The Advantages of Aptitude Treatment Interaction Model in Mathematics Learning

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Abstract

This study aims to highlight the benefits of employing the aptitude treatment interaction model in mathematics education using research from the past ten years. In this study, a systematic literature review of 15 relevant journals was used to meet inclusion and quality criteria. It was discovered that research utilizing the aptitude treatment interaction model originated at the elementary, middle, and university levels. The application of the aptitude treatment interaction model to the learning of mathematics at the elementary, junior high, high school, and tertiary levels demonstrates a very high level of success. One of the inputs written in the article is that a teacher must make good preparations when applying the aptitude treatment interaction model in learning and that the teacher must know the student's abilities well. This is in line with the results of the analysis of the research and some of the inputs provided by the author. If the teacher groups students incorrectly, then the students will also receive incorrect treatment.

Keywords: *aptitude treatment interaction*

Abstrak

Penelitian ini bertujuan untuk menyoroti manfaat penggunaan model interaksi aptitude treatment dalam pendidikan matematika dengan menggunakan penelitian dari sepuluh tahun terakhir. Dalam penelitian ini, tinjauan pustaka sistematis terhadap 15 jurnal yang relevan digunakan untuk memenuhi kriteria inklusi dan kualitas. Ditemukan bahwa penelitian yang menggunakan model interaksi aptitude treatment berasal dari tingkat SD, SMP, dan universitas. Penerapan model interaksi perlakuan bakat pada pembelajaran matematika di tingkat SD, SMP, SMA, dan perguruan tinggi menunjukkan tingkat keberhasilan yang sangat tinggi. Salah satu masukan yang ditulis dalam artikel tersebut adalah bahwa seorang guru harus melakukan persiapan yang baik ketika menerapkan model interaksi perlakuan bakat dalam pembelajaran dan bahwa guru harus mengetahui kemampuan siswa dengan baik. Hal ini sejalan dengan hasil analisis penelitian dan beberapa masukan yang diberikan oleh penulis. Jika guru salah mengelompokkan siswa, maka siswa juga akan menerima treatment yang salah.

Keywords: *bakat Perlakuan Interaksi*

INTRODUCTION

Creativity is the foundation of human life. Based on the importance of having creativity and understanding e-learning in life, a way is needed to identify procedures that underlie the contribution to creativity learning in an e-learning environment, that's why a way is needed to design effective learning programs to enhance their creativity (Yeh & Lin, 2015). The aptitude treatment interaction model is one of the learning models that can be used to encourage student creativity in the application of learning. (Maskur et al., 2020) said that the aptitude treatment interaction model can be done with the phases of an instructor giving introductory treatment as a work to fabricate the development of understudies' innovative

reasoning skills (Syahrir et al., 2019). Furthermore, in the aptitude treatment interaction model, students will be grouped and then the teacher will provide follow-up in the form of treatment according to the ability level of each student. (Serlina & Leonard, 2020) states that the Aptitude Treatment Interaction model is a cooperative learning method developed by Slavin. The aptitude treatment interaction model is widely used to improve students' abilities. A learning model called aptitude treatment interaction includes a number of learning strategies (treatments) that are used to effectively teach students based on their abilities. (Syafruddin, 2005), furthermore (Saregar et al., 2017) states that the aptitude treatment interaction model is a learning model that uses a variety of specific treatments that are given to students effectively based on their ability level. (Pirayanti, 2012; Fuchs, Schumacher, Sterba, Long, Namkung, Malone, & Changas, 2014). furthermore (Lehmann et al., 2016) wrote that the prior knowledge of students compensates for instructional shortcomings (Mayer dan Sims 1994). The aptitude treatment interaction model reveals that learning results will be optimal when the instructions or treatment given are in accordance with the talents of the learner.

METHODS

A comprehensive literature review was used for this study. A methodical writing survey was directed by reporting and evaluating the nature of the investigations (Litte et al., 2008) and adheres to a procedure (detailed plan) that first outlines the organization's primary objectives, ideas, and methods (Juandi, 2021).

RESEARCH QUESTION DEVELOPMENT

The author formulates the following research questions:

a. How has research on the application of aptitude treatment interaction models progressed over the past ten years?

b. In terms of learning mathematics, what are the benefits of employing the aptitude treatment interaction model?

