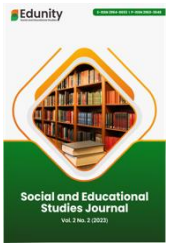
Edunity

Union

Volume 3 Number 8, August 2024
p- ISSN 2963-3648- e-ISSN 2964-8653



THE EFFECT OF ADAPTIVE LEARNING EXPERIENCE (ADLX) ON MATHEMATICS LEARNING OUTCOMES OF HIGH SCHOOL STUDENTS IN GRADE XI BASED ON LEARNING MOTIVATION

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ABSTRACT

This study aims to analyze the effect of the use of ADLX (Adaptive Learning Experience) on the mathematics learning outcomes of grade XI high school students by considering learning motivation. Using a quasi-experimental method with a non-equivalent control group design, this study involved several 11th grade high school students in X City who were divided into two groups: an experimental group using ADLX and a control group using conventional methods. The research instruments include mathematics learning outcome tests and learning motivation questionnaires validated by experts. The data were analyzed using the variance analysis technique (ANOVA) to test the hypothesis. The results showed significant differences in mathematics learning outcomes between the experimental and control groups, with the experimental group using ADLX showing better results. The data analysis also revealed that learning motivation interacted significantly with ADLX use, suggesting students with high learning motivation benefited more from ADLX use than students with low learning motivation. In general, students report that their learning motivation is influenced by the material's relevance to their daily lives and interactive and engaging teaching approaches. The use of ADLX, which involves hands-on experience and real-life examples, is considered effective in increasing understanding and motivation for learning math. This shows that the contextual learning approach is to improve students' understanding of mathematics. The conclusion of this study is that the use of ADLX can improve the mathematics learning outcomes of high school students in grade XI, especially for students with high learning motivation. These findings emphasize the importance of integrating adaptive technology in learning and the need for strategies to increase student learning motivation to achieve optimal learning outcomes.

Keywords: ADLX, mathematics learning outcomes, learning motivation, high school grade XI students, adaptive learning

Introduction

Education is one of the most important sectors in the development of a country. According to him, education is a fundamental human right and the key to achieving sustainable development. In Indonesia, education has a very important role in improving the quality of human resources (HR) in order to be able to compete in the current era of globalization. Therefore, the quality of education must always be improved in order to produce quality human resources who are able to compete in the era of globalization. (Unesco, 2016)

Learning can be interpreted as any psychological activity carried out by each individual, causing differences in their behavior before and after the learning process (Djamaluddin & Wardana, 2019). Learning activities are a process that refers to the deepening of the knowledge and experience that students have, not only collecting them but making them more meaningful. The learning materials given to students can be connected and absorbed by students in the form of cognitive structures. Learning can also be interpreted as a process of changing behavior. The interaction process in learning activities includes several elements, including students, teachers, the learning process, and the learning environment, and ultimately results in effective interaction. Thus, learning activities are instructions from teachers to students in achieving learning goals that are in line with educational goals.

One of the subjects that is the main focus of education is mathematics. Mathematics, as one of the branches of science that has an important role in the development of science and technology, functions not only as a tool in the application of other fields of science but also as a crucial basis in studying various other sciences, making it a very important subject in daily life (Siagian, 2016). However, one of the main challenges faced by most schools in Indonesia is the low learning achievement of students in mathematics (Ayu & Suryo, 2017; Resya, 2021). This is caused by various factors, including (1) students find math lessons difficult, (2) lack of student interest, (3) lack of student concentration, and (4) low understanding of students' concepts (Ayu & Suryo, 2017). Halim, 2020

The description shows that there are many factors that need to be improved and developed in learning activities, including learning design. One important factor that needs to be considered is the interaction between students, teachers, the learning process, and the learning environment. Learning must enable students to understand and absorb learning materials more meaningfully through deepening knowledge and experience. In addition, student learning outcomes in the field of mathematics are also a major concern in efforts to improve the quality of education in Indonesia. There are still challenges in improving student learning outcomes in these subjects, including Indonesia's low ranking in math skills according to PISA in 2018.

To improve students' mathematics learning outcomes, teachers and schools need to implement effective and efficient learning approaches. An effective learning approach can help students understand mathematical concepts better and be able to apply them in real situations as well as provide opportunities for students to learn independently and collaborate in solving problems. In addition, an efficient learning approach is also important so that learning time can be used optimally and students can achieve significant progress in a relatively short time. By applying an effective and efficient learning approach, students are expected to develop a deep understanding of mathematics and achieve optimal learning outcomes.

