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Board Game Design as Education to Prevent Game Addiction for Elementary Students

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Abstract: Child gaming addiction is a type of addiction that many children experience but its existence is rarely known or realized. The use of excessive digital games has several bad effects such as addiction, poor eye health, or lack of socialization in children. However, the nature of children playing games cannot be simply eliminated, so it needs to be completed with the right media. Board game is one of the right medium and with the right visual elements and game mechanics it can be an effective solution. This will be also accompanied by context and material about game addiction education. The method used is the graphic design process method by Robin Landa, the method stages are orientation, analysis and strategy, conceptual design, design development, and implementation. Data was obtained through interviews and questionnaires with elementary students, parents and academics. The design produces an educational board game with the title "*Mencari Bintang*" with a game mechanism like the classic monopoly board game and also effectiveness test result of the product.

Keyword: Addiction, Games, Children, Boardgames, Education

INTRODUCTION

Cocaine, methamphetamine, marijuana, alcohol and cigarettes are objects of addiction that people are familiar with. But there is a type of addiction that is usually not being aware (elearning.asam.org, 2021) by society, namely game addiction. The meaning of addiction according to the American Society of Addiction Medicine is a chronic disease that can still be cured through interactions that occur in the brain, environment, genetics, and also the experiences that occur in the sufferer's life. Addiction sufferers will usually behave compulsively and often withstand even though they knew there are bad consequences. Game addiction is included in the behavioral addiction classification. Game addiction itself is included in the ICD-11 international disease classification. ICD-11 itself is the eleventh revision of the global standards for classification of health information and causes of death developed by WHO (World Health Organization, 2019). Game addiction itself is given the disease code '6C51'. Games that usually cause addiction are usually digital games. Digital games are a type of game that is popular with children today. The meaning of digital game is

game played by individuals or groups of people with their own devices or gadgets (Pratama et al., 2020). Online games are activities with main element named enjoyment. When online games are played, it is usually aimed at fulfilling the need to fill free time and to entertain users (Eldhia & Iriyanty, 2022). Online games can be an initial source of problems when users start to feel addicted (Hermawan et al., 2021).

According to Ilham (Mujadid, 2023) online games can result in forgetting existence of time and chores/work that should be done. Behavior changes of game addicts are not felt by the sufferers, but are felt by those around them. The meaning of behavior itself is all activities and appearance that exist or occur in a person's daily life (Hayati, 2023). Most digital games have dangerous social effects, psychological and physical effects such as addiction. In social situations, sufferers spend less time together and relationships with friends and family become more tensed (Mujadid, 2023).

The increasing cases phenomenon of children addicted to games is closely related to the high internet penetration in Indonesia (Mariana, 2020). Internet use was also increasing and become more evenly distributed in the post-covid era in 2022, which can be seen through the internet penetration survey instrument. The penetration itself means the level of user penetration, namely "the ratio of Internet users to annual population". Based on the 2022 Indonesian Internet Service Providers Association Survey (APJII, 2022), as many as 143.26 million people, representing 54.68 percent of the Indonesian population, use the Internet, and the Internet penetration rate among children is 62.4%. So, it can be said that it is difficult for children to separate themselves from the presence of the Internet, and it continues to coexist with them. Generation Alpha children will live side by side with technology in the future and need good education and supervision in their daily lives. Because wrong parenting can potentially make children addicted to games (Bafadal, 2021). The term alpha generation itself, according to hellosehat.com (Hello Sehat, 2023), is children born after 2013 who have truly lived side by side with advanced technology since they were born.

According to the Indonesian Child Protection Commission (KPAI, 2020), parents felt there's an impact on their children's use of games and the majority of the impacts they feel are negative. 90.3% of parents are worried that their children will fall into game addiction. For the record, according to the Centers for Disease Control and Prevention (Lee et al., 2019), children are categorized as "using excessive games" if children aged 6-12 years play games for more than 2 hours (excluding use for assignments). If this is not regulated with more supervision from parents, this behavior can be very dangerous to the point of causing addiction and if it is not treated quickly, it can even reach the realm of mental disorders, because game addiction can cause serious mental and behavioral problems in children.

Board games are one of the right choices as a learning medium for this problem, because children can learn something well if they are happy (Ningtyas, 2023). Research by Limantara shows the positive impact of using board games as a learning medium. (Limantara et al., 2019) with the title "Designing Board Games to Foster Moral Values in Adolescents". The study concluded that game-based material is easier and better to teach because it keeps students engaged, compared to direct classroom instruction, which can be boring. Likewise, the results of research conducted by Purwanti (Setiawan et al., 2019), namely through the board games, children can be involved with various social problems and learn values and moral systems that can be applied in society. Cooperative game mechanics can also be considered good because it teaches children to share, pay attention to other people's feelings, and build good social interaction skills (Shalehah et al., 2020).

