



## Implementation of ADERiC Learning Model and Student Interest in Problem-Solving Skills of the Students in Indonesia

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### ABSTRACT

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**Purpose** Problem-solving abilities are the most important factor in a student's success worldwide, and they may be developed utilizing the ADERiC (Accumulation, Demonstration, Exercise, Reflection and Creation) learning paradigm and student interest. This feature deserves the attention of researchers, and the current study explores the influence of the ADERiC learning model and student interest on the problem-solving skills of Indonesian students. The current research additionally analyzes the moderating effect of institutional support on the relationships between the ADERiC learning model, student interest, and problem-solving skills of Indonesian students. **Method** Using survey questionnaires, the researchers gathered primary data from students enrolled in Indonesian higher education institutions. The researchers also utilized SPSS-AMOS to examine the relationship between factors.

**Findings** The results demonstrated that the ADERiC learning model and student interest are positively associated with the problem-solving abilities of Indonesian students. The results also revealed that institutional support significantly moderates the relationship between the ADERiC learning model, student enthusiasm, and the problem-solving skills of Indonesian students. **Implications to Research and Practice** According to the research, using the ADERiC learning paradigm will enhance students' problem-solving abilities.

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## Introduction

Students are a nation's greatest asset. A nation's future existence and progress depend on the student's knowledge and skills. These students are economic forecasters, social reformers, economic players, intellectuals, philosophers, scientists, and doctors who will assist the economy in future (Fitriani et al., 2020). When students enter practical life (social, professional, or political), they face several new situations and must overcome many obstacles. Pupils must develop problem-solving abilities to respond to real-world scenarios and accept difficulties effectively. Having problem-solving skills enables you to do this. Some problem-solving talents include active listening, comprehension, research, analysis, communication, creativity, decision-making, and team management. These abilities assist individuals in identifying problems, generating potential solutions, prioritizing choices, selecting the best option, and evaluating results (Akben, 2020). When students have problem-solving abilities and the capacity to follow the problem-solving process effectively, they can better respond to complicated obstacles when conducting social lives or carrying out other responsibilities in the workplace. Achieving these students' goals contributes to economic sustainability, political stability, social welfare, and human growth. Due to the importance of problem-solving abilities to student achievement and their contribution to the nation, it must be studied to garner intellectuals' interest.

The development of problem-solving skills in students is contingent on the students' intents, the learning models they employ during their studies, and the institution's treatment of teachers and students (Peranginangin, Saragih, & Siagian, 2019). This study examines the role of student interest, the ADERiC learning model, and institutional support in developing problem-solving skills among college students. The Accumulation, Demonstration, Exercise, Reflection, and Creation (ADERiC) learning model includes random yet effective learning phases, as implied by its name. These learning processes include the accumulation of knowledge, the freedom to express one's thoughts, the application of principles or skills learned, reflection on what has been discovered, and the capacity to create something new. Using the ADERiC learning paradigm enables students to investigate their problems and acquire factual information, some practical experience, adaptability, and self-assurance so that they can resolve many types of issues (Ozturk & Ullah, 2022).

Student interest is students' disposition toward learning, carrying a specific subject, and excelling in the classroom. Students with a high level of interest are consistent in classes and assignments, driven, attentive, and foster a healthy level of competition. Students learn effectively and acquire problem-solving skills in these conditions (Hobri & IK, 2020). Institutional support is the management's encouragement of students and faculty members to fulfill their obligations through policies, laws, methods, and monetary and non-monetary aid. The institution's assistance fosters an environment in which students receive an excellent education and can develop problem-solving skills (Fadli, 2020).

This study investigates students' problem-solving abilities in the Indonesian higher education system. Indonesia is a growing nation with a lower middle income population. The country's Minister of Education, Nadiem, oversees an excellent higher education system. Recent estimates indicate that there are approximately 2,350 institutes of higher education that offer academic degrees, vocational degrees, and professional degrees (Nuryana, 2022). The government finances and administers several higher education

institutes. Among the 122 public education institutions are 63 public universities, 43 polytechnics, 12 institutes, and 4 community colleges. There are four Institutes of Technology, four Institutes of Arts, one Institute of Agriculture, and three Institutes of Cultural Arts (ISBI) among the public institutes (Rosser, 2023). One Electronic Engineering Polytechnic, one Maritime Polytechnic, two Manufacturing Polytechnics, one Fisheries Polytechnic, four Agriculture Polytechnics, one Shipbuilding Polytechnic, and 34 "generic" Polytechnics make up the public polytechnic institutes. The Ministry of Religious Affairs oversees public institutes of Islamic higher education. State Islamic Institutions (IAIN), State Islamic Universities (UIN), and State Islamic Colleges (STAIN) comprise these institutions (Aditya, Ferdiana, & Kusumawardani, 2022).