The Indonesia Integrated Islamic Schools Network (JSIT) has developed an integrated learning approach known as Active Deep Learner Experience (ADLX). JSIT together with the Ministry of Education and Culture of the Republic of Indonesia carry

out collaboration through the policy of the driving organization. JSIT Indonesia has a program that is in line with the Operation Drive Program (POP) implemented by the Ministry of Education and Culture. JSIT hopes that this collaboration can improve the quality of education through the implementation of learning that can bring Indonesia to a better place (JSIT, 2021).

Active Deep Learner Experience (ADLX) is one of the active learning approaches that has been developed and has the potential to provide an effective learning experience for students. In this approach, students are given the opportunity to be actively involved in the learning process, both through independent learning and through collaboration with fellow students. ADLX encourages students to become more independent in problem-solving so that they can develop their critical thinking skills and analytical abilities. Thus, ADLX becomes a learning approach that provides space for students to apply the knowledge and skills they have learned in real contexts, thereby increasing their understanding and application of learning concepts (. Bishop, 2013)

Ash-Shiddiiqi IT High School is one of the schools that applies the ADLX learning approach in mathematics. Therefore, this study will be conducted to determine the influence of the ADLX learning approach on student learning outcomes in grade XI mathematics at SMA IT Ash-Shiddiiqi. In addition, this study will also examine the relationship between student learning motivation and student learning outcomes in mathematics.

Several previous studies have shown that active learning approaches, including ADLX, can improve student learning achievement in mathematics (Lailie & Dewi, 2022; Wiliawanto et al., 2019). In addition, several studies also show that student learning motivation has a significant effect on student learning outcomes in mathematics subjects (Lestari, 2012, 2017; Novianti et al., 2020). Therefore, this research is expected to contribute to the understanding of effective and efficient learning approaches and provide a better understanding of the factors that affect student learning outcomes in mathematics. In this study, learning motivation will be measured using a learning motivation scale, while to measure student learning outcomes, a learning outcome test will be used that is adjusted to the curriculum and materials taught in class XI of IT-Shiddiiqi High School. The data obtained will be analyzed using multiple linear regression techniques to test the influence of the ADLX learning approach and learning motivation on student learning outcomes in the field of mathematics.

It is hoped that the results of this study can provide input for teachers and schools in choosing effective learning approaches and provide a better understanding of the factors that affect student learning outcomes in the field of mathematics. In addition, the results of this study are also expected to be a reference material for other researchers in developing further research on the influence of learning approaches and learning motivation on student learning outcomes in mathematics subjects. Thus, efforts to improve the quality of education in Indonesia can continue to be carried out to achieve sustainable development and produce quality human resources.

Research Methods

The design used in this study is a pretest-posttest group design, which also involves collecting data through questionnaires and interviews with students. The method used in this study refers to the pre-trial stage, with a research design called Pre-test and Post-test Group (Arikunto, 2010, p.124), as well as One-Group Pretest-Posttest Design (Sugiyono, 2011, p.110). In this context, the chosen design is One-Group Pretest-posttest. This means that this study involves one group of subjects without a control group. Before the treatment is given, the measurement is done on the same variable (pre-test), and after the treatment is given, the measurement is done again (post-test). This design allows researchers to compare differences between pre-test and post-test results in a single group of subjects, thus providing an overview of the effects of the given treatment.

Table 1
One Group Pretest-Posttest Research Design

Group	Pre-Test	Treatment	Post-Test
Experiment *(ADLX)*	Test 1	ADLX	Test 2

Description:
T1: Pretest
T2: Final test (posttest) of learning outcomes and student learning motivation
X1: Experimental class 1 treatment with ADLX approach

In the context of the design of this study, all science students in grade XI were involved as an experimental group that would take part in the application of Active Deep Learner Experience (ADLX) learning. Before undergoing treatment, students in this group took a pre-test to measure their initial level of understanding of the material. Furthermore, the treatment is applied by applying ADLX learning. After the learning period, students take a post-test to measure their learning outcomes and motivation to learn. In addition, the interview process also involved members of the experimental group to gain a deeper understanding of the evolution of their learning motivation as well as the positive impacts that may arise from the learning experience with the ADLX approach.

Research Sample

Jaya (2019) stated "Samples are part of the number and characteristics owned by the population". In this study, experimental research is used with the type of research being quasi-experiment (pseudo-experiment). The sampling technique in this study involves the use of the purposive sampling method. Purposive sampling is used when the researcher has a specific goal or certain criteria in selecting a sample. In this context, the deliberate selection of Grade XI Women's and Boys' Science as the experimental group and the control group was carried out due to the consideration

that the two classes were included in the science department, while the other two classes belonged to the social studies department.

