

Implementation of Authentic Assessment Through Dice Games to Measure Early Childhood Cognitive Development at Nur Faizah PAUD, Bingin Rupit Village

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ABSTRACT

Early childhood development assessment needs to be conducted authentically and enjoyably in accordance with the characteristics of learning through play. However, assessment practices in early childhood education (PAUD) are still dominated by traditional assessments that do not reflect the children's natural abilities. This study examined the use of dice games as a medium for assessing children's cognitive development at Nur Faizah PAUD to overcome the limitations of conventional assessments and improve the accuracy of learning assessments. This study aimed to describe the implementation of dice-based assessments and their effectiveness in assessing numeracy and number recognition skills. This study used a qualitative descriptive approach through observation, interviews, and documentation of 15 children in Group B and their classroom teachers. The results showed that dice games can increase learning motivation and enable natural cognitive assessment. Most children were able to correctly name the numbers according to the dice roll results, and approximately 70% of the children were able to perform simple additions using two dice. In addition to academic outcomes, this activity also stimulated social-emotional development such as cooperation, waiting for turns, emotional regulation, and communication during play. Teachers acknowledged that assessment through dice games facilitated observation of the learning process without causing stress to children, although obstacles such as limited game equipment and recording of assessment results were still encountered. Overall, the dice game proved to be an effective, fun, and developmentally appropriate assessment instrument for early childhood and supported the principles of the Independent Curriculum, which is oriented towards meaningful and child-centered learning.

Keywords: Authentic Assessment, Dice Games, Cognitive Development, Early Childhood Education

I. INTRODUCTION

Early Childhood Education (PAUD) is a crucial phase that provides the foundation for children's comprehensive development, including cognitive, socio-emotional, language, physical, and moral development. One aspect that significantly determines the quality of PAUD services is the implementation of assessments during learning activities. Assessment is a process undertaken to understand a child's learning development and to obtain information that can be used to improve learning (Suyadi, 2019). In the context of PAUD, assessment should be conducted through an authentic, natural, and non-burdensome process in accordance with the characteristics of early childhood development, which learn through play. This view is reinforced by the Ministry of Education, Culture, Research, and Technology (2021), which emphasizes that assessment in PAUD must be ongoing, enjoyable, and conducted contextually through children's daily activities.

One form of assessment that aligns with these characteristics is assessment through games, including Dice games. Play is a natural learning tool for children, as it allows them to interact, think, experiment, solve problems, and understand concrete concepts that form the basis of their cognitive development (Sujiono, 2017). Dice games, as a learning tool, allow children to explore concepts such as numbers, quantities, colors, rules, taking turns, and even cooperation. Therefore, dice games are not merely recreational activities but can be an effective tool for assessing children's cognitive abilities, particularly in arithmetic and number recognition.

Theoretically, Piaget's (1969) perspective states that early childhood is in the pre-operational stage, a developmental stage in which children learn through concrete objects, manipulatives, and direct experience. Dice games provide these experiences because children can see, touch, count, and relate them to numbers. Furthermore, Vygotsky's (1978) theory emphasizes that child development is influenced by social interaction and environmental support. In dice games, children learn with peers, wait for their turn, accept the outcome of the game, and regulate their emotions, all of which are important processes in authentic assessment.

Although authentic assessment has been recommended in the national education policy, its implementation in the field still faces various challenges. Many early childhood education teachers still rely on traditional assessment methods, such as tests or written assignments, which are not well-suited to the developmental characteristics of early childhood, who learn through concrete activities and play. Furthermore, teachers often struggle to assess all children simultaneously, especially when the number of students is large, and time and supporting assessment tools are limited. The variety of assessment media used also tends to be limited, resulting in a monotonous assessment process that does not fully reflect children's learning process. Another issue is the lack of objective and systematic assessment documentation, particularly in the form of direct observation during activities. Furthermore, there is still a lack of research specifically examining the effectiveness of dice games as a tool for assessing cognitive development in early childhood education, especially in real-world setting. Nur Faizah Early Childhood Education is an institution attempting to implement innovative assessment through dice games, but teachers still need a deep understanding of authentic assessment techniques, observation skills, and valid and comprehensive recording of assessment results.