The breadth of the Indonesian higher education system is extensive, with several educational institutions serving various purposes. Despite this, many of the students generated by these institutes of higher education fail in their practice and do not perform effectively. These pose a threat to the nation's development and education system. Developing problem-solving abilities is a remedy for the existing situation. This study aims to investigate the effects of the ADERiC learning model and student interest on students' problem-solving abilities. It also intends to examine the relationship between institutional support, the ADERiC learning model, student interest, and student problem-solving skills.

It is not duplicating a scholarly article but a contribution to literature. First, the relationship between the ADERiC learning model, student interest, and student problem-solving skills has been extensively studied. Yet, most authors have discussed the individual relationships between the ADERiC learning model and student interest in problem-solving skills with only a few arguments. This article provides a detailed analysis of the relationship between the ADERiC learning model, student interest, and student problem-solving ability. Second, only the direct relationship between institutional support and students' problem-solving skills has been explored in earlier research. This research examines the moderating effect of institutional support on the relationship between the ADERiC learning model, student interest, and problem-solving skills. Thirdly, student failure is a concern in the Indonesian education system. It analyzes the influence of institutional support, the ADERiC learning model, and student interest in developing students' problem-solving skills for the first time.

### Literature Review

- *ADERiC learning model and problem-solving skills,*

This paper is divided into five sections. The second section examines, through the perspective of past research, the relationship between institutional support, the ADERiC learning model, student interest, and students' problem-solving skills. The third section describes the data gathering and analysis methods used for the research. In the fourth section, the results on the integrity of the research hypotheses are extracted, discussed, and compared to past relevant studies. Finally, a brief conclusion paragraph with implications and restrictions is presented.

Students require great problem-solving skills throughout their educational careers. While pursuing an education or leading practical lives as thinkers, philosophers, scientists, medics, reformers, or economic actors, students may encounter various challenging

conditions and complex obstacles. Children with problem-solving skills can do better because they respond effectively to unpleasant events and difficult obstacles. Institutional support, the ADERiC learning model, and student motivation enhance students' abilities and foster an atmosphere conducive to developing problem-solving skills (Yurtseven et al., 2021). The relationship between institutional support, the ADERiC learning model, student interest, and students' problem-solving abilities have been extensively examined by researchers and academics in the past. Various authors have seen the relationship between these parameters differently. Reviewing previous papers, the current study sheds insight into the relationship between institutional support, the ADERiC learning model, student interest, and problem-solving skills.

With the ADERiC learning approach, students acquire knowledge not only through classroom lectures. To clarify their concepts, people continue to absorb information from other sources, gain experience, and investigate the unknown. The increased breadth of knowledge, precision of concepts, and resulting confidence help pupils determine what is wrong with a situation and how to fix it. Thus, applying the ADERiC learning paradigm enables students to resolve issues (Kozikoglu, 2019). Syahrul (2021) examines the relationship between the ADERiC learning model, student motivation, the student replies, and students' problem-solving ability. Ten students at the University of Muhammadiyah Sorong provided information regarding implementing the ADERiC learning model, student motivation, the student replies, and problem-solving skills; data were analyzed using Pearson correlation and covariance approaches. The study hypothesizes that if the ADERiC learning model is taught to students and they properly execute it, they will absorb knowledge from all possible sources, learn through the exchange of ideas and clarity of thought, and never hesitate to accept new methods and procedures. This enhances students' cognitive ability and builds their confidence. Consequently, pupils learn problem-solving skills.