SELECTION CRITERIA

Table 1 displays the selection criteria for this study's articles.

Table 1. Selection Methods

Acceptance/Rejection	Criteria
Inclusion (acceptance)	1. Research results in articles published by publishers from Indonesian journals, international journals or proceedings. 2. Discussion of the articles used in relation to the subject of the research. 3. Publication of utilized articles between 2014 and 2023.
Exception (rejection)	1. Articles are not published research findings from international journals, Indonesian journals, or proceedings. 2. Conversation of articles utilized external the exploration subject. 3. publication of the article before 2014.

DEVELOP A SEARCH STRATEGY

This study used an electronic database search strategy to gather research articles on the analysis of the application of the aptitude treatment interaction model in Indonesia over the past decade, such as; SINTA, ERIC, IOP Science, and Springer journals, in addition to Google Scholar. The pursuit string is:

a. Aptitude treatment interaction

b. Learning mathematics through interaction of aptitude treatment

c. In Indonesia, the application of the aptitude treatment interaction model to the study of mathematics

To avoid filtering a large number of articles, the above search string is required to obtain more specific search results.

CONCENTRATE ON CHOICE INTERACTION

The discovered journal articles are subject to a screening or selection procedure. To determine whether or not the conducted research met the selection criteria, screening was carried out.

QUALITY ASSESSMENT OF STUDY

The following questions from the quality assessment criteria will be used to evaluate the gathered data:

QA1. Is the article utilized the consequence of exploration?

QA2. Was the used article published in the last ten years?

QA3. Does the article present a research issue pertinent to this study?

QA4. Does the article explain how the aptitude treatment interaction model is used to teach mathematics?

For each article used, an answer value based on the question above will be given with Y (Yes) or N (No).

SYNTHESIS RESULTS

Then carry out the data synthesis stage. Data synthesis is used to collect evidence from selected studies to answer questions in this study.

DISCUSSION AND RESULTS

As many as 661 articles related to the analysis of the application of aptitude treatment interaction were found in the Google Scholar search results. The author selected 23 articles in accordance with the inclusion criteria. The writer then continues to survey the nature of the exploration results and decides upwards of 15 examination articles that meet the rules. Figures (1) and (2) show the results of a 15-article search and discussion to answer the research questions.

IN MATHEMATICS LEARNING, DEVELOPMENT OF RESEARCH WITH THE APTITUDE TREATMENT INTERACTION MODEL

The improvement of exploration on the utilization of the fitness treatment connection model in learning arithmetic in Indonesia with the accompanying subtleties:

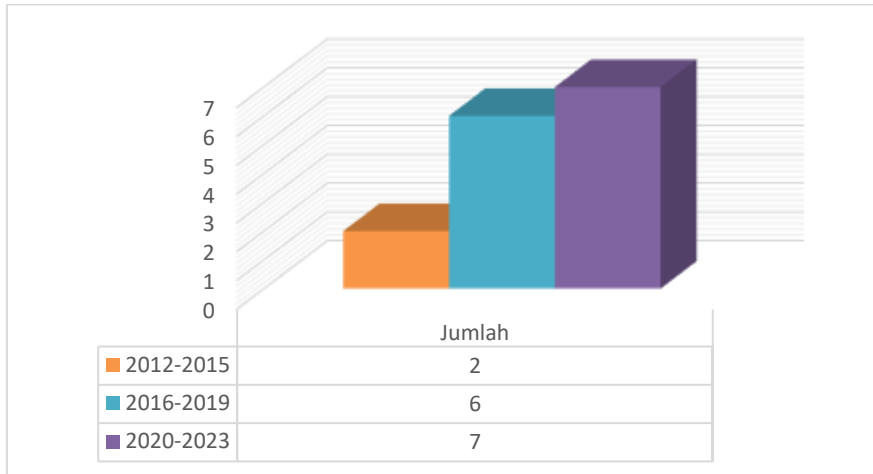|	Jumlah
■ 2012-2015	2
■ 2016-2019	6
■ 2020-2023	7

Figure 1. Results of Aptitude Treatment Interaction Research Development Analysis