Playing can be said to be a form of children's lifestyle (Nurrahman et al., 2019). In article 31 of the children's rights convention which was approved by the UN General Assembly on 20 November 1989, it is stated that play and recreation activities are one of children's rights that must be fulfilled, so that it is impossible for children to eliminate playing games in their daily lives. From the description above, the idea was formed to design a board game as an educational

medium for preventing game addiction in children as a problem-solving innovation, resulting in the creation of the writing " Board Game Design As Education To Prevent Game Addiction For Elementary Students" as a solution to this problem.

METHOD



Figure 1. 5 Phases of Design Graphic Process Robin Landa

Source: (Cuaca et al., 2023)

The research was held on SDIT Arofah Boyolali, 5th grade students precisely. This research uses the 5 Phases of Design Graphic Process method by Robin Landa which its steps consists of Orientation, Analysis and Strategy, Conceptual Design, Design Development, and Implementation (Cuaca et al., 2023). During the search for data, this research collected it through (1) interviews with teachers, students and psychologists, (2) questionnaires, (3) observations, (4) tests, and (5) documentation. To determine the validity of the work created, the work goes through several tests using a formula. Namely validator evaluation test, Output effectiveness test (N-Gain), and Effectiveness test based on student responses. The following is the formula used:

Validator Evaluation Test

Evaluation test of the validity of the work is based on evaluations based on several validators using validation questionnaires and processed using formulas and criteria to determine the level of validity(Nesri & Kristanto, 2020).

$V = \frac{\sum x}{\sum xi} \times 100\%$		
No	Criteria Validity	Validity Level
1	$85\% < V \leq 100\%$	Very Valid
2	$70\% < V \leq 85\%$	Valid
3	$50\% < V \leq 70\%$	Less Valid
4	$V \leq 50\%$	Not Valid

Figure 2. Test formula and Validator Evaluation Assessment Criteria

Source: (Nesri & Kristanto, 2020)

Description=

V: Percentage

X: Expert judgment

Xi: Ideal value

Product Effectiveness Test (N-Gain)

Product effectiveness test (N-gain) or normalized gain is an assessment to measure the effectiveness of learning material for students. This is done by carrying out a short pretest and posttest on students and processing it through a formula and determining the product effectiveness value. The test was observed by observers (Saputri, 2021).

$N\ Gain = \frac{\text{Posttest score} - \text{Pretest Score}}{\text{Ideal score} - \text{Pretest score}}$	
N-Gain	Category
$G > 0,7$	High
$0,3 \leq g < 0,7$	Medium
$G < 0,3$	Low

Figure 3. Test Formula and Assessment Criteria for Product Effectiveness (N-Gain)

Source: (Saputri, 2021)

Test Product Effectiveness based on Students

The product effectiveness test was carried out from the student's perspective by filling out a questionnaire which was completed by the student after using the product (Humairah et al., 2023).

$P = \frac{\text{Total score gained}}{\text{Maximum score}} \times 100\%$		
No	Score Interval (%)	Category
1.	81-100	Excellent
2.	61-80	Good
3.	41-60	Average
4.	21-40	Fair
5.	0-20	Poor

Figure 4. Test Formula and Product Effectiveness Assessment Criteria Based on Students

Source: (Humairah et al., 2023)

RESULTS AND DISCUSSION

Literature Review

Child gaming addiction, or often referred to as "gaming disorder" or "game addiction", is a condition where a child loses control over the habit of playing games excessively (M. Fitri et al., 2023). Game addiction in children has several identifiable characteristics, including: loss of control, excessive anxiety, social and academic disorders, physical symptoms such as eye strain and mental health problems such as sleep disorders or depression. It is important for parents and educators to understand the risks and dangers of gaming addiction in children and take steps to prevent and overcome this condition with the right approach to teaching children about balance in the use of technology.

Learning using edugames (educational games) is an interesting and effective approach to involving students in the learning process. Edugames are games specifically designed for educational purposes. They combine game elements with learning, thus creating active engagement, increasing intrinsic motivation, experience-based learning, development of critical thinking, collaboration and competition, and individual adaptation (E. Fitri et al., 2019). By taking advantage of these benefits, learning using edugames can be an experience that helps their students to gain the knowledge, skills, and understanding they need to be successful in education and everyday life.