**H1:** *ADERiC Learning Model has a positive association with problem-solving skills.*

- ***Linkages between Student interest and problem-solving skills.***

Aslan (2021) conducted a study to determine the effectiveness of the ADERiC learning model and problem-based online learning about problem-solving skills, learning achievement, communication skills, and interaction. In the quantitative portion of the study, a quasi-experimental design with a control group and pre-and post-tests was utilized. The research sample consists of forty-five students from an eastern Turkish institution. The study suggests that under the ADERiC learning paradigm, students are not restricted to traditional learning methods to satisfy their desire for knowledge. Instead, students are driven to utilize innovative learning sources and develop creative thought. These pupils understand certain areas more deeply and employ inventive approaches to resolving subject-related challenges. Moreover, Hulaikah and Degeng (2020) investigate the relationship between the ADERiC Learning Model and problem-solving abilities. The study asserts that the ADERiC Learning Model promotes the growth of students' problem-solving skills. Hence, the hypothesis framed is :

Students' interest measures a student's predisposition toward acquiring knowledge about a certain topic, digesting it, enhancing it, refining it, and transforming it into a refined form. The student's passion for studying ensures sufficient, accurate, and genuine

knowledge that discloses several facts and enhances their judgment. Students can address and resolve situations with such information and sound judgment. [Simamora and Saragih \(2018\)](#) study the effects of student interest on mathematical self-efficacy and problem-solving abilities. Students at SMA Negeri 1 Pagaran, a school in Pagaran District, North Tapanuli Regency, Indonesia, were surveyed. The statistical analysis was carried out using SPSS 20. According to the study, students with a strong interest in learning materials, tutor lectures, and current learning methodologies acquire confidence in their abilities. The students with high self-efficacy gain the ability to solve difficulties and attain goals due to their knowledge.

[Hasibuan, Saragih, and Amry \(2018\)](#) examined the relationship between student engagement, learning autonomy, and problem-solving abilities. In 2017 and 2018, the study sample comprised students in grades VII-3 and VII-4 at SMP Negeri 5 Padangsidimpuan. These data were collected using the Teacher's Book, Student Book, Learning Implementation Plan, Student Worksheet, test scores, and Questionnaires. The study hypothesizes that students with a strong interest in general or professional education are more open-minded and autonomous learners. Students can develop problem-solving abilities through independent learning outside of the classroom. Consequently, student interest contributes to the development of problem-solving abilities. [Ciftci and Durusu-Ciftci \(2022\)](#) study the relationship between student interest and the development of problem-solving skills. The study suggests that tutors are attentive and assist students in developing problem-solving skills if students demonstrate an interest in the class and enthusiasm for the allotted task. Based on the above discussion, the following hypothesis can be formulated:

**H2:** *Student interest has a positive association with problem-solving skills.*

- ***Role of Institutional support in learning model and problem solving skills***

Institutional support is the aid and encouragement that an institution provides to its administrative and teaching faculty and students utilizing various cognitive, emotional, and physical strategies. When a school creates a helpful environment, it gains the loyalty of its employees. Effective staff involvement in educating students polishes their skills, enhances their performance, and facilitates the development of problem-solving skills ([Fauza et al., 2022](#)). [Wu et al. \(2021\)](#) investigate the connection between institutional support, the ADERiC Learning Model, and problem-solving abilities. Suppose institutions have supportive policies and want students' wellbeing to the greatest extent possible. In that case, they introduce effective learning models, such as the ADERiC Learning Model, to students and assist in their efficient implementation.

In addition, organization assistance helps students benefit from effective learning sources and develop cognitive skills such as observation, critical thought, judgment, courage, evaluation, etc. Students with ADERiC Learning Model and cognitive skills can acquire problem-solving abilities. The relationship between institutional support, the ADERiC learning model, and students' problem-solving skills is investigated by [Lolonlun et al. \(2022\)](#). For the investigation, experimental methods in the form of pre-experimental designs were utilized. This study employs a sample of 19 Muhammadiyah University of Sorong students enrolled in the fourth semester of mathematics instruction. Analyses used the normalcy test, descriptive statistics, and hypothesis testing. [Andrews-Todd et al. \(2022\)](#)

investigate the connection between institutional support, the ADERiC Learning Model, and problem-solving abilities. The study demonstrates that institutional support facilitates the implementation of the ADERiC Learning Model and enhances problem-solving skills. In the light of these facts, the hypothesis formed is:

**H3:** *Institutional support significantly moderates ADERiC Learning Model and problem-solving skills.*

- ***Role of institutional support in student interest and problem-solving abilities***