The class chosen as a sample in this study is a homogeneous class where each class consists of students of the same gender. Even so, these two classes are considered to still meet the criteria needed for this research. As for gender differences in students, it is not a problem in this study. According to Egara et al. (2023), their research related to student achievement in learning mathematics and United Kingdom shows that there is no significant effect shown of gender differences on students. This is supported by Nepal (2016) in his research entitled "Impact of Gender and Location on Mathematical Thinking and Mathematics Achievement". Nepal states that there is no significant influence of gender differences on students' ability to think mathematically and their achievement in learning mathematics.

In this study, the female science class XI taught using ADLX learning was deliberately selected as the experimental group, while the male science class XI was deliberately chosen as the control group. By choosing the two classes that are included in the science department, it is hoped that this study can obtain a more comprehensive picture of the influence of ADLX learning on student learning outcomes in various classroom contexts and learning approaches.

Results and Discussion

This research was conducted in May 2024. It began with the distribution of research instruments in the form of written questionnaires to all students of class XI Science of Ash-Shiddiiqi High School, both boys and girls. The questionnaire was distributed to 57 students. In this chapter, the results of the research conducted by the author will be presented as well as a discussion of the research results. This research includes the influence of Active Deep Learner Experience (ADLX) learning on student learning motivation, on student learning outcomes, and the influence of ADLX learning on student learning outcomes in mathematics learning in terms of student learning motivation. In the following section, the author will explain the variables studied one by one as follows.

Motivation for Learning Mathematics

The learning motivation variable was measured through a mathematics motivation questionnaire consisting of 30 statements and using a scale of 1-4, namely strongly disagreeing with a score of 1, disagreeing with a score of 2, agreeing to be given a score of 3, and strongly agreeing to be given a score of 4. A learning motivation research questionnaire was given to 57 respondents after being given learning using ADLX. The following are the results of descriptive statistical calculations using the SPSS 25.0 for Windows program, as presented in Table 2 as follows:

Table 2
Description of Statistical Motivation for Learning Mathematics

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
MMQ	57	34.00	75.00	109.00	90.0526	6.48190
Valid N (listwise)	57					

Based on the results of descriptive statistical analysis of mathematics learning motivation variables (MMQ), data from 57 valid respondents were obtained. The range of learning motivation scores is 34, with a minimum score of 75 and a maximum score of 109. The average score of students' learning motivation was 90.0526 with a standard deviation of 6.48190. The average score of 90.0526 shows that in general, students' learning motivation is at a fairly high level. A standard deviation of 6.48190 indicates that the variation in learning motivation scores among students is relatively small, which means that most students have a level of learning motivation that is not much different from the average. A score range of 34 indicates that there is considerable variation in the level of learning motivation between the students with the lowest scores and the students with the highest scores. These results provide a comprehensive picture of the distribution of learning motivation among science students in grade 11 of SMA IT Ash-Shiddiiqi.

After describing the data that has been processed above, to be able to find out the level of tendency of learning motivation scores into 5 categories can be done with the following steps:

1. Specifying Range = Maximum score - Minimum score
   = 120 – 30
   = 90
2. Determine the number of classes by looking at the number of categories specified. In this study, there are 4 categories, namely: Very high, high, low, and very low.
3. Specify the length of the interval with the formula:

$$\text{Interval Length} = \frac{Range}{\text{Number of Classes}} = \frac{90}{5} = 18$$

Then it is converted into a trend table with 4 (four) categories as follows

Table 3
Categories of Motivation Interval for Learning Mathematics

Not.	Interval	Ranking Category
1.	102 – 120	Very High
2.	84 – 101	Tall
3.	66 – 83	Fair
4.	48 – 65	Less
5.	< 47	Very Less

Furthermore, after explaining the data that has been processed above, the data is made in the form of a relative frequency distribution table as follows:

Table 4
Description of Motivation for Learning Mathematics
Learning Motivation

		Frequency	Percent	Valid Percent	Cumulative Percent
Legitimate	Very High	2	3.5	3.5	3.5
	Tall	47	82.5	82.5	86.0
	Fair	8	14.0	14.0	100.0
	Less	0	0	0	0
	Very poor	0	0	0	0
	Entire	57	100.0	100.0	

Based on the data in the table above, it can be analyzed that none of the respondents were classified as having very little or no motivation to learn, 14.0% in the medium category, 82.5% in the high category, and 3.5% in the very high category. So it can be concluded from the table that the learning motivation in students and students of class XI SCIENCE SMA IT Ash-Shiddiiqi is in the high category.