By providing an interesting and engaging learning experience for elementary school children, board games can be an effective tool in educating children about gaming addiction. Board game itself is a board game that usually uses a board, pawns, cards, tokens, or something else to play and is usually played by more than one person (Mangundjaya et al., 2022). With

the use of board games, it is hoped that it can be a solution in fulfilling the need for exciting learning tools and involving students as participants, so that it can increase student motivation in participating in learning activities with enthusiasm and learning can run effectively. This also happens because if it is based on andragogy principles, board games can lull participants into the learning process and foster attitudes of self-control, motivation and problem-solving activities. Board games have their own positive impact if implemented for the education of elementary school children, including: awareness education, learning time management skills, improving social skills, introducing alternative entertainment, learning cognitive skills. Through the use of board games in the context of learning about game addiction, children can gain a better understanding of the dangers of game addiction and strategies for preventing or overcoming this behavior.

Orientation

On orientation, data was collected by conducting interviews from the views of parents, teachers, students and psychologists. And after doing through these three things, it is known that children's game addiction exists due to lack of parental supervision, lack of knowledge and awareness regarding children's game addiction, and parents giving children unlimited freedom in playing games. Currently, 25 students of SDIT Boyolali 5th grader are classified as not knowing or being aware of game addiction, and after conducting a questionnaire, several of them have characteristics that point to children's game addiction. This will certainly disrupt the student's learning process. However, playing is a child's natural need, but using electronic media in this technological era without restrictions from parents will be very dangerous. From all the interviewees, all of them agreed that education regarding childhood game addiction for elementary school students is important and choosing board game media to implement this material can make it easier for students to understand the material in a more creative and exciting way. This can certainly help in the SDIT Arofah Boyolali school counseling program.

Analysis & Strategy

After collecting the data, the data is processed and the best strategy for solving the problem is determined to suit the needs, material and learning objectives. So that game addiction education can be carried out without eliminating children's natural instincts, namely playing games, they can use strategies to create conventional game education media, namely board games about game addiction education. This can also be a creative and exciting solution because it has the concept of edugames, which is a way of learning that students tend to like.

After all the data has been analyzed, the next step is to formulate the data using the 5W+1 H analysis technique which is described as follows: 1) What are the benefits of educational board game media? Game addiction can be a medium for education while playing; 2) Who is the target audience? The target audience for this game is primary children aged 9-12 years; 3) Why is it needed/important? As a preventive measure, children need to be introduced to the dangers and forms of gaming addiction so that they can avoid gaming addiction and become knowledgeable so that they become agents of change in the family and society; 4) When it can be used? It can be played at any time in your free time or when delivering counseling guidance material with a duration of one hour; 5) Where it can be used? It can be played anywhere, home or school; and 6) How is boardgame the solution of the problem? Through board games, game addiction will be indirectly conveyed and children will be educated when playing them with peers or parents.

From the description above, it is known that those who need it are elementary school students. The material presented is what are the dangers of game addiction. And the implementation of this material can be done on counseling guidance class.

Conceptual Design

In the conceptual design process, a board game concept framework was formed with educational aspects of children's game addiction as the main material.

A. Board Game Title

This design uses Indonesian as the language of communication and not using any medical terms due to concerns about children's comprehension while using the board game. The title that will be featured in this board game is "*Mencari Bintang*". This game has a gameplay similar to the Monopoly board game. So that in appearance layout will be almost similar to monopoly.

B. Visual Concept

The illustration style used in board games is two-dimensional cartoon illustrations with various interesting and funny characters. This illustration was chosen because it is popular among children and is suitable for the target audience of elementary school students aged 9 to 12 years. The illustration style itself takes reference from the "Hello Jadoo" animation, because after conducting a questionnaire with elementary school children, the majority liked the animation style.



Figure 5. Hello Jadoo Illustration

Source: (Kurniasari, 2019)

The color palette in this design is bright but slightly muted so that it is comfortable for the eyes to see, and the majority of colors use yellow and orange.



Figure 6. Color Palette

Source: (Research Results, 2024)

C. Typography

The type of typography used in this board game is sans serif with the font name "Hand Marker". This font was used because its characteristics are similar to handwriting which is giving friendly vibe, and it tends to be curved and looks pleasant.

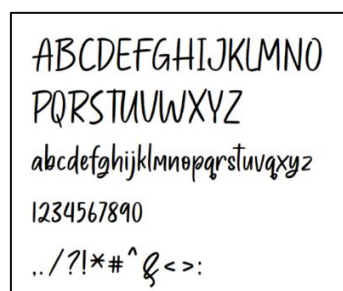


Figure 7. Font Hand Marker

Source: (Research Results, 2024)

D. Game Instruction

To achieve victory, players must collect 5 stars quickly. Here's how to play the game from start to finish: Game Preparation: 1) Prepare all the game board components. Game board and scoreboard; 2) Maximum number of players is 4 people; 3) Players choose a game character; and 4) Determine the order of players by throwing the dice. If the dice shows the highest value, then you get first place and so on. Players are advised to read and understand the game rule book first. Then the game can start.

