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Using gamification through wordwall to enhance concentration in ADHD students at inclusive primary schools

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Abstract

This study investigates strategies to enhance the learning concentration of elementary school students with attention deficit hyperactivity disorder (ADHD) in Subang City, West Java Province. ADHD students often face challenges in maintaining focus and processing learning materials, particularly in subjects that require sustained attention. Despite the increasing integration of inclusive education, effective methods to support ADHD students remain underexplored. This study examines the use of gamification as an alternative approach to improving learning concentration in inclusive primary schools. A qualitative descriptive research design was employed, involving in-depth interviews, focus group discussions, and classroom observations. Participants included four teachers, four ADHD students, four parents, and one school principal. The findings indicate that gamification enhances ADHD students' concentration through a structured process, including defining learning objectives, designing engaging scenarios, and fostering interactive group dynamics. The study's implications suggest that gamification can serve as an effective instructional model for inclusive education, providing valuable insights for educators in similar contexts.

Keywords: ADHD; concentration; gamification; inclusive school; student

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1. INTRODUCTION

The Concentration in learning can be viewed as focusing one's thoughts on a specific object or task. This process involves concentrating the mind, attention, and other cognitive faculties. In an educational context, particularly for students, learning concentration refers to the ability to focus on the subject matter being studied (Bates, 2019; Aguilos & Fuchs, 2022). Achieving this focus requires setting aside distractions, and allowing students to fully engage with what they are learning. When students can concentrate, they gain a deeper understanding and absorb the knowledge being conveyed by the teacher (Williams et al., 2018). Thus, concentration plays a critical role in the learning process and directly impacts students' academic performance. It is a necessary component for achieving success in education (Riany et al., 2017; Wicaksana, 2019).

Several factors influence students' ability to concentrate during learning. Environmental factors such as noise, lighting, and classroom setup, as well as personal factors like social interactions, psychological well-being, and motivation, all play a significant role in focus (Lampropoulos & Kinshuk, 2024). These factors can either support or hinder the concentration required for effective learning. Disruptions such as a lack of interest in the subject, external noise, chaotic surroundings, or unfavorable weather conditions are common obstacles to concentration (Arthur, 2019). These issues underscore the complexity of maintaining focus during the learning process.

Another challenge to concentration arises from the monotony of teaching methods. When students experience a lack of variety in teaching techniques, it can lead to disengagement and reduced focus. This is particularly true in elementary schools, where a single teacher may be responsible for teaching multiple subjects. To improve the learning process, teachers must incorporate diverse teaching methods and models (Clausen et al., 2019; Prevatt et al., 2017).

Elementary school students often struggle with concentration. One of the primary tasks of these students is to develop and train their concentration skills to minimize distractions and better retain what they are learning. For example, when studying subjects like mathematics, language, or social sciences, students need to practice focusing on the material. If concentration issues persist at this stage, students may experience cognitive challenges that could affect their learning progress (Dunn, 2019; Everett & Oswald, 2018). Moreover, if these concentration difficulties are not addressed, they may hinder the student's ability to progress in higher education and impact future academic achievements and career development.

Teachers face additional challenges when working with children with special needs in inclusive classrooms. Inclusive schools admit both general and special-needs students (Chaimaha et al., 2017; De Picker, 2020). Students with special needs may have limitations such as visual or hearing impairments, low IQ, hyperactivity, or other conditions, each requiring unique teaching approaches. Teachers must employ a variety of methods, models, and learning media to effectively teach these students, making concentration a particularly challenging aspect of instruction (Dobson & Dobson, 2021).

In addition to students with special needs, typically developing students also benefit from tailored teaching strategies. Teachers need to adapt their approach to suit a variety of learning needs. One method to enhance student concentration is brain gymnastics, which has been shown in several studies to improve focus, memory, and academic performance (Fossey et al., 2017; Wilton et al., 2018). Brain gymnastics can reactivate attention centers in the brain, promoting better engagement during learning sessions. However, this method is typically short-term and may not be suitable for students with special needs (Buchanan & LeMoyné, 2020; Kilpatrick et al., 2017).

For students with special needs, one approach that has shown promise is the discovery learning method (Laslo-Roth et al., 2022; Yildiz Durak, 2021). This method encourages active problem-solving and critical thinking, allowing students to discover knowledge, develop skills, and change their behavior. While this approach works well for many students, it may not be appropriate for children with attention-deficit hyperactivity disorder (ADHD), as their learning needs often require a different set of strategies.