When students are supported by their educational institution, they have access to efficient tutors, the most recent course of study, and sophisticated learning tools; yet, they are also constrained by time and space constraints. Students discover something creative, interesting, and educational in such situations. These students become more interested in their schooling and driven to learn. Students' improved performance enables them to solve a variety of challenges. Consequently, institutional support strengthens the connection between student interest and problem-solving abilities (Rahman, 2019). Lin (2019) investigates the relationship between student attention, perception, performance, and problem-solving skills using flipped classrooms and smart technologies. The research sample consists of students in Taiwan's educational system. Data were collected using a prior knowledge exam, a learning attitude questionnaire, a learning motivation questionnaire, a learning achievement test, and a problem-solving ability questionnaire. IBM SPSS was used for the outcomes of data analysis. According to the study, if educational institutions embrace supportive conduct, student engagement and contribution to the development of problem-solving skills improve. The relationship between student engagement, student perception, student performance, and problem-solving skills is investigated in a literary piece by Putri and Dwikoranto (2022). The study hypothesizes that students who receive assistance from organizational management through learning resources, the alleviation of anxiety, and a conducive learning environment develop an interest in learning and devote significant time to learning processes. And when kids take a great interest in their studies and extracurricular activities to enhance their knowledge and skills, they can develop their situational awareness and mentality. Students are, therefore, prepared to develop problem-solving skills. The literature review helps substantiate the following hypothesis:

**H4:** *Institutional support significantly moderates student interest and problem-solving skills.*

## **Research Methods**

- ***Research Design***

Using the quantitative research design, this study examined the influence of the ADERiC learning model and student interest on the problem-solving skills of Indonesian students, as well as the moderating effect of institutional support on these relationships.

- ***Sample Selection***

The respondents of the study comprised students enrolled in Indonesian higher education institutions. A sample of 298 students was selected for this study through purposive sampling method.

- **Instrumentation**

A questionnaire was designed for this study by utilizing the original data from higher education students, and from previous literature. For instance, the ADERiC learning model utilized five items from Kahar et al. (2023), student interest took four items from Sutarto, Sari, and Fathurrochman (2020), problem-solving skills borrowed four items from Araiza-Alba et al. (2021), and institutional support was measured with four items from Li, Bonn, and Ye (2019).

- **Data Collection Procedures and analysis**

The questionnaires were sent to the students by personal visit. The researchers mailed approximately 524 surveys, but only 298 were returned, representing a response rate of roughly 56.87 percent. In addition, the researchers utilized SPSS-AMOS to examine the relationship between the variables. It is an effective instrument for analyzing primary data. It yields the greatest outcomes despite the researchers' usage of intricate models. In addition, the researchers employed the ADERiC learning model (ADERiCLM) and student interest (SI) as predictors. In addition, the researchers used a moderating variable institutional support (IS) and a dependent variable problem-solving skills (PSS). These structures are shown in Figure 1.

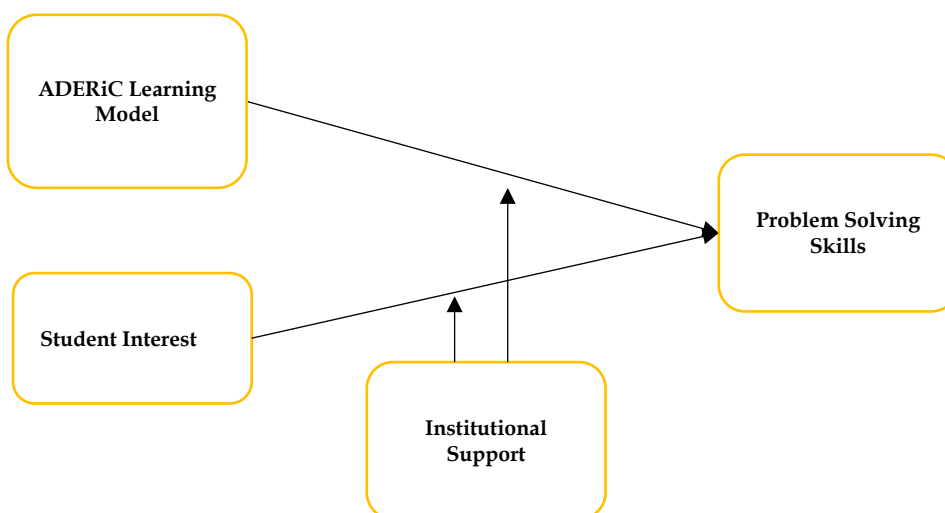


Figure 1: A research framework

### Results And Findings

Right at the outset, the study examined the correlation between items utilizing factor loadings and found values greater than 0.50, composite reliability (CR) values greater than 0.70, and average variance extracted (AVE) values greater than 0.50. In addition, the results indicated that the values for Maximum Shared Variance (MSV) and average Squared Shared Variance (ASV) were less than AVE. These results suggested a strong link between the items. These outcomes are provided in Table 1.