If the frequency table above is included in the bar chart, it can be seen in Figure 4 below:

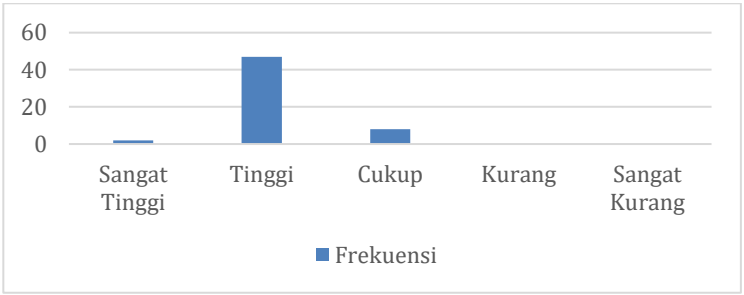

Figure 1
Frequency Diagram of Motivation Levels for Learning Mathematics

Descriptive Pre-Test and Post-Test Scores

The data in this section is the result of a test of student learning outcomes in the subject of Numbers and Sequences. The test instrument used was in the form of 10 multiple-choice questions and a description of 5 questions that had been previously validated by expert validators, namely lecturers of the Postgraduate Education Program at the University of Jambi.

Table 5
Description of Pre-test and Post-test Scores Mathematics Learning Outcomes
Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Previous tests	57	60.03	40.02	100.05	70.7956	13.20559
Post tests	57	46.69	53.36	100.05	78.1677	12.65257
Valid N (listwise)	57					

Prerequisite Test Analysis

a. Normality Test

The Normality Test Aims to See Normal or Not Data Distribution from Research Variables. The normality test was carried out on the results of the pretest and posttest obtained by all students of grade XI Science as an experimental group. The normality test was carried out using the Kolmogrov-Smirnov test of one sample. The normality test was conducted using SPSS 25.0 for Windows.

b. Mathematics Learning Motivation Questionnaire Normality Test

Table 6
Mathematics Learning Motivation Questionnaire Normality Test
Normality Test

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	Df	Sig.
MMQ	.095	57	.200*	.987	57	.779

*. This is the lower limit of true significance.

a. Lilliefors Significance Correction

The results of the normality test shown in the figure show the results of two testing methods, namely Kolmogorov-Smirnov and Shapiro-Wilk, which were used to test the data distribution of the variable Motivation for Learning Mathematics.

In the Kolmogorov-Smirnov test, the statistical value obtained was 0.095 with a degree of freedom (df) of 57. The significance value (p-value) obtained was 0.200. In the context of hypothesis testing, this p-value is compared to the commonly used significance level of 0.05. Since the p-value (0.200) is greater than 0.05, we fail to reject the null hypothesis (H0) stating that the data is distributed normally.

Meanwhile, the results of the Shapiro-Wilk test showed a statistical value of 0.987 with the same degree of freedom (df) of 57. The significance value (p-value) obtained from this test is 0.779. As in the Kolmogorov-Smirnov test, this p-value is also greater than 0.05, so we once again fail to reject the null hypothesis that the data are normally distributed.

Results of Qualitative Analysis

In this study, qualitative data analysis is the main focus to explore a deep understanding of the impact of ADLX learning on students. The qualitative approach provides a solid foundation for understanding students' changing behaviors and views on mathematics learning, helping to identify patterns, perceptions, and experiences that emerge in the context of active learning and in the development of deep learning. The

explanation of the results of qualitative data analysis will be discussed in several themes, namely learning motivation, the influence of the role of teachers, the differences between conventional learning and ADLX, and the challenges and advantages of implementing ADLX.

Learning Motivation

Based on the results of interviews with six students with the theme "Learning Motivation" in learning mathematics, it appears that learning motivation is influenced by various factors, both internal and external. In general, students feel motivated to learn mathematics because of the direct application of the material learned into daily life, as expressed by Haikal and Syafiq. They emphasized that the understanding of the usefulness of mathematics in different fields of science and in everyday life motivates them to delve deeper into this subject.

External factors such as encouragement from teachers and the learning environment also greatly affect student motivation. Most students admit that the teacher's engaging learning approach, as well as peer support, plays an important role in boosting their enthusiasm for math. Haikal and Syafiq highlighted the importance of a teaching approach that involves real experience and direct action, as applied in the ADLX (Active Deep Learning Experience) approach. This approach is considered effective because it helps students understand mathematical concepts through concrete examples and personal experiences, making the material easier to remember and understand.

Evan and other students note that before using ADLX, learning math felt more difficult and abstract. However, after the implementation of ADLX, they felt they were better able to relate mathematical concepts to real-life situations, making learning more engaging and meaningful. Hands-on experience in applying mathematical concepts, such as counting the number of electric poles or understanding arithmetic sequences through the arrangement of seats in the cinema, helps students to remember and understand the material better.