1.1. Purpose of study

Gamification is one of the game-based learning media that can help the learning process (Khattib & Alt 2024; Murillo-Zamorano et al., 2021). According to several previous studies, ADHD students need a special learning medium to be able to increase learning concentration, so this can help them during the learning process in the classroom, especially inclusion elementary schools (Prevatt et al., 2017; Climie & Henley 2018). Gamification can be used as an effective way to be able to increase student learning concentration, especially in terms of students who are included in ADHD students. Therefore, this study will focus on the use of Gamification in increasing the learning concentration of ADHD students in inclusion primary schools. The research questions are 1) What are the steps to use Gamification in improving the learning concentration of ADHD students in inclusion primary schools?

2. METHODS AND MATERIALS

2.1. Research design

The research method used is descriptive with a qualitative approach. The descriptive method is one of the methods in research that aims to be able to describe something in detail so that the results are well described in written form (Cohen et al., 2002). In this study, the way teachers use gamification media in the classroom in inclusion elementary schools is described in detail, especially about how to increase student learning concentration, so that the result is to be able to see the results that special needs students can be able to increase learning concentration slowly. There are three main reasons for choosing a descriptive method in a qualitative approach. The first is that teaching students with special needs is a very difficult way because they have different levels of disabilities, one of which is ADHD students. The inclusion elementary school that was used as a research location has very experienced teachers so the teacher can teach students with special needs by using gamification media. So that this research was conducted by observation and interviews to be able to see and describe the teacher's way of educating and teaching his students. The second is an inclusion public elementary school that has students with special needs with the ADHD category very rarely and very specifically, so when you find the school, The most appropriate method is to describe how the teacher teaches. Third, this method is also very appropriate because, in addition to describing the teacher when teaching in the classroom, researchers also try to be able to see directly how is the preparation process carried out by teachers in educating the character of their students including students with special needs.

2.2. Participants

This research was conducted at an inclusive elementary school in Subang City, West Java Province, Indonesia. There are two primary reasons for selecting this particular inclusive public primary school as the research site. First, inclusive elementary schools in Subang City are quite rare, especially those with students who have special needs, specifically those in the ADHD category. According to data from the Subang District Education Office, there is only one inclusive primary school in the area that serves students with ADHD. This school was therefore chosen as the research site. The second reason is that these school employs teacher who are highly experienced and knowledgeable in managing and educating students with specific needs, particularly those with ADHD. As a result, these teachers became key informants for the research.

Thirteen individuals participated in the study, categorized into four groups: four teachers from the inclusive primary school, all with teaching experience at inclusion schools; four students diagnosed with ADHD; four parents; and one school principal. A breakdown of the participants is provided in Table 1 below.

Table 1

Category of participants

No	Category	Number
1	School teacher	4
2	Special Need Student	4
3	Special Need Parents	4
4	School principal	1
TOTAL		13

Based on Table 1, it can be seen that four main categories are participants in this study. The first is the teacher who aims to be able to obtain main information about how the use of gamification in the learning process is carried out. Gamification is one of the media that can help students to be able to understand and understand how to increase concentration on students. The second category is students with special needs. This student was interviewed and made a participant to be able to find out more about how teachers educate and use gamification in the learning process. The third category is parents who supervise and are with the student for a long time, aiming to be able to know about the changes in concentration possessed by the child his child. Meanwhile, the principal aims to be able to see the policies made by the school in teaching students with special needs.

2.3. Data collection technique

The data collection techniques used in this study were in-depth interviews, focus group discussions (FGDs), and observations. In-depth interviews were conducted with four teachers who had special needs students in their classes with the ADHD category as well as one principal, the teacher also had a minimum of five years of teaching experience, so the teacher had special experience in dealing with ADHD students. Focus group discussions (FGDs) are conducted with parents of students who have ADHD students in elementary school to be able to know parenting patterns in increasing learning concentration. Meanwhile, the observation of students in the classroom is to be able to see and describe how the teacher takes steps with the use of gamification in the classroom. The total number of participants who were willing to participate in this study was 13 people consisting of 4 elementary school student teachers, 4 ADHD students, 4 parents, and one inclusion primary school principal.

2.4. Data analysis technique

The data analysis technique used is use content analysis technique using the Cresswell method. The steps are 1) The data that has been obtained from the results of interviews and observations is changed to a form of text narrative so that this makes it easier to be able to analyze it. 2) data reduction, the goal is to be able to eliminate some data that is not by the research questions, so that this research can obtain data that is only related to the use of gamification in increasing the concentration of ADHD students. 3) display data, which shows data that has been processed and finalized into research results (Creswell & Creswell 2017).

3. RESULTS

The results of this study show that the use of gamification can increase the concentration of student learning outcomes, especially for those who fall into the category of ADHD students. ADHD students have very poor learning concentration and are far from the average student learning, so they need special strategies and mentoring from the class teachers and also the mentors in particular. In terms of gamification users, ADHD students have a desire to be able to participate in group learning, so that their other friends can participate in participating in each of their learning processes.

3.1. Research Question (RQ): What are the steps to use Gamification in improving the learning concentration of ADHD students in inclusion primary schools?