To address these issues, this study implemented an assessment using dice games as an alternative approach that aligns with children's developmental characteristics. The dice game was designed based on cognitive development indicators such as numeracy and number recognition. During the activity, the teacher conducted direct observations of the children, recording the developmental process and outcomes through observation sheets, anecdotal notes, and documentation of the activities as evidence of assessment. The teacher then reflected on the assessment results to improve subsequent learning strategies. Thus, the game was used not only as a learning medium but also as a natural, non-stressful assessment instrument. This approach aligns with the concept of formative assessment, which not only measures the final results but also continuously improves the learning process, as proposed by Black and Wiliam (2009).

This study aimed to describe the implementation of cognitive development assessment through dice games at Nur Faizah Preschool and to explain children's development and responses during the activity. Furthermore, this study analyzes the effectiveness of dice games as an assessment tool in assessing children's numeracy and number recognition skills and identifies challenges that arise during the implementation of game-based assessments and their solutions. Theoretically, this study contributes to the development of insights into authentic assessment in Preschool and Kindergarten, particularly assessments that utilize games as an instrument for assessing children's cognitive development. Practically, the results of this study are expected to serve as a reference for teachers to implement assessment strategies that are creative, simple, and relevant to children's learning experiences. For Preschool institutions, this study can serve as an example of a good practice that supports curriculum development and play-based learning, while for future researchers, this study provides a basis and reference for developing similar research.

This research is highly urgent because assessments in early childhood education (PAUD) often do not fully reflect the characteristics of child development, although various regulations emphasize the importance of contextual, authentic, and enjoyable assessment processes, as directed by the Ministry of Education and Culture (2021). Furthermore, dice games are readily available, inexpensive, and enjoyable learning tools with significant potential for use as assessment instruments; however, they have rarely been studied in depth in scientific research. Teachers also need concrete and applicable guidance to improve their observation skills, document assessment results, and develop follow-up learning plans. Furthermore, the Independent Curriculum emphasizes flexible assessment and supports holistic child development, thus aligning this research with the direction of the national education policy. Therefore, this research is crucial for strengthening the understanding that assessments in PAUD do not have to take the form of formal tests, but can be realized through meaningful, enjoyable play activities that authentically reflect child development.

II. RESEARCH METHODS

This research was conducted using a qualitative descriptive approach, as it aimed to provide an in-depth description of the assessment process through dice games in the context of early childhood learning in Nur Faizah Preschool. A qualitative approach was chosen so that researchers could obtain a realistic picture of children's behavior, interactions, and abilities while engaging in play activities. With this method, the data

obtained were naturalistic, reflecting field conditions, allowing for contextual and in-depth interpretation of the research results based on empirical findings that emerged during the learning process.

The research subjects were 15 children in Group B who regularly participated in dice games as part of the learning process. In addition to the children, the class teacher served as a source of information to obtain supporting data regarding assessment implementation, learning strategies, and child development. Subjects were selected purposively, meaning that they were considered directly relevant to the research objectives, as is common in qualitative research, which emphasizes data depth over sample size (Miles & Huberman, 1994).

Data were collected using three main techniques: observation, interviews, and documentation. Direct observations were conducted while the children were playing dice, allowing researchers to record their behavior, numeracy skills, social interactions, and responses during the activity. In-depth interviews were conducted with class teachers to gather information regarding the purpose of using the dice game, assessment process, difficulties encountered, and follow-up learning. Furthermore, documentation such as activity photos and assessment notes were used as authentic evidence to strengthen the field data in accordance with the Early Childhood Education Assessment Implementation Guidelines, which emphasize systematic recording of developmental evidence (Ministry of Education, Culture, Research, and Technology, 2021).

