



How Mobile Learning as Mindtools Affects Decision-Making Ability in Autistic Children?

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Abstract

Mobile learning as mindtools for children with autism is flexible, independent of time and place. This study aims to determine how mobile learning as mindtools affects decision-making abilities in children with autism. This research is an experimental research aimed at students with special needs with limited subjects. Single Subject Research (SSR) was chosen as the research design which is also part of the experimental research. The analysis in this study uses descriptive analysis with graphs. The data are analyzed based on individual data obtained. In this study, four children with autism type Asperger syndrome were taken at the Extraordinary Junior High School (SMPLB) level as research subjects. The research subjects or the first participant from PKLK Insan Istimewa Magetan, the second participant from SLB Panca Bhakti Magetan, the third and fourth participants from SMPLB Insan Istimewa Panekan Magetan. The research data was collected using observation, questionnaire and test techniques to test the effect of mobile learning as mindtools on decision making skills in learning children with autism. The results showed that using the mobile learning model media can reduce the frequency of subject errors in working on decision-making questions. Thus the mobile learning model media can affect the decision-making ability of research subjects which is characterized by a reduced frequency of error behavior in working on decision-making questions.

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1. Introduction

The development of educational technology has been recognized as having a significant influence in the world of education with the presence of increasingly massive transformations of learning technology today. Education is faced with a tremendous technological acceleration. Learning that was previously only done in classrooms or offline learning, can now be done online in various places and in

various conditions as a result of the acceleration of technology (Bonete, Molinero and Garrido-Zurita, 2022). Learning in the 21st century provides freedom and independence in learning for students. The relevance and acceleration of knowledge demands new innovations and transformations in learning technology in today's new learning era (Zeid and Kk., 2022).

In learning for children with autism in special schools as well as in regular or



inclusive schools requires the integration of media, relevant learning resources and technology that is in accordance with the characteristics of children with autism by emphasizing personalized learning. Learning in the 21st century requires three abilities that must be mastered by students, including: (1) learning and innovation skills, (2) skills in information media and technology (information media and technology skills), (3) life and careers skills (Mergany, Dafalla and Awooda, 2021).

In line with the birth of a new policy in learning under special conditions based on the circular letter of the minister of education number 4 of 2020 regarding policies for implementing education during the spread of Corona Virus Disease which is usually abbreviated as the COVID-19 period. The learning system for children with autism is also implemented by utilizing mobile learning as mindtools through existing mobile technologies such as smartphones, laptops, personal computers (PCs) that are also connected to an internet network connection. Learning for children with autism can be done through social media such as: WhatsApp (WA), telegram, Instagram, video conference media, Microsoft Teams, learning management system and many more choices made by teachers to provide learning for their students to be able to improve problem solving skills, self-regulated learning and decision making in children with autism (Nurhasanah et al., 2022).

Learning to use mobile learning as mindtools for children with autism spectrum is expected to be part of problem solving solutions and increased decision making skills in using digital learning resources which will also affect self-regulated learning for children with autism to be able to adapt and reduce their dependence on formal rules that are stiff and difficult to move from previous activities (Walsh, Holloway and Lydon, 2018).

Mobile learning as mindtools for children with autism is flexible, independent of time and place. By utilizing mobile learning as mindtools in learning, children with autism are expected to be able to visualize

knowledge and share knowledge in learning so that meaningful learning is easier to achieve. Children with autism can learn to solve their own problems and are able to self-regulate in learning and are more sensitive in decision making or making decisions. This study aims to determine how mobile learning as mindtools affects decision-making abilities in children with autism.

2. Method

Study Design

This research is an experimental research aimed at students with special needs with limited subjects. Single Subject Research (SSR) was chosen as the research design which is also part of the experimental research. The experiment given is by giving treatment to research subjects related to learning for children with autism using mobile learning as mindtools in learning activities.

Subject

A total of 4 children with autism participated in this study. The treatment given is in the form of mobile learning as mindtools in learning activities.