However, some students also face challenges in adapting to the new ADLX approach. They feel it takes time to get used to this approach. However, they agree that learning with ADLX brings positive impacts, such as improved memory and a deeper understanding of the material. To improve the effectiveness of ADLX implementation, some students suggested that this method should be applied more widely in various areas of study, not just mathematics so that students can relate more concepts to their daily experiences.

Overall, students' motivation to learn in mathematics is influenced by the relevance of the material to real life, interactive and engaging learning, and support from teachers and friends. The implementation of ADLX is recognized as an effective approach to improve learning understanding and motivation, although it still requires further adaptation to achieve optimal results.

The Influence of the Role of Teachers

The influence of the teacher's role in learning is very significant on student motivation and learning outcomes, especially in mathematics. Based on interviews with six students, it can be concluded that the way teachers teach plays an important role in arousing students' interest and enthusiasm for mathematics.

Haikal emphasized that his motivation to learn mathematics mostly comes from his teachers. She feels more enthusiastic and motivated because of the ADLX approach used by her teachers, which she says makes the understanding of the material deeper through direct experience and real examples.

Syafiq also stated that the main motivation for learning mathematics comes from his teachers who are able to make the material more interesting and relevant to daily life. Syafiq added that the ADLX approach allows him to dig deeper into the material and make learning more interactive and fun.

Overall, these interviews show that interactive learning approaches that are relevant to daily life, such as ADLX, applied by teachers have a great positive impact on students' motivation and understanding of mathematics. Teachers who are able to integrate real-life experiences and hands-on interactions in their learning can significantly increase student interest and learning outcomes.

Difference between Conventional Learning and ADLX

Conventional learning approaches and Active Deep Learning Experience (ADLX) offer different advantages in math learning, each with its advantages and disadvantages. Based on interviews with several students, there are a number of notable differences between these two learning approaches.

Haikal, in his interview, revealed that before using the ADLX approach, he felt that he was not deep enough in mathematics. After using ADLX, he felt an increase in understanding through real-life examples and hands-on actions that made the material easier to understand and apply in everyday life. "After using the ADLX approach, I feel more profound because there are real examples and direct actions," he said.

Syafiq stated that conventional learning only helps him understand the material for the day, while ADLX allows for further deepening. He added that the hands-on experience offered by ADLX makes it easier to understand mathematical concepts. "With ADLX, I can go deeper into the material," said Syafiq, emphasizing the benefits of ADLX in providing a deeper and long-lasting understanding.

Overall, interviews with students showed that ADLX provides a deeper and more meaningful learning experience than conventional learning. Hands-on experience and connecting concepts to everyday life are important elements that make ADLX more effective in improving student understanding and retention. This approach not only makes learning math more enjoyable but also allows students to internalize and apply the concepts learned in real-life contexts.

Challenges and Benefits of ADLX Implementation

In interviews conducted with students regarding the influence of the application of the Active Deep Learning Experience (ADLX) learning approach in mathematics, it

can be seen that the application of ADLX provides a number of significant challenges and advantages.

From the interview, it can be concluded that one of the main challenges in the implementation of ADLX is students' ignorance of the concept of ADLX itself and adaptation to new learning. Most students admitted that they were not very familiar with the ADLX concept and needed time to adapt. However, these challenges can be overcome with time, patience, and consistency in implementing ADLX learning. Some students revealed that by continuing to practice and understand more deeply, they were able to overcome this obstacle.

The benefits obtained from the implementation of ADLX are also quite significant. One of them is to increase students' understanding and motivation to learn mathematics material. With a more lively and relevant approach to daily life, students find it easier to understand and remember the material being taught. The use of examples from personal experiences also makes students more interested and motivated in learning.

In addition, hands-on experience and connecting the material with real life are considered the most helpful elements of ADLX in understanding mathematical concepts. Students revealed that through hands-on experience, they can more easily relate mathematical concepts to situations they experience on a daily basis, thus strengthening their understanding of the material.

The interviews also show the students' expectations to apply the ADLX learning approach in the classroom more often. They hope that ADLX learning will not only be used in mathematics but also in all fields of study because it is considered to be able to make learning clearer, relevant, and easier to understand.

Overall, the application of ADLX in mathematics learning provides significant challenges and benefits for students. With patience, consistency, and the right support, the ADLX approach has the potential to increase students' understanding and motivation in learning mathematics, as well as make learning more lively and relevant to daily life.