**Table 1**

*Convergent validity*

	Constructs		Loadings	CR	AVE	MSV	ASV
SI1	<---	SI	0.857	0.911	0.721	0.294	0.269
SI2	<---	SI	0.942				
SI3	<---	SI	0.863				
SI4	<---	SI	0.720				
PSS1	<---	PSS	0.804	0.789	0.612	0.519	0.507
PSS2	<---	PSS	0.842				
PSS3	<---	PSS	0.563				
PSS4	<---	PSS	0.544				
IS1	<---	IS	0.802	0.768	0.528	0.489	0.447
IS2	<---	IS	0.754				
IS4	<---	IS	0.609				
ADERiCLM1	<---	ADERiCLM	0.912	0.839	0.523	0.438	0.343
ADERiCLM2	<---	ADERiCLM	0.880				
ADERiCLM3	<---	ADERiCLM	0.601				
ADERiCLM4	<---	ADERiCLM	0.507				
ADERiCLM5	<---	ADERiCLM	0.625				

**Note:** PSS: Problem-Solving Skills; IS: Institutional Support; SI: Student Interest; ADERiCLM: ADERiC Learning Model

The study used Fornell Larcker to examine the correlation between the variables, and the results revealed that the first value was greater than the other values in the column. These results demonstrated a low correlation between factors. These results are shown in Table 2.

**Table 2**

*Discriminant validity*

	PSS	SI	ADERiCLM	IS
PSS	0.801			
SI	0.542	0.849		
ADERiCLM	0.662	0.524	0.723	
IS	0.588	0.488	0.561	0.826

**Note:** PSS: Problem-Solving Skills; SI: Student Interest; ADERiCLM: ADERiC Learning Model; IS: Institutional Support;

In addition, the study verifies the model's good fitness by determining that Tucker-Lewis index (TLI) values are greater than 0.90, comparative fit index (CFI) values are greater than 0.90, and root mean square error of approximation (RMSEA) values are less than 0.10. These results demonstrated the model's validity. These results are listed in Table 3.

**Table 3**

*Model Good Fitness*

Selected Indices	Result	Acceptable level of fit
TLI	0.922	TLI > 0.90
CFI	0.931	CFI > 0.90
RMSEA	0.002	RMSEA < 0.05 good; 0.05 to 0.10 acceptable