Data analysis was conducted using Miles and Huberman's interactive model, which involved data reduction, data presentation, and conclusion drawing. Data reduction was achieved by selecting information relevant to the research focus, such as changes in children's numeracy skills or teachers' responses to assessments. The compiled data were then presented in narrative form and interpretive tables to facilitate researchers' understanding of the key patterns and findings. The final stage involved drawing conclusions, which were conducted continuously from the beginning of data collection until the research was completed, ensuring that the resulting interpretations remained consistent with empirical evidence in the field (Miles & Huberman, 1994).

To enhance data validity, this study employed the triangulation of sources and techniques by comparing data from observations, interviews, and documentation. Triangulation ensured that research findings were not solely based on a single source of information, but were supported by various field evidence. Furthermore, continuous recording was conducted each time the dice games took place to ensure that the assessment process reflected the children's actual condition. This effort aligns with the principles of authentic assessment in early childhood learning, which emphasizes continuous data collection within the context of meaningful play (Ministry of Education and Culture, 2021).

III. RESEARCH RESULT

The results of the study indicate that the implementation of assessments through dice games in Nur Faizah Early Childhood Education (PAUD) provides a clear picture of children's cognitive development, particularly in counting and number recognition skills. Based on the observations, the children appeared very enthusiastic about participating in the activities. The learning atmosphere was enjoyable, because the children were actively involved in the process of playing while learning. The children's enthusiasm was evident from the start of the game, when they eagerly waited for their turn to roll the dice, count the dots or numbers that appeared, and show the results of their calculations to the teacher. This learning atmosphere is in accordance with the characteristics of early childhood learning, which emphasizes direct experience, play, and social interaction as part of learning development (Suyadi, 2019; Sujiono, 2017).

In this activity, the teacher used dice with numbers and colors to simultaneously assess two aspects of development: counting ability and color recognition. The assessment results showed that approximately 80% of the children were able to correctly name the numbers based on dice roll. This indicates that most children were able to recognize numbers accurately and independently. Furthermore, approximately 70% of the children were able to perform simple addition using two dice simultaneously. These findings indicate that playing with dice can stimulate the development of children's numerical abilities through concrete experiences appropriate to their developmental stages. According to Piaget's theory, early childhood is in the preoperational stage, so learning through tangible objects such as dice helps them understand the concept of numbers more meaningfully (Piaget, 1969).

In addition to assessing cognitive development, this assessment also provides insight into children's social-emotional development. When playing dice, children learn to wait for their turn, respect their peers, cooperate, and accept the outcome of the game, whether to win or lose. These behavioral patterns were consistently observed throughout the activity. Teachers noted that after participating in similar activities several times. This aligns with Vygotsky's (1978) view that social interaction with peers and teacher support can enhance children's learning development through the zone of proximal development (ZPD).

Teachers stated that using dice games facilitated the assessment process because the assessment could be conducted naturally without putting pressure on children. The children demonstrated their abilities during the activity without realizing that they were being assessed. This approach aligns with the principles of authentic assessment in early childhood education, which are implemented continuously through real-life activities within the learning context (Ministry of Education, Culture, Research, and Technology, 2021).

Teachers not only assess the final results, but also observe how children count dots on dice, name numbers, understand instructions, and interact with peers. This makes the assessment more comprehensive because it focuses not only on academic ability but also on the learning process and attitude.

Observational data also show that the use of dice can increase children's motivation for counting activities. Children did not seem burdened when asked to name numbers or add them, and many volunteered to try again in their next turn. This enthusiasm and motivation are indicators of the success of play-based learning, which is recognized as an appropriate approach for early childhood. Mayesty (2018) stated that game-based learning makes learning more enjoyable and increases children's engagement in the learning process.