The progression of research utilizing the aptitude treatment interaction model in learning is depicted in the aforementioned table. The number of studies is increasing, and they will continue to do so until early 2023.
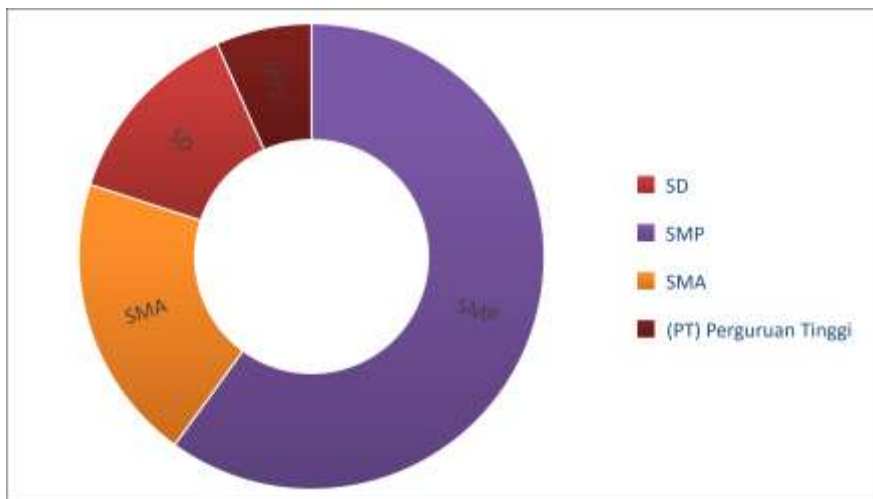

Figure 2 Analysis Results of Using the Aptitude Treatment Interaction Model in Learning

According to the data presented in the table above, the majority of aptitude treatment interaction model-based learning occurs at the junior high school and equivalent levels. The aptitude treatment interaction model is also used at the elementary, high school, and university levels.

DETAILS OF THE ANALYSIS OF HOW THE APTITUDE TREATMENT INTERACTION MODEL IS USED IN THE LEARNING OF MATHEMATICS

1) An investigation into the application of the aptitude treatment interaction model to the teaching of elementary school mathematics

   There are 2 articles that look at how the aptitude treatment interaction model is used in education, namely in class V elementary school students in region I Pangkajene, Pangkep Regency; The study shows that students' understanding of concepts and motivation to learn mathematics are significantly impacted by the aptitude treatment interaction model. Students find it easier to comprehend the material when they use the aptitude treatment interaction model in learning because they can learn with other students at their level of ability. so every understudy won't feel the rise of rivalry in dominating the material (Syamsuddin et al., 2022). The results of the study of class VI students at SDN 01 Cibalung; revealed that the use of the aptitude treatment interaction model can improve students' mathematical communication skills, it is also stated that the aptitude treatment interaction model is very effectively applied to students according to differences in student abilities (Lusi Rahmawati, 2021).

2) An investigation into the application of the aptitude treatment interaction model to the study of mathematics instruction in junior high schools

   Research into the application of the aptitude treatment interaction model to the learning of mathematics at the junior high school level was conducted in 4 articles for class VII, 4 articles for class VIII and 1 research article for class IX students. Several Indonesian schools were the sites of junior high school-level research., namely: class VII students at the Abinnur Al-Islami Boarding School, The aptitude treatment interaction model outperformed conventional learning models in terms of students' comprehension

of the subject matter and mathematical concepts, according to the findings (Nur Saidah Arifin, Haida Fitri, Rusdi, 2023). The results of the research that was carried out at SMPN 4 Rancah in class VIII, showed that during the learning activities students were active as a group or individually, this conclusion can be seen from interactions that can go well between teachers and students, students have high courage to ask questions and ask for the teacher's direction in completing the assigned task (Nuraini et al., 2022). The results of research that has been carried out at SMPIT Al-Azhar Banda Aceh in class VII, shows that grouping students according to their cognitive ability has numerous advantages, including: giving comfort to educators while showing in class, making it simpler for an educator to control the most common way of giving guidelines and can reinforce understudy accomplishment. The aptitude treatment interaction model's shortcomings include the need for effective time management and the teacher's requirement to divide students into three groups based on their abilities; if the teacher groups students incorrectly, students will receive incorrect treatment (Septiana et al., 2021). The research results of class VII students of MTS ANNUR Karang Rejo, show that the use of the aptitude treatment interaction learning method can improve the ability to understand students' mathematical concepts compared to students who receive instruction using conventional learning models (Dewi, 2020). The results of research at SMPN 10 Batam in class VII show that the aptitude treatment interaction model is effectively used to improve student learning outcomes. This can be seen based on the average post-test score of the experimental class which is higher than the average post-test score of the control class (Bagindo & Yulia, 2019). The results of research at SMPN 2 Bangkinang Pekanbaru in class VIII revealed that the use of the aptitude treatment interaction model in learning mathematics had a significant optimization of learning outcomes and this was obtained through adjustments between the treatment given and the differences in students' abilities, it was also found that good preparation the application of the aptitude treatment interaction model is needed so that teaching and learning activities can run effectively and meaningfully (Fitri, 2017). The results of research at SMPN 1 Tarogong Kidul in class VIII students reveal that although the aptitude treatment interaction model has been proven to be able to increase students' mathematical understanding, teachers