**Note:** TLI: Tucker-Lewis index; CFI: Comparative Fit Index; RMSEA: Root Mean Square Error Of Approximation



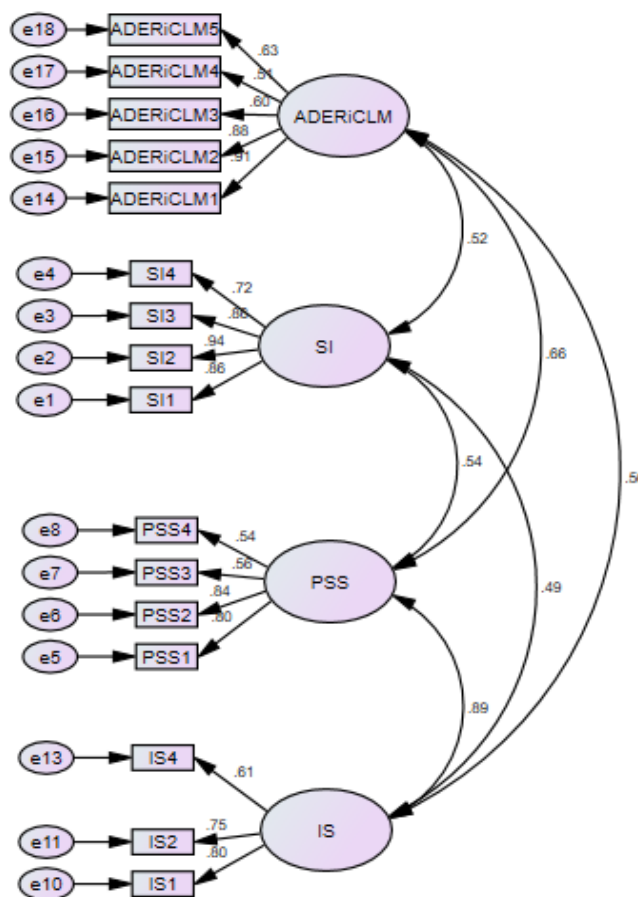


Figure 2: Measurement model assessment

Based on the findings that the ADERiC learning model and student interest favorably correlate with Indonesian students' problem-solving skills, H1 and H2 were accepted. The results also reveal that institutional support moderates considerably between the ADERiC learning model, student interest, and problem-solving skills of Indonesian students. Thus hypotheses H3 and H4 are also accepted. These results are shown in Table 4.

Table 4

A path analysis

	Relationships	Beta	Std. Beta	SE	CR	P
Problem-Solving Skills	<-- ADERiCLM x IS	0.070	0.359	0.005	12.791	0.000
Problem-Solving Skills	<-- ADERiC Learning Model	0.044	0.038	0.012	3.667	0.000
Problem-Solving Skills	<-- Institutional Support	0.374	0.298	0.035	10.630	0.000
Problem-Solving Skills	<-- Student Interest	0.552	0.469	0.033	16.704	0.000
Problem-Solving Skills	<-- SI x IS	0.106	0.517	0.006	18.426	0.000

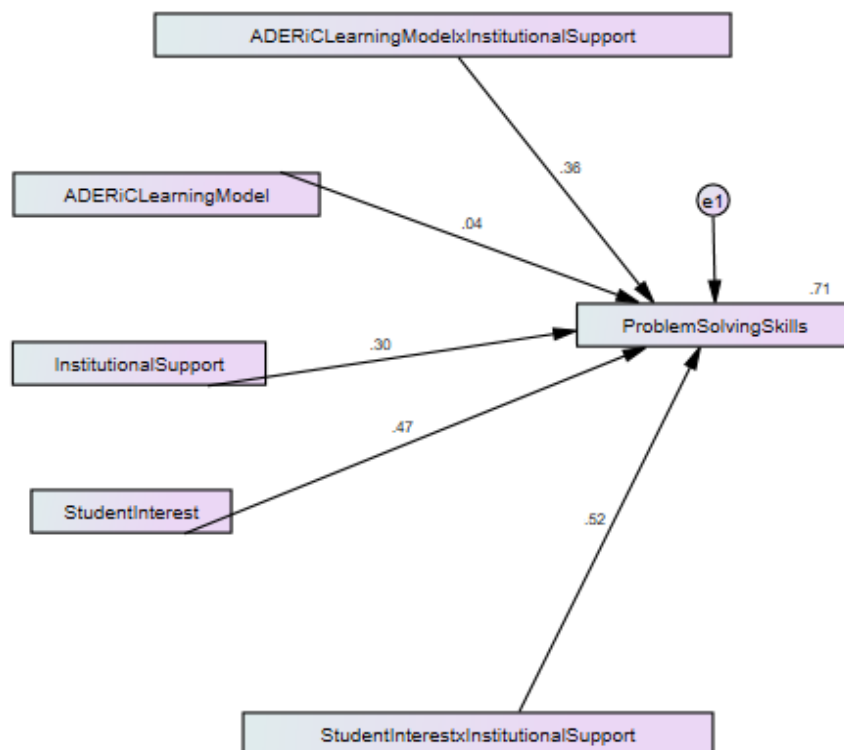


Figure 3: Structural model assessment

### Discussion

The findings demonstrated that the ADERiC Learning Model positively correlates with problem-solving abilities. The results are consistent with Güleç (2020) assertion that implementing the ADERiC Learning Model increases students' willingness to learn, confidence in their learning abilities, and learning progress. Motivated and attentive students can acquire the problem-solving skills necessary for success. These findings concur with Yildiz Durak (2020) assertion that students' adoption of the ADERiC Learning Model encourages them to maintain their battle to gain knowledge from external sources, process the acquired knowledge, and clarify their conceptual understanding. So, with more knowledge and clear conceptions, the learner can manage the situation and eliminate issues.