Furthermore, teacher documentation, such as assessment notes, activity photos, and observation sheets, demonstrate that children's progress can be clearly monitored from one meeting to the next. This provides teachers with valuable insights into making decisions regarding further learning. For example, children who are not yet able to count accurately may be provided additional activities with the help of simpler manipulatives. This approach aligns with the principles of formative assessment, in which assessment results are used not only to determine learning outcomes, but also to improve subsequent learning processes (Black & Wiliam, 2009).

Despite its positive impact, this study identified several challenges in implementing assessments using dice games. One challenge was the difficulty in observing all the children simultaneously, especially when there were a large number of students. Furthermore, the limited game equipment meant that some children had to wait longer for their turn, potentially reducing their focus on learning. However, teachers overcame this by providing additional dice made from simple materials such as foam or thick cardboard. This strategy demonstrates the teachers' creativity in adapting the assessment process to real-world classroom conditions.

Overall, the research results show that dice games are an effective tool for assessing the cognitive and social development of early childhood. This simple tool helps teachers obtain authentic data from natural learning situations while creating an engaging, meaningful, and enjoyable learning environment for children. Therefore, dice games are worthy of further development as creative assessment strategies in early childhood education.

IV. DISCUSSION

The results show that the implementation of dice games as an assessment tool at Nur Faizah Preschool has a positive impact on children's learning and cognitive development. Dice games are not only a form of entertainment but also serve as a learning tool that allows teachers to authentically assess children's abilities. Through these activities, children learn to count, recognize numbers, understand colors, and develop social skills naturally, without pressure.

1. Authentic Assessment in the Context of Play

Authentic assessment focuses on children's abilities in real-life situations. In the context of early childhood education, this assessment is conducted through planned and meaningful activities. Research results show that teachers at Nur Faizah Early Childhood Education (PAUD) conducted assessments through direct observation while the children played dice. This process aligns with guidelines stating that PAUD assessments must be conducted continuously through fun and contextual activities (Ministry of Education, Culture, Research, & Technology, 2021). During play, teachers not only assess the final results, but also pay attention to the children's thought processes, how they count the dots on the dice, their ability to recognize numbers, and how they interact with peers. Thus, playing dice serves as an assessment tool that reflects children's holistic development, encompassing cognitive, socio-emotional, and linguistic aspects.

2. Dice Games as a Cognitive Assessment Medium

Dice games have been proven to be effective in stimulating children's cognitive abilities, particularly counting and number recognition. Observations showed that most children in Group B were able to name the numbers they rolled correctly. Furthermore, they were able to perform simple additions using two dice, indicating that dice games help reinforce number concepts concretely. These findings align with the cognitive development theory, which states that early childhood is in the preoperational stage, so they learn through concrete objects and direct experience (Piaget, 1969). Therefore, activities such as dice games make learning

more meaningful and understandable. Furthermore, dice games stimulate other skills such as remembering patterns, distinguishing colors, and developing concentration. Teachers can assess these abilities through direct observation while children participate in games. Therefore, dice is not only a game tool but also a valid and contextual assessment instrument in early childhood education.

3. Social and Emotional Aspects in Assessment

Playing dice significantly contributes to children's social-emotional development. During play, children learn to wait for their turn, cooperate, accept the outcomes of the game, and respect their peers. Teachers record these behaviors as part of their non-cognitive assessments. This view aligns with social development theory, which states that child development is strongly influenced by social interactions and play environment (Vygotsky, 1978). During dice games, children actively interact with their peers and teachers, allowing them to develop emotional control skills, understand rules, and learn responsibility. Observations also showed that children who were initially passive became more active after repeated participation in the game. Thus, playing dice is an effective way to build children's self-confidence and independence through natural assessments.