Discussion

This mixed method research combines quantitative and qualitative approaches to provide a comprehensive overview of how the ADLX learning method affects student learning outcomes. The quantitative approach involves collecting data through questionnaires and test questions as well as statistical measurements to identify the relationships between the variables involved, while the qualitative approach relies on in-depth live interviews to explore the student experience in more detail. The combination of these two methods not only allows researchers to obtain richer and more diverse data but also to confirm quantitative findings with qualitative evidence, thus providing a more holistic and valid understanding of the impact of ADLX on student learning outcomes in the context of mathematics learning.

The effect of motivation on the learning outcomes of Active Deep Learner Experience (ADLX)

Quantitatively, ANOVA regression analysis shows that the relationship between ADLX learning and student motivation is not significant, while the qualitative research results provide deeper insights into the factors that affect students' motivation in learning mathematics. Rasyid (2022) explained that the strength of mixed method research lies in its ability to handle diversity and differences in results. Similar to the findings in this study, the difference between quantitative and qualitative analysis is common in mixed methods. Therefore, a more holistic approach that combines statistical analysis with qualitative information is needed to comprehensively understand the factors that affect students' motivation to learn. (Harri, n.d2022).

The results of the ANOVA regression analysis test gave a result with a significance value (p-value) of 0.954 which was greater than the threshold of 0.05. This suggests that there is not enough statistical evidence to show that ADLX learning significantly affects students' motivation to learn mathematics based on the post-test data analyzed. These results show that the variation in student motivation cannot be significantly explained only by using a regression model that includes a posttest variable as a predictor at a significance level of 0.05.

Interviews with six college students showed that their motivation was influenced by a variety of internal and external factors. Internal factors include an understanding of the practical application of mathematics in everyday life, as expressed by Haikal and Syafiq. They feel motivated because mathematics material can be applied in various fields of science and everyday situations. This is in line with and in his writings states that students who participate in mathematics learning by solving daily problems will experience an increase in their learning outcomes. Research shows that when students understand the relevance of subject matter to their real life, their motivation to learn increases because they see the immediate benefits of the knowledge gained. (Nurlaily , 2019) (Widodo, n.d. 2019)

External factors, such as encouragement from teachers and a supportive learning environment, also play an important role. explained that teacher competence determines activities and learning outcomes. Competent teachers can design and implement interesting and relevant learning, thus motivating students to be more actively involved in the learning process. (Titu, 2023)

Interactive and experiential learning approaches, such as the ADLX approach, are cited by students as important factors that boost their enthusiasm for learning math. This approach shows that the role of expert teachers in presenting material in an interesting and relevant manner can significantly increase students' learning motivation. It also explains that students who are given active learning will have better motivation than students who do not. This is supported by research that states that active and creative learning can increase students' motivation in participating in learning. This statement emphasizes the importance of a learning approach that triggers student activity because it can make the learning process more interesting and challenging. This shows that ADLX learning that actively involves students in their learning activities can provide encouragement to students in learning activities. This approach not only makes students

more interested and motivated but also increases their understanding and retention of the material as they experience first-hand the application of the concepts learned (Muflihah , 2021) (Ramdania , 2020).

The ADLX approach is considered effective because it helps students understand mathematical concepts through concrete examples and hands-on experience, making the material easier to remember and understand. For example, students like Evan stated that the application of ADLX makes math learning more engaging and meaningful, especially when they can relate abstract concepts to real-life situations, such as counting the number of electric poles or understanding arithmetic sequences through the arrangement of seats in a movie theater. This example shows that the ADLX approach can change students' perception of math lessons from something abstract and difficult to something concrete and relevant in everyday life.

(Samtirin , 2023) explained that real-life problem-solving context-based learning can help students develop critical thinking skills through real-world contexts. This confirms that learning that takes advantage of the context of applying theory to cases that occur in the real world can not only make the material more interesting but also help students develop higher thinking skills.

Although the results of qualitative data analysis show the positive impact of ADLX learning, some students face challenges in adapting to this new learning approach and need time to get used to it. They suggest that ADLX should be applied more broadly across different fields of study to increase the relevance of concepts to students' daily experiences. This suggestion shows that the application of ADLX is not only beneficial for mathematics but can also be applied to other subjects to improve the relevance and understanding of concepts.

Overall, students' motivation to learn mathematics is influenced by the material's relevance to real life, its interactive and engaging teaching approach, and the support of teachers and peers. This research highlights the importance of creating a supportive and relevant learning environment for students, as well as the important role of teachers in designing effective and meaningful learning.

