. According to research by Wihartanti (2022:370), student participation in learning can be measured through three main aspects: participation in asking questions, answering questions, and doing tasks. This aspect shows the extent to which students are actively involved in the learning process. The measurement of participation indicators in this study was carried out using a number of statement items listed in the questionnaire

The following is an explanation based on each statement item:

- Number 6: "If I am asked questions about the Earth and Solar System material by

the teacher, I try to give an answer even though the answer I will give is not necessarily correct." The response to this statement shows that students in the experimental class were more courageous and confident. This shows the courage to participate actively without fear of being wrong, which is one of the important indicators in active learning.

- Number 22: "I just kept quiet during the discussion because I didn't understand the Earth and Solar System material." This negative statement scored higher in the experimental class, indicating that students were not just silent during the discussion, but actively participated in the process. The UbD approach succeeded in reducing students' confusion and improving their understanding, so they were encouraged to learn more.

The implementation of the UbD approach in the experimental class created a learning environment that encouraged students to play an active role through interactive discussion activities, presentation of group work results, and question and answer sessions. These activities allow students to express ideas, share perspectives, and be directly involved in knowledge development. According to Jay McTighe (2025:1) who said that teachers need to actively involve students in learning activities and performance tasks that reflect knowledge in the real world. In contrast, conventional learning in the control class that relies on the lecture method tends to limit students' opportunities to participate optimally.

The implementation of the UbD approach in the experimental class facilitated students' active participation through group discussions, presentations, and question and answer sessions, thus achieving a very high participation category. In contrast, conventional learning in the control class, which is dominated by the lecture method, limits students' involvement, resulting in participation only in the high category.

Discussion of Inferential Analysis Results

Based on the results of processing the questionnaire score data through SPSS version 30, it was found that both classes were normally distributed with a normality test significance value of 0.096 for the experimental class and 0.090 for the control class. The homogeneity test shows a significance value of 0.668 which means that both classes have homogeneous variances. Hypothesis testing using independent sample t-test resulted in a significance value of 0.000, so H_0 was rejected and H_a was accepted. This means that there is a significant difference in the level of student interest in learning between the control class that applies conventional learning and the experimental class that applies the UbD approach to the material of the earth and solar system of class VII SMPN 1 Rengat.

Descriptive analysis shows that student interest in learning in the experimental class is higher (average 88.30 very high category) than the control class (average 74.97 high category) on all indicators. These results reflect the positive impact of the Understanding by Design approach on indicators of feelings of pleasure, interest, attention in learning, and student participation. This analysis is reinforced by inferential analysis through the independent sample t-test which shows a significance value of 0.000 (<0.05), meaning that there is a significant difference in student interest in learning in both classes.

Thus, the descriptive results that show an increase in learning interest are supported

by statistical evidence and the UbD approach is proven to increase student learning interest compared to conventional learning.

Advantages and Disadvantages of Understanding by Design Approach

During the implementation of the research, the researcher felt some advantages, especially in the learning process in the experimental class that used the Understanding by Design approach. One of the most prominent things was the increased active participation of students. When the teacher asked questions, students seemed enthusiastic about answering. This is different from the control class which tends to be passive, only one or two students respond. Likewise, during the quiz, experimental class students scrambled to raise their hands and wanted to go to the front of the class.

In group discussion activities, students in the experimental class also showed good cooperation. For example, when given five LKPD sheets, students took the initiative to divide the tasks and sheets so that each member had responsibility, so that no student was just silent during the discussion. This attitude reflects active participation and high responsibility in the learning process.

In addition, students' attention was clearly visible, most of them paid attention to the teacher and followed the learning in an orderly manner. In contrast, students in the control class were often late and unfocused due to the divided learning time. Then, students in the experimental class were more active in summarizing the material. Then during the daily test, experimental class students looked more focused and calm. The results of the score recap show an increase in both classes. This reinforces that high interest in learning has a positive impact and can improve student learning outcomes.

Although this study showed positive results towards increasing student interest and learning outcomes, the researcher realized that there were several shortcomings and during the implementation process. One of them is that the research only focused on one material, namely the Earth and Solar System, so the results may not necessarily be generalized to other materials with different characteristics. The limited number of samples in two classes also limits the scope of generalization.

In addition, the Understanding by Design (UbD) approach is still relatively new in schools, so not all teachers understand this concept well. At the beginning of the implementation, students were also not familiar with the applied learning, although gradually they began to adjust and showed a positive response.

CONCLUSION

Based on the results of the research and data analysis, it can be concluded that the Understanding by Design (UbD) approach is effective in increasing students' interest in learning about Earth and Solar System material in grade 7th at SMPN 1 Rengat. Students who follow the UbD approach show a higher level of interest in learning than students who follow conventional learning. This finding indicates that instructional planning focused on outcomes and meaningful learning experiences can encourage active participation and enthusiasm among students in science learning. Therefore, the UbD approach is worth considering as an alternative instructional strategy that can be implemented in schools, and it is recommended that teachers pay attention to

each stage of this approach to achieve more optimal learning outcomes.

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