To be able to find out how to increase concentration in ADHD students by using Gamification, the most important thing is to know the steps to use gamification in the learning process in the classroom. Based on the results of observations and interviews with teachers and classes that have ADHD students, there are several steps used by teachers while using Gamification. In this case, the process of implementing learning using Gamification is grouped into three main stages, namely determining the learning objectives and main game ideas, the second is to create scenarios and design learning activities and the third is to form learning groups and make dynamics in the game.

3.2. Define learning objectives and big ideas for the game

Learning objectives are the most important thing in the learning process. This is because the learning objectives can show how much the learning process will be used and also the target of the outcomes in the

learning process. In addition to the learning objectives, the big idea or the main idea of the game should be clearly described. The purpose of learning in elementary school students is to be able to provide understanding in the process of using technology and make students able to understand and understand every learning content delivered.

"Learning objectives are the most important thing and very important. So, teachers need to determine learning objectives using this gamification" interview, teacher 2

"The big idea of the game has a very important role to play. So that students do not feel bored during the learning process, then a teacher needs to be able to determine the main idea in advance. So that with the main idea and that main idea, it can help students in the learning process, "interview, teacher 3

Based on the findings in interviews with teachers who received assignments to be able to teach elementary school students, it was stated that learning objectives are the most important thing, so for there to be success in using gamification, teachers need to be able to determine learning goals and big ideas for games. When the teacher teaches the subject of Pancasila and Citizenship Education in the classroom, with the main topic being cultural diversity, the learning design and learning objectives that will be used must also adapt to this. There is also the purpose of learning Pancasila, so the gamification design that must be used must use and focus on Pancasila.

After knowing the learning objectives, the teacher can determine the big idea or the main idea of the process of using games in learning in the classroom. As a result of the observations that have been made, one of the games used by teachers in teaching mathematics is the use of online games so that the teacher only needs to display some of the games on the layer. Gamification is a learning approach in which teachers use elements in learning with games so that students have motivation and enthusiasm in the learning process (Khaldi et al., 2023). When the subjects to be taught are those related to the social sciences, then the game used is also related to the social sciences. So that in this case, the main objectives and ideas of the use of the game can be determined based on the learning objectives and subjects presented by the teacher in the learning in the classroom.

3.3. Create Groups, scenarios and design learning activities

After determining the idea of Utama in the learning process, the second step is to determine the group. The use of Gamification needs to be done in groups because this can stimulate and make students more creative in participating in this process. The criteria for determining the group are students with special needs need to be able to join other students. For example, when a group consists of five people, then the composition is one ADHD student and the other four people are normal students.

"Groups have a very important role in the learning process, this is because the group can make ADHD students participate in the learning process" interview, teacher 1

"My children are always happy when learning in groups because they tell me that their friends are very good and can learn more optimally" FGD, participants 1, 2, 3

Participation in groups when carrying out the learning process can make students very comfortable in carrying out the learning process. Based on information from teachers and parents at focus group discussions (FGD), students who are included in ADHD always tell their parents that they can participate in the learning process and follow the instructions delivered by the teacher and their friends in the group. When the group process has been carried out, the teacher can integrate the values into the learning process. When the teacher had determined that the purpose of this learning was to be able to know about Pancasila and cultural diversity, the learning media used to teach it must also adapt to matters related to Pancasila. Thus, students can also slowly have a focus on the learning process. Although ADHD students have limitations in terms of learning concentration, with group learning and using games, they have fun and happiness, and with this happiness, students can become more focused on learning.

One of the learning designs that can be used to be able to teach about Diversity and Pancasila is to use a website-based application, namely Wordwall. Based on the observations in the classroom, the students were very happy with the use of the wordwall application, especially the "open the box", so that students could guess what was behind the box.

"The use of wordwall applications, especially "open the box", makes students enthusiastic in answering questions, so that discussions become more active and more interesting" Interview, teacher 3