The effect of Active Deep Learner Experience (ADLX) learning on student learning outcomes in mathematics learning

The effect of the application of the Active Deep Learning Experience (ADLX) approach on student learning outcomes in mathematics learning shows significant results both quantitatively and qualitatively. According to Alqarny and Mujiburrohman (2023), ADLX is a learning approach that integrates in-depth activities and active learning experiences to improve students' conceptual understanding of learning activities. Based on the results of quantitative research, statistical analysis of test paired samples from pretest and posttest scores from 57 students showed a significant increase. The average score of the pretest was 70.80 with a standard deviation of 13.21, while the average posttest score reached 78.17 with a standard deviation of 12.65. The correlation between the pretest and posttest scores was very strong (0.884) with a significance value of 0.000, indicating that this increase was very significant. The mean difference of -7.37

with a 95% confidence interval of -9.03 to -5.71, and a t-value of -8.887 with a p-value of 0.000, showed that ADLX learning statistically significantly improved student learning outcomes. This finding is in line with research conducted by Riyanti (2021), which stated that the application of active and in-depth learning methods in mathematics can significantly improve students' conceptual understanding and academic achievement.

Qualitatively, in-depth interviews with six students revealed that ADLX had a significant positive impact on students' motivation and understanding in learning mathematics. ADLX involves the direct application of mathematics materials in daily life, as expressed by Haikal and Syafiq, which increases their motivation to learn. They emphasized that such ADLX learning helps them better understand mathematical concepts through real-life experiences and concrete examples, making the material easier to remember and understand. Alqarny and Mujiburrohman (2023) explained that this is due to active learning that is part of ADLX so that students are more motivated and achieve good learning outcomes (Ramdania, 2020). Active learning that involves students in concrete and relevant activities can make the learning process more fun and meaningful.

Engaging teacher teaching approaches, support of the learning environment, and involvement of personal experiences in the learning process also play a significant role in increasing students' enthusiasm for mathematics. This is in line with the opinion that teachers' teaching creativity involves efforts to create interesting, interactive, and meaningful learning experiences for students. In addition, it is argued that a supportive learning environment significantly improves students' motivation and performance in participating in mathematics lessons, suggesting that the role of teachers in setting up a supportive learning environment is very important in creating a conducive and inspiring learning atmosphere for students (Sari, et al., 2020). Juanti, et al. (2023). (Rahmiati , 2023) (Halim, 2020)

Furthermore, several other students interviewed stated that ADLX makes learning mathematics easier and relevant to real situations compared to conventional learning which tends to be abstract. Manurung (2020) explained that contextual learning can contribute positively to student learning outcomes. Contextual learning helps students see the relationship between theory and practice, so they can better understand and remember concepts. In addition, Siregar (2023) also stated that mathematics learning based on real problem solving can help students develop their mathematical logic. This approach allows students to apply mathematical concepts in real-life situations, which in turn improves their logical and analytical thinking skills.

Hands-on experience in the application of mathematical concepts, such as understanding arithmetic sequences through counting the number of electric poles or arranging seats in the cinema, makes students more able to remember and understand the material. These concrete examples help students connect theory with practice, making it easier for them to understand and remember the concepts being taught. According to research conducted by Ibrahim (2021), the use of real context in

mathematics learning can improve students' conceptual understanding and their ability to apply mathematical knowledge in everyday situations.

Although there are challenges in the early adaptation of ADLX learning, students generally agree that this learning brings improved memory and deeper understanding. This challenge may be due to students' previous habits about conventional learning methods. However, as time went by, students began to feel the benefits of the ADLX approach, especially in terms of increased understanding and retention of the material. This suggests that while adaptation to new methods may take time, its long-term benefits are significant in improving the quality of student learning.

The influence of the role of teachers in the implementation of ADLX is also very significant. Teachers who are able to integrate real-life experiences and hands-on interactions in their learning can significantly improve student interest and learning outcomes. This is in line with the research of Tjahjadi and Seleky (2022) which emphasizes the importance of the role of teachers in creating an effective learning environment. For example, Haikal feels more motivated to learn math because the ADLX approach used by his teachers makes a deeper understanding of the material through hands-on experience. Similarly, Syafiq stated that ADLX allows him to delve deeper into the material and make learning more interactive and fun.

Overall, the combination of quantitative and qualitative results shows that the application of ADLX in mathematics learning not only significantly improves learning outcomes but also increases student motivation and understanding through a more lively and relevant approach in daily life. Despite the challenges in early adaptation, the gains gained in improved memory and deeper comprehension make ADLX an effective learning approach with the potential for wider applicability across different areas of study. This is in line with those who state that learning activities and outcomes can be improved by adopting a more innovative and student-oriented approach to learning in mathematics education. (Hadi, 2019)

The effect of Active Deep Learner Experience (ADLX) learning on student learning outcomes in terms of student learning motivation.