4. The Role of Teachers in Implementing Assessments

Teachers play a crucial role in the success of game-based assessment. In dice games, teachers act as facilitators, observers, and assessors in children's development. They designed games based on developmental indicators and conducted direct observations of children's behavior and abilities. Data are recorded through anecdotal notes and observation sheets in accordance with the principle of formative assessment, which states that assessment results are used to refine subsequent learning strategies (Black & Wiliam, 2009). For example, children who have not yet grasped the concept of numbers are given a more challenging game. Teachers also conducted reflections after the activity to assess the effectiveness of the implementation and follow-up of the learning process. Thus, assessment through dice games not only collects learning outcomes but also influences future learning planning.

5. Challenges in Implementing Assessments

Despite its positive impact, the omplementation of dice-based assessments faces several challenges. Teachers find it difficult to observe all children simultaneously, especially in classes with a large number of students. Furthermore, some children easily lose focus when they must wait longer for their turn. Another challenge is limited play equipment, which forces children to take turns playing. However, teachers overcome this by making additional dice using simple materials such as cardboard and sponges. Difficulties also arise in recording assessment results because teachers must quickly and accurately record children's progress during the game. Therefore, training in observation and recording techniques is essential for more effective assessment implementation (Suyadi, 2019).

6. Implications of Research on Early Childhood Education Learning

The findings of this study have important implications for early childhood education. First, dice games offer an alternative authentic assessment method suited to the learning characteristics of early childhood. Second, teachers must be more creative in designing educational games that incorporate assessment values. Third, the assessment results through games can form the basis for comprehensive child development reports. Furthermore, dice games align with the principles of an Independent Curriculum, which emphasizes flexibility and meaningful learning, as children learn through real-life experiences that foster curiosity and active participation (Ministry of Education, Culture, Research, & Technology, 2021).

7. Relation to Previous Research

The results of this study align with previous research, showing that games can be used to assess children's overall development (Sujiono, 2017). Other research also suggests that assessment through play activities can increase children's motivation to learn and understand basic concepts (Mulyasa, 2020). This research also supports the view that social interaction plays a significant role in child development, as outlined in Vygotsky's (1978) theory of social learning development. In dice games, children learn together and help their peers, thereby fostering communication and thinking skills.

8. Synthesis and Reflection

In general, dice games have proven to be authentic, effective, enjoyable, and appropriate assessment tools for early childhood. Teachers can observe children's natural development based on their behavior, interactions, and thought processes while playing. Furthermore, game-based assessments support holistic learning, encompassing not only cognitive aspects, but also social, emotional, and communication skills. Therefore, game-based assessments deserve wider development as a good practice in early childhood education (Mayesty, 2018; Suyadi, 2019).

V. CONCLUSION

Based on the research results, it can be concluded that dice games are an effective assessment tool for assessing the cognitive development of early childhood in Nur Faizah Preschool. Through this game, children gain real-life learning experiences that enable them to recognize numbers, count, distinguish colors, and naturally develop concentration without pressure. Observations show that most children are able to name numbers according to the dice roll, and even complete simple addition calculations, indicating an increased understanding of number concepts. Dice games also have a positive impact on children's social and emotional aspects as they learn to wait for their turn, cooperate, control their emotions, and interact with peers. From an educator's perspective, this activity allows teachers to conduct authentic assessments directly by observing children's processes and behaviors during play. Thus, dice games have proven to be a relevant, fun, and developmentally appropriate assessment strategy for early childhood, while also supporting the principles of the Independent Curriculum, which emphasizes meaningful and child-centered learning.

Suggestion

Based on the research findings, it is recommended that teachers continue to develop variations in assessment-based games to make the assessment process more creative, comprehensive, and enjoyable for their children. Teachers also need to improve their observation and recording skills to accurately document each child's development and use them as a basis for planning subsequent learning. Furthermore, the provision of game media needs to be improved to ensure the optimal involvement of all children, especially in classes with large numbers of students. Other early childhood education institutions are expected to use dice games as a good example of implementing simple yet effective authentic assessments to support children's cognitive, social, and emotional development. Future research can expand this study by using other types of games or by comparing the effectiveness of game-based assessments across multiple educational institutions, resulting in broader and more varied results in the context of early childhood education.

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