

Educators' perceptions of early childhood working memory capacity and its implementation in outdoor learning activities (OLA)

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Abstract

Children aged 5-6 years need cognitive executive function (EF) skills to be ready to learn in elementary school. Working memory (WM) is one aspect of EF that is very important in children's academic abilities. The research aims to identify the working memory capacity of early childhood children based on teachers' perceptions and to understand the implementation of Outdoor Learning Activity (OLA) in early childhood education. This research is a descriptive study. Data was collected using questionnaires distributed during the Forum Group Discussion (FGD) activities. 35 Early Childhood Educators filled out the questionnaire. The data analysis was conducted by providing an in-depth description of the research results. The research results show that based on educators' perceptions, children's working memory (WM) capacity is not yet optimal, reaching only 65.23%, which falls into the sufficient category. The implementation of OLA is carried out 7 times every month. Currently, WM stimulus is implemented by 54.29% of educators in Indonesia through recalling during the closing learning activities. The results of this study serve as a basis for future researchers to develop the OLA model in stimulating children's WM.

Keywords

Educators' perception, Working memory, Outdoor learning activity

Introduction

Early childhood children are in a critical period of development influenced by their self-concept and basic competencies [1]. At this stage, children have their first experiences at school [2]. Open spaces and nature are very important for learning about obesity prevention. This shows how crucial physical activity is [3].

Generally, children who often engage in outdoor learning activities (OLA) are healthier than those who frequently play indoors. The results of a child care survey in Texas show that what is needed to improve the quality of their outdoor environment is to make arrangements by creating an environment with nature, vegetation, pathways, and play

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and learning settings. However, in reality, it shows that educators have not provided students with the opportunity to learn outside every day [4]. This is demonstrated by childcare centers in the United States providing children access only to fenced play areas with commercial play structures [5]. Therefore, outdoor learning is necessary because it contributes to the cognitive, socio-emotional, motor, and language development of preschool children [6].

Cognitive functions play a very important role in a child's life. One of the most important cognitive aspects for children is working memory. The important role of working memory is to support the entire range of complex daily cognitive activities of children, such as long-term learning, mental arithmetic, reasoning, and language comprehension [7]. Search in the last 10 years in neuroscience has shown significant evidence indicating that physical activities are related to children's cognitive abilities [8–11]. In addition, working memory increases during preschool or the first six years of age. The executive components of working memory are sufficiently developed to be used in tasks that require coordination of working memory subcomponents, such as the visuospatial sketchpad, phonological loop, and episodic buffer [12,13]. In essence, working memory consists of four components: the attention controller, which has limited control over attention, the phonological loop, the visuospatial sketchpad, and the episodic buffer. The attention controller also consists of two subsystems within the storage system. The visuospatial sketchpad is the part that can input, retain, and manipulate information. The phonological loop is the part that can input, retain, and manipulate sound or verbal-based information. Conversely, the episodic buffer helps integrate the received data with previously existing episodic event memories in long-term memory [14]. It can be interpreted that the central executive functions as a "control center" that oversees the processes of manipulation, retrieval, and processing of information for meaningful functions such as decision-making, problem-solving, or even scriptwriting [15].

Physical activities performed during outdoor play, such as jumping, kicking, swinging, and running, can supply blood to the child's brain and cause natural chemicals to support a greater number of neuron connections [16]. The implementation of outdoor play activities shows a 22% increase in physical activity when the play is packaged as outdoor play activities [17]. The implementation of outdoor play activities is at least 30 minutes once every day [18]. This research was conducted to understand children's working memory capacity according to educators' perceptions, determining the duration of outdoor learning activity implementation each week, and examining the stimuli provided by educators to enhance children's working memory, so that the research results can serve as a basis for educators or other researchers in developing outdoor learning activity models to stimulate children's working memory.

Method

This research uses a descriptive quantitative method in the form of a survey. Data collection was conducted using a questionnaire. The subjects in this study are early

childhood education institution educators under the auspices of the Raudhatul Athfal Teacher Association, Bustanul Athfal Teacher Association, and Himpaudi in Indonesia, totaling 35 educators who teach in kindergartens, playgroups, and daycare centers. The data collection tool used was the completion of questionnaires by respondents during the FGD event about teachers' perceptions of working memory and its implementation in learning, as well as the implementation of OLA in early childhood education. This survey research uses quantitative data analysis techniques with a descriptive approach. This approach involves analyzing the data obtained by calculating percentages and then describing the results. The stages of the research can be observed in Figure 1.