Procedure

- 1) With the initial step, baseline data were simultaneously collected according to variables, conditions and research subjects, namely the use of mobile learning as mindtools for decision making skills in children with autism, then after this baseline data reached a trend and was stable, intervention was started and recorded as well until the data showed stability for then repeat the baseline phase to determine the effect of mobile learning as mindtools on decision making skills in children with autism.
- 2) The analysis in this study uses descriptive analysis with graphs. The data are analyzed based on individual data obtained. The components are analyzed based on analysis under conditions and analysis between conditions. In the analysis under conditions, the components analyzed include: length of condition, trend of direction, level of stability, rate of change, data trail, and range. However, in the analysis between



conditions, the components analyzed include: the number of variables that are changed, changes in the direction of the trend and its effects, changes in stability, changes in the level and percentage of overlapping data.

- 3) The research data was collected using observation, questionnaire and test techniques to test the effect of mobile learning as mindtools on decision making skills in learning children with autism.

Statistical analysis

A comprehensive picture of the results of the interventions carried out in this study over a certain period was analyzed using simple descriptive statistics. The analysis was carried

Table 1. Accumulated Decision-Making Test Scores on Research Subjects at Baseline-1, Intervention, and Baseline-2

| Baseline-1 (A) | | | Intervensi (B) | | | | Baseline-2 (A') | | | |
|----------------|----|----|----------------|----|----|-----|-----------------|----|-----|-----|
| 40 | 40 | 40 | 60 | 75 | 90 | 100 | 100 | 90 | 100 | 100 |

The table above is an accumulation of the subject's Decision Making test scores that have been achieved at baseline-1 (A), intervention (B), and baseline-2 (A'). These data indicate that there is an influence of the mobile learning model media on behavior in the frequency of errors that occur, so that the error frequency decreases in the intervention phase and is quite stable in the baseline-2 phase.

Based on the data above, it is known that using the mobile learning model media can

Table 2. Summary of Visual Analysis Results in Conditions with Aspects of Decision-Making Ability

| Condition Comparison | B/A | A'/B |
|--|------------------------|------------------------|
| Number of variables changed | 1 | 1 |
| Changes in trend direction and their effects | (-) _____ (+) _____ | (+) _____ (+) _____ |
| Trend change and stability | Stable to variable | Stable to stable |
| Level change | 12-8 = +4 | 2-8 = +6 |
| Overlapping percentage | (0 + 4) x 100% = 0% | (0 : 3) x 100% = 0% |

In this study, it was found that the length of the baseline-1 (A) = 3, Intervention (B) = 5 and baseline-2 (A') = 3 phases. The trend towards baseline-1 (A) was stable, intervention (B) decreased, and baseline-2 (A') decreased. In addition, changes that occur in decision-making abilities appear when

out with tabulations and graphs before being given treatment, when given treatment and after being given treatment. The existing data is analyzed through visual analysis of graphic data (visual graphic technique) by plotting all existing data into a graph to be analyzed individually on the basis of each condition (baseline and intervention) according to its components.

4) Results

Based on the measurement results that have been described previously, to find out and clarify the developments that occurred in baseline-1, intervention, and baseline-2, the following table can be presented:

reduce the frequency of subject errors in working on decision making questions. Thus the mobile learning model media can affect the decision-making ability of research subjects which is characterized by a reduced frequency of error behavior in working on decision-making questions. Based on the research data above, it can be summarized the results of the analysis under conditions and the results of the analysis between conditions into the following table:

intervention is given with a +8 level change and in the baseline-2 phase there is a +2 level change.

5) Discussion

The use of mobile learning as mindtools in learning is the direction of a new educational paradigm that can benefit



everyone and improve the quality of educational technology services, including children with special needs (autism). Mobile learning is a combination of pedagogical technology design and context that can change the way of learning and teaching to be more interesting, effective and efficient, free from context in accordance with the new paradigm of learning in the 21st century (Nurhasanah et al., 2022)..