are expected to be able to provide more stimulus to students by giving questions so that their mathematical understanding abilities can increase (Pamungkas & Afriansyah, 2017). The results of research at SMPN 2 Makasar in class IX students showed that there was an increase in student learning outcomes when the learning process was carried out by applying the aptitude treatment interaction model to groups of students with different abilities in field dependent cognitive style (Kusumawati & Ruslan, 2016). Research conducted at SMPN 25 Pekanbaru in class VIII, states that the aptitude treatment interaction model is proven to be effective in optimizing the results of student academic achievement so that a reciprocal relationship can be built between the setting of learning conditions in class and the academic achievement achieved by students. (Herlina, 2015).

3) An investigation into the application of the aptitude treatment interaction model to the teaching of mathematics at the senior high school level

There are 3 research articles that analyze the use of the aptitude treatment interaction model's application to mathematics education, namely: research conducted at SMAN 1 Petang on students of class XI MIPA 2, Using the aptitude treatment interaction model has been shown to significantly improve students' creative thinking and math skills, according to the study's findings (Saraswati et al., 2020). Research conducted at Perintis 1 Vocational School Depok and Fajar Depok Vocational School in class X students showed that the fitness treatment collaboration model with assignment and power procedures was shown to have the option to work on understudies' thinking skills in arithmetic and can increment understudy action. By giving routine assignments, students will be familiar with all the assignments given (Serlina & Leonard, 2020). The results of research conducted at SMA East Sumba Regency in class X students demonstrated that in terms of students' self-confidence and ability to comprehend mathematical concepts, learning in the discovery learning model using an aptitude treatment interaction strategy was superior to learning in the unmodified discovery learning model. (Inda & Widjajanti, 2019).

4) An investigation into the application of the aptitude treatment interaction model to university-level mathematics instruction

There is 1 research article that analyzes the use of the aptitude treatment interaction model in learning mathematics at the tertiary level. The research was conducted on first semester students of the 2013/2014 academic year majoring in mathematics education at UIN Suska Riau (Eko Suhendra & Risnawati, 2021). From the results of an analysis of the use of the aptitude treatment interaction model in mathematics learning It is well established that the aptitude treatment interaction model and problem-based instruction learning model are the best options for enhancing problem solving. because students with the aptitude treatment interaction approach are grouped based on ability so that they will more easily construct their own knowledge to find solutions to problems based on their interests and experiences.

CONCLUSION

According to the findings of this study's data analysis, there were a total of 15 articles that met the inclusion criteria and quality assessment out of 661 research articles searched in the Google School database over the past decade. The results of the analysis of the utilization of the aptitude treatment interaction model in the learning of mathematics in Indonesia are discussed in research articles that come from reputable publication sources and proceedings. Every year, more and more research is being done on the use of aptitude treatment interaction models in mathematics education in Indonesia. The aptitude treatment interaction model's success rate in mathematics education in Indonesia is of great interest to researchers. From elementary, middle, and high school all the way up to university, the research was carried out at all educational unit levels. The degree of accomplishment acquired from utilizing the fitness treatment collaboration model in learning arithmetic at the rudimentary, middle school, secondary school and tertiary levels is extremely high. In accordance with the findings of the written analysis of the research, the author provided the following input: The teacher must have good preparation in order for learning and teaching activities to run smoothly, and it is expected that the teacher will be able to correctly

recognize student abilities because if the teacher groups students incorrectly, students will be treated incorrectly.

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