Based on the results of the moderation regression analysis that has been carried out, it can be concluded that student learning motivation (Level Motivation) does not moderate the influence of Active Deep Learner Experience (ADLX) learning on student learning outcomes. This is shown by a very small interaction coefficient between ADLX and learning motivation of 0.009, with a p value of 0.821 which is well above the significance level of 0.05. This insignificant coefficient suggests that the increased interaction between ADLX and students' learning motivation has no significant effect on learning outcomes. In other words, the influence of ADLX on learning outcomes did not change significantly based on the level of student learning motivation. These findings show that the ADLX learning strategy in the context of this study is not influenced by the variation of student learning motivation in determining the learning outcomes. This suggests the need for further research to explore other factors that may be more influential or different methodological approaches to gain a deeper understanding of

how ADLX learning can improve student learning outcomes. This study also underscores the importance of considering other variables that can act as moderators or mediators in the relationship between learning strategies and learning outcomes.

On the other hand, qualitative interviews with six students provided deeper insights into how ADLX affects their motivation and learning outcomes. In general, students report that their learning motivation is influenced by the material's relevance to their daily lives and interactive and engaging teaching approaches. The use of ADLX, which involves hands-on experience and real-life examples, is considered effective in increasing understanding and motivation for learning math. This shows that a contextual learning approach to improve students' understanding of mathematics As explained by Ibrahim (2021), the use of context in mathematics learning can help students relate abstract concepts to real-life situations, thereby increasing their understanding and interest in mathematics. (Hadi, 2019).

Students such as Haikal and Syafiq emphasized that this approach helps them understand mathematical concepts better because the material becomes more concrete and memorable. This finding is in line with the research of Prahmana et al. (2021) which stated that realistic contextual learning in mathematics helps students build their own knowledge through hands-on experience so that abstract concepts become easier to understand and improve students' mathematical skills. Evan and other students also observed that before using ADLX, learning math felt more difficult and abstract, but after the implementation of ADLX, they felt they were better able to relate mathematical concepts to real situations, making learning more engaging and meaningful. This supports the findings of Sari, et al. (2021) who concluded that the use of a learning approach that prioritizes real experience can significantly improve student motivation and learning outcomes in mathematics.

In addition, the role of teachers is very significant in motivating students through the ADLX approach. Teachers who use the ADLX approach are considered able to make the material more interesting and relevant to daily life, which in turn increases student motivation and learning outcomes. This is expressed by students such as Syafiq and Aska, who state that this learning makes learning more lively and helps them understand the material better (Muflihah , 2021).

Although the quantitative results showed that the difference in learning outcomes based on motivation level was not statistically significant, the qualitative data revealed that ADLX had a large positive impact on student motivation and understanding. This finding is in line with the research of Arsyantika et al. (2023) which shows that interest and motivation have an important role in improving student learning outcomes, although the relationship is not always linear (Wijaya, 2019). The application of active learning using the ADLX approach in mathematics learning can make the material more relevant and interesting, thereby increasing student interest and learning outcomes (Arsyantika, 2023). Saputri et al., (2023) in their research also found that a learning approach that considers students' cognitive styles can improve mathematical problem-solving skills.

The challenges of adapting to learning with this new approach are acknowledged by the students, but they agree that with time and practice, the benefits of ADLX in improving their motivation and understanding of the subject matter are significant. The ADLX approach takes time to adapt, but the results are very positive in increasing students' motivation and understanding of the math material.

Conclusion

Based on the results of this study, several conclusions can be drawn. First, although the quantitative analysis did not show a significant association between students' learning motivation and ADLX, the qualitative findings revealed a substantial positive impact, where students were motivated to learn mathematics when associated with real-life situations and everyday experiences. Second, ADLX was shown to be effective in improving learning outcomes, with statistical analysis showing an increase in posttest scores compared to pretest and qualitative reports of students showing better comprehension and retention of the material. Third, although there was no significant correlation between motivation levels and learning outcomes in the quantitative analysis, qualitative data showed that ADLX was beneficial for students with varying levels of motivation, highlighting its potential as an effective learning approach. This research provides several suggestions, among which teachers are advised to adopt and develop the ADLX approach, creating a learning experience that is concrete and relevant to students' daily lives. The education office is expected to facilitate training and professional development for teachers in implementing ADLX and consider integrating ADLX principles into the curriculum. Researchers are further advised to conduct longitudinal studies to evaluate the long-term impact of ADLX on student motivation and learning outcomes, as well as explore the factors that affect the effectiveness of ADLX.

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