The results also demonstrated a strong correlation between student interest and problem-solving abilities. The results are consistent with Tambunan (2019), which examines the influence of student interest in the problem-solving skill development of students. According to the study, if students are interested in the subject they are learning, they are internally motivated and pay greater attention while acquiring knowledge. These students learn effectively and develop problem-solving skills. Hence, student interest enhances problem-solving skills. Albay (2019) asserts that student interest in learning keeps

them alert, enabling them to identify obstacles in the path of knowledge or specific social, economic, and traditional issues, and motivates them to find answers. Thus, student curiosity leads pupils to adopt problem-solving skills.

The results demonstrated that institutional support moderates the relationship between the ADERiC Learning Model and problem-solving abilities. According to [Pongsakdi et al. \(2020\)](#), if educational institutions provide support for students, effective learning models such as the ADERiC Learning Model are introduced to students, and they are assisted in adopting this model. The supported institutions also aid students in developing problem-solving skills. Hence, the link between the ADERiC Learning Model and problem-solving abilities strengthens. These findings are also consistent with [Üredi \(2020\)](#) examination of how support from educational institutions to students and teachers facilitates the application of the ADERiC Learning Model and, consequently, the development of problem-solving skills.

Results suggested that institutional support significantly moderates the relationship between student engagement and problem-solving skills. The results are consistent with [Sutarto et al. \(2020\)](#), which asserted that a supportive climate in an educational system provides students with the comfort that they will receive assistance; they become less confused and more actively engaged in the learning process. This stimulates kids' enthusiasm for learning. As pupils acquire new information with enthusiasm, they can solve issues. These findings are also consistent with [Lawner et al. \(2019\)](#) Weltz's assertion that the development of problem-solving skills demands students' attention. If pupils have institutional support, they may develop a greater interest in learning and problem-solving skills.

### Conclusion And Implications And Limitations

The study aimed to examine the relationship between the ADERiC learning model, student interest, and students' problem-solving abilities, as well as the function of institutional support. The authors engaged with respondents in Indonesian educational institutions to collect primary data on institutional support, the ADERiC learning model, student interest, and problem-solving skills. The results demonstrate that the ADERiC learning paradigm and student interest in problem-solving skills are significant. According to the findings, students that embrace the ADERiC learning model boost their knowledge and build intrinsic motivation, self-confidence, learning management, and decision-making skills. As a result, children might acquire problem-solving skills. In addition, the results demonstrated that students' interest keeps them attentive in class, that they learn well from their course of study and professors' conversations, and that they engage in self-learning. Students may therefore possess problem-solving abilities.

According to the survey, institutional support moderates the relationship between the ADERiC learning model, student interest, and problem-solving skills. Effective adoption of the ADERiC learning model is facilitated by institutional assistance, allowing students to demonstrate problem-solving abilities. Similarly, when there is institutional support, students' curiosity grows, which is essential for developing problem-solving skills.

Due to its addition to the education literature, the study supplies academics with useful guidelines. This paper investigates the effects of the ADERiC learning model and student

interest on students' problem-solving skills. This research examines the moderating effect of institutional support on the relationship between the ADERiC learning model, student interest, and problem-solving skills. Investigating the function of institutional support, the ADERiC learning model, and student engagement in students' problem-solving skills in the Indonesian education system is one of the study's major contributions to the literature.

This study would benefit the nation's education system in preparing human capital. It instructs the administration of educational institutions on how to foster students' problem-solving abilities. The study instructs educational administration to adopt the ADERiC learning model with students to enhance their problem-solving skills. This study guides for education management to establish policies that stimulate student interest and hence promote the growth of problem-solving abilities. According to the research, using the ADERiC learning paradigm will enhance students' problem-solving skills. It suggests that teachers and students should receive institutional support to implement the ADERiC learning paradigm and develop student problem-solving skills. In addition, the study indicates that the institution should promote student engagement and problem-solving abilities

There are numerous restrictions associated with this article. In future research, these constraints should be addressed to. In the current study, the authors have discussed only two criteria that have a direct association with the problem-solving ability of students: ADERiC learning paradigm and student interest. The study is limited since the few aspects suggesting the development of problem-solving skills have not been mentioned. To address the underlying issue, researchers should enhance the quantity of indicators. In addition, researchers undertake a study of the Indonesian education system to gather data regarding the relationship between institutional support, the ADERiC learning model, student interest, and students' problem-solving skills. The facts from a single economy cannot be utilized to derive equally valid outcomes as reader instructions. Future scholars must also undertake a comparison assessment of various education systems to provide generalized findings.

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