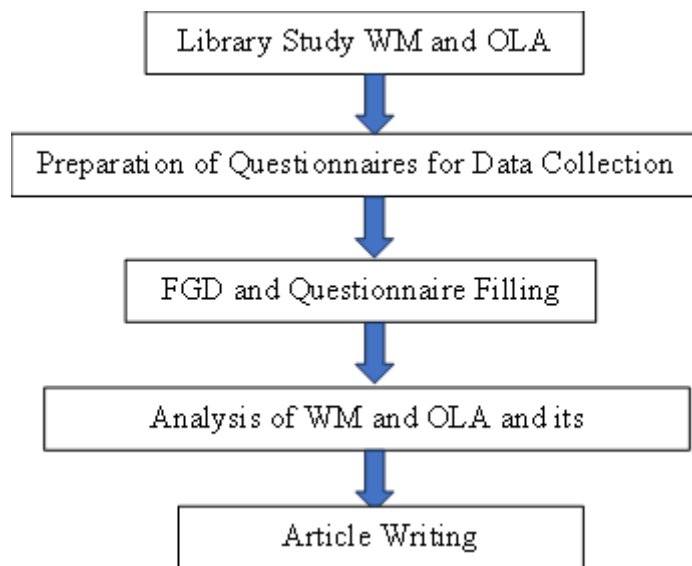


Figure 1. Stages of Research

Result and Discussion

Focus Group Discussion (FGD) was conducted to identify the capacity of working memory according to educators' perceptions and its implementation, as well as the implementation of outdoor learning activities. Before the FGD participants were asked to fill out the questionnaire, the research team first presented material related to the capacity of early childhood working memory and its implementation in learning. This aimed to provide understanding to the FGD participants regarding the capacity of working memory and outdoor learning activities and their implementation. After the questionnaire was filled out by the FGD participants, data analysis on working memory capacity and outdoor learning activities and their implementation was conducted.

Working Memory Capacity and Its Implementation

Based on the educators' perception, the analysis of the early childhood working memory capacity questionnaire results in Table 1 shows that the working memory capacity reaches 65.23% and falls into the sufficient category. This proves that the stimulation provided by parents and early childhood educators is not yet optimal. Based on the analysis of the survey data conducted, the efforts made to improve working memory capacity have not been optimally planned in the educational unit's learning

plan. The categories are based on the percentage category table [19] in Table 2 as follows.

Table 1. Early Childhood Working Memory Capacity

WM (%)	Respondent	Total percentage (%)
30	1	30
40	5	200
50	3	150
60	5	300
70	8	560
75	3	225
78	1	78
80	5	400
85	4	340
Number	35	2283
Average		65.22857143
WM Capacity		65.23
Category		Sufficient

Table 2. Percentage Categories

Category	Percentage
Good	76% - 100%
Satisfactory	56% - 75%
Not good	40% - 55%
Bad	<40%

Currently, the stimuli provided by educators in the learning activities based on the analysis of the survey data that has been conducted can be observed in the following the Table 3.

Table 3. Activities that Stimulate Children's Working Memory Capacity

Activities Implemented to Stimulate Working Memory Capacity	Score	Percentage (%)
Arranging patterns, playing puzzles	2	5.71
Conducting recalling/asking about activities at the closure	19	54.29
Assigning daily prayer	2	5.71
memorization tasks	3	8.58
Giving instructions	2	5.71
Asking with prompting sentences	2	5.71
Providing explanations slowly and repeatedly	2	5.71
Storytelling	3	8.58
Game rules	2	5.71
Total	35	100

Table 3 shows that in the current learning activities conducted by educators to stimulate working memory capacity, 54.29% is done through recalling/asking about the activities that the children have done at the end of the learning activities or closure. This is because during the closing before the children go home, when the educator asks what activities have been carried out throughout the day, the children try to recall the play activities that the students have gone through or done in one day. Usually, this recalling is done using the question-and-answer method. In addition, 8.58% of educators have

planned learning activities through storytelling and giving instructions. This is done after the children pray before the educator's activities, where the educator first invites the children to tell stories, either about religious matters or the introduction of certain character values. After the educator finishes telling the story, the educator continues by asking the students questions about the story that has been conveyed. At this stage, the child is stimulated to remember the story that has been conveyed by the educator. In addition, the ability to remember is stimulated by the educator after presenting the theme and material to be delivered today. The educator introduces various play activities and instructions for playing. When the educator explains all the types of play activities for the day, the educator also instructs how to play each type of activity. After the educator explains the instructions for each type of play, the educator is allowed to play the types of play they are interested in while remembering the instructions for each type of play.

This is in line with the opinion of [20] that working memory (WM) is the child's ability to remember and process memories in the brain. The implementation of early childhood education learning activities is carried out both indoors and outdoors. Based on the data analysis results obtained during the FGD, educators implement activities that stimulate working memory capacity outdoors with the duration shown in Table 4.

Table 4. Implementation of Working Memory Outdoors

WM (times in 1 month)	Respondent	Score Total
2	5	10
3	2	6
4	15	60
8	6	48
10	1	10
12	2	24
16	1	16
24	3	72
Number	35	246
Average implementation		7,03

Based on the data in Table 4, it can be concluded that educators implement outdoor learning activities that stimulate working memory capacity in learning activities 7 times each month. However, referring to the opinion [18] that outdoor activities should be conducted by educational institutions every day for at least 30 minutes. Additionally, in line with the accreditation standards set by BAN PAUD and PNF, educational institutions should be accustomed to outdoor activities every morning [21]. Thus, the recommendation for future researchers is to include several variations of outdoor learning activities to implement outdoor learning for at least 30 minutes every day.

Conclusion

The research results show that based on educators' perceptions, the capacity of children's working memory (WM) is not yet optimal, reaching only 65.23%, which falls into the adequate category. (2) The implementation of OLA was carried out 7 times each

month, and 54.29% of educators stimulated WM during the closing recall. The results of this study serve as a basis for future researchers to develop the OLA model in stimulating children's WM.

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