Beginning of the Game: 1) Players roll the dice to move their pawns; 2) Move each pawn according to the number of numbers shown by the dice; 3) If the pawn has passed the first round. Every time you pass a "GO" path, players are entitled to receive 1 star. If you just stop at that square, you don't get a star; 4) If the pawn stops on the "STOP!" path, then the player must stop until all players have rolled the dice twice or the player can give 1; 5) There are two types of cards, namely "CHALLENGE" and "SURPRISE" cards. If they stop at these squares, players may take one card according to the mark on the square; 6) If they stop at the "CHALLENGE" path, the player can take a card then read the contents of the card aloud, and follow the directions written on the card. On this card you can get a reward in the form of a star, but if you lose you get punishment in the form of going back 5 steps or a zonk card; 7) If the pawn stops on the "SURPRISE" path, the player can take a card then read the contents of the card aloud, and follow the instructions as written on the card. Special challenge cards only have rewards and punishments in the form of steps forward or backward according to what is written on the card found; 8) If a player gets zonk cards twice, the player must take 5 steps back; and 9) The game can be continued by other players with the same rules.

End Game: 1) The game may be declared over if the winner is first; 2) Players can win if they have completed 5 stars first; and 3) The game can also be continued until the second, third and fourth winners are found in the same way as the second point.

Design Development

After determining the design concept, the next stage is to develop the design concept into a visual with three stages, tight tissue, thumbnail, and final design. After that, a validator evaluation test is carried out to determine the validity of the product.

A. Thumbnail

The design development section begins with the process of creating thumbnails, namely making sketches manually according to the visual concept that has been designed.

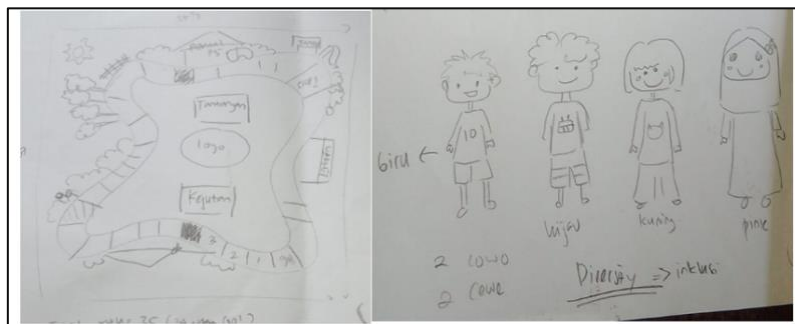


Figure 8. Thumbnail Sketch
Source: (Research Results, 2024)

B. Tight Tissue

The finished thumbnail is then digitalized through software. Researcher used Medibang paint as the software.

C. Final Design

1) Mainboard



Figure 9. Final Mainboard
Source: (Research Results, 2024)

2) Complementary



Figure 10. Pawns Design
Source: (Research Results, 2024)



Figure 11. Game Cards Design
Source: (Research Results, 2024)

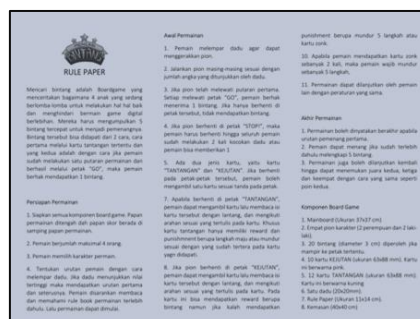


Figure 12. Rule Paper
Source: (Research Results, 2024)

3) Packaging


Figure 13. Packaging

Source: (Research Results, 2024)

4) Validator Evaluation Test

The validation process was carried out by three validators, namely psychology experts, teachers and parents. The results are:

Table 1. Validator Evaluation Test Results of *Mencari Bintang* Boardgame

No.	Aspect Assessment	Validator Score			Percentage %	Category
		1	2	3		
Media Validity						
1	Product Graphics	82	88	86	85	Very Valid
2	Product Presentation	84	86	86	85	Very Valid
3	Language	85	88	90	88	Very Valid
Context Validity						
4	Context	85	85	85	85	Very Valid
Percentage %		84	87	87	86	Very Valid

Source: (Research Data, 2024)

The results from table 1 show that the average results from the three validators show that the product is very valid both in terms of media and content, so this product is suitable for implementation with a percentage result of 86%.

Implementation

A. Product Implementation

The product test was held on elementary school in Boyolali, named SDIT 1 Arofah Boyolali. Testing was carried out for approximately 1 hour 20 minutes (2 games). There are 4 players in accordance with the provisions and are aged between 10-12 years and are in the 5th grade of elementary school. During observations, it was seen that children became more active and interactive and could increase socialization between players.


Figure 14. Game Test

Source: (Research Results, 2024)

B. Evaluation

An evaluation is carried out to find out whether the product is effective enough and in accordance with the main objective, namely educating children about game addiction