In this study, mobile learning as mindtools is a mobile technology-based learning, namely electronic learning as the main source that is a center in learning that is used to help the thinking process of students with autism spectrum disorders through their mobile-based learning devices or mobile devices, while Mindtools is a the concept of ways of thinking of children with autism by utilizing information and communication technology from other technologies and digital learning environments or structured and temporary learning activities in a constructive manner for students with autism spectrum by utilizing all kinds of tools and features in mobile technology that are used to compile mobile learning resources .

Decision making on autism spectrum disorder is one of the important things in the process of a child's life becoming an independent person and able to take decisions in every problem. Decision making is always related to problem solving. Decision making itself is a basic human behavior in the process of selecting several options that must be taken and decided. In the process, alternative conditions are described with consideration of existing phenomena or events with the aim of getting the best from the options chosen which are also related to personal values as humans.

Decision making skills in children with autism require repeated habituation because decision making is one part of the difficulties of children with autism. If they are not used to it, children will not understand and realize that they have to make choices and are confident in making decisions on problem solving in electronic learning-based independent learning such as mobile learning. Some individuals with the autism spectrum

were found to have difficulty in decision making.

Strategies to deal with general stress and anxiety that exist at the time of decision making in children with autism by means of; give extra time; minimize irrelevant stimuli; presenting closed questions; provide encouragement and reassurance; and acknowledge the person's decision-making power for children with autism (Stathopoulou et al., 2019).

Decision making behavior consists of a very complex process. The process includes visual recognition, visual analysis, emotional reactions, consideration of the many factors that influence decisions and how to take the chosen course of action. The decision making process is shortened into three parts;

perception, cognition, and action (Yee, 2012). Children with autism spectrum in making decisions usually need more understanding and repetition by reassuring what problems must be solved in the tasks that are charged as their responsibilities in learning (Charitaki, Souli dan Tyropoli, 2021).

Decision making in children with autism cannot just grow, but there is a need for habituation, training and new stimuli in learning by aligning with the creation of interesting learning resources and learning environments to foster positive emotions that influence in stimulating sensitivity in decision making in children with autism spectrum. In the decision making process, an environment that is conducive and in accordance with the mood of a child with autism is needed (Lener, 2016).

Decision making activities on mobile learning or vice versa are strongly influenced by different mental factors in each individual's mind. Said that in mastering 21st century learning skills, there are four complex processes that each individual must have, including decision making (Dewi and Riandi 2015).

Decision making in the process is influenced by several intrinsic and extrinsic factors. Decision making cannot be explained in detail in the process by cognitive capacities which include reasoning, intelligence and the



use of information. Factors in decision making including children's age, peer influence, learning transfer skills, strategies used in decision making, motivation, sources of information, assessment criteria and other variables. Variables that influence decision making are information, skills, and values related to the nature of decision making or problems in decision making. In the decision making process, the curriculum has a central role in the development of decision making skills. Decisions are a combination of emotional, skills, values, beliefs and cognitive social motivation. Decision making also cannot be explained by cognitive capacities such as intelligence, reasoning and use of information (Hosozawa *et al.*, 2021).

Mobile learning with mindtools on decision making has an effect on learning for children with autism related to children's decisions or choices in utilizing learning resources through mobile learning software that has been prepared by the teacher for them to learn. Children with autism are given the freedom to make choices or make decisions about the selected materials, materials or learning contexts based on mobile. Decision making in the use of mobile learning as mindtools departs from learning problems that must be solved and the solution decided by children in learning using mobile learning facilities so that their problem solving skills also increase with the determination of the right decision choices for solutions in learning.

6) Conclusion

Based on the results of the analysis, it is known that there are changes that occur in the decision-making ability of the research subject. Thus, it is known that using mobile learning model media can reduce the frequency of subject errors in working on decision-making questions. Thus the mobile learning model media can affect the decision-making ability on research subjects which is characterized by a reduced frequency of error behavior in working on decision-making questions

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