Figure 1

Wordwall application opens the box as a form of gamification

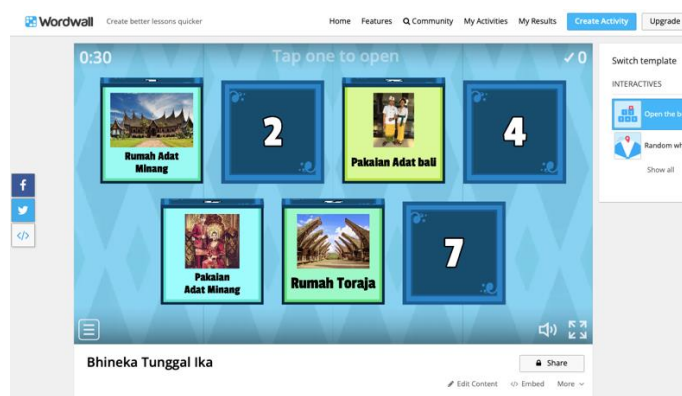
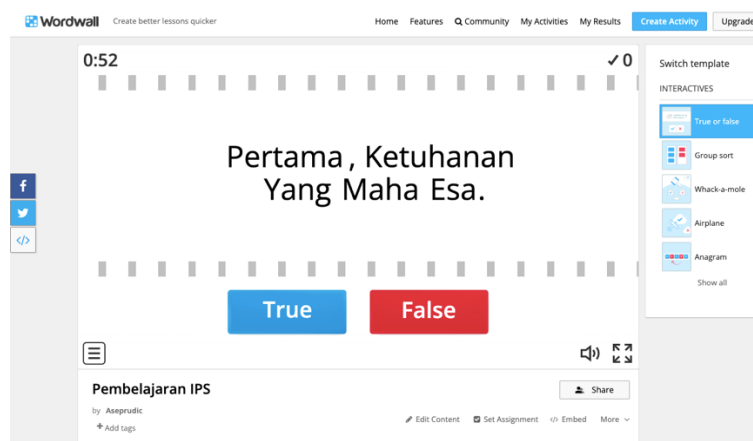


Figure 1 shows one example and form of using open the box as an example of the use of wordwall in learning gamification for ADHD students in inclusion elementary schools. According to the teacher's description at the interview, the use of wordwall can make students become more participating in the learning process, so they become very happy and interactive. The observation results also showed that students became very happy in using wordwalls. In learning the subjects of Pancasila and Citizenship Education, especially regarding "Bhineka Tunggal Ika", students try to learn about the diversity of regional cultures, ranging from traditional houses, traditional clothes, and several landmarks from every city in Indonesia. This can use the wordwall application so that the learning process becomes more interactive and interesting.

"ADHD students who usually have difficulty concentrating and participating in the classroom also actively participate in the learning process, there is even one ADHD student who answers correctly in one box" Interview, teacher 4

Figure 2

Use of wordwall application on gamification in the form of True or False



One of the ADHD students was very happy with one of the menus in Wordwall, namely the use of "True or False" in the selection of the menu. In this case, the learning objectives used are so that students know and understand Pancasila as a form of activity and practice in daily life. So, the media chosen by the teacher is about it. The observations showed that the group that had ADHD students appointed them so that the ADHD students answered the questions. When the answer is correct, all groups give appreciation. This form of appreciation can bring happiness and pleasure to ADHD students and become more eager to learn more about Pancasila.

4. DISCUSSIONS

Gamification is one way to be able to increase student learning concentration in the learning process (Buckley & Doyle 2016). Educators in inclusion primary schools have difficulty being able to teach students and provide material to students, especially in increasing enthusiasm in every learning process. When there are students who are included in ADHD, concentration becomes one of the most important problems. So, teachers need special media and applications in every learning process.

Gamification has several very positive benefits and impacts in improving student learning concentration, including ADHD students in elementary (Rivera & Garden 2021). According to Rivera and Garden (2021), there are several benefits related to the use of Gamification in every learning process including 1) making learning more fun and interactive (Bennani et al., 2025). 2) create a desire to dig deeper into information about the material presented by the teacher. 3) provide learners with the opportunity to be able to see the application and usage in the real world. 4) Offer feedback from students at a moment's notice. 5) improving student learning concentration (Cruaud, 2018; Laubersheimer et al., 2016).

Based on the findings in the field, the use of gamification can also increase the learning concentration of students in inclusion primary schools. This is by the results of a study conducted by Rivera and Garden (2021) which states the same thing. The visible form of concentration is the enthusiasm of the students in delivering the material and responding to the use of the wordwall. Therefore, this can be said that the use of gamification, especially with the help of wordwall, is very effective in increasing learning concentration in ADHD students.

5. CONCLUSION

Based on the findings of the study, it can be concluded that gamification can help ADHD students increase their learning concentration. ADHD students have characteristics that have difficulty in their learning process. They are also sometimes always active in the learning process in the classroom. Therefore, teachers need special methods and media so that they can also participate in the learning process. The use of Gamification is one way to be able to increase student learning concentration, gamification makes students become actively participating, in discussions in groups and happy in answering learning materials.

The application used by teachers in using gamification is Wordwall because, at the time of observation, the learning objectives used are about learning Pancasila and Citizenship Education and teaching about diversity. So with this learning, students become more interested and concentrated. There are three main steps that teachers can take to be able to teach and use gamification in the learning process. 1) the teacher determines the learning objectives and big ideas of the game. 2) The teacher forms a study group, and scenario, and designs the learning activity. When group learning, ADHD students are equated with being combined with other students so that they become more interesting and feel happy in each of their learning activities.

Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval: The study adheres to the ethical guidelines for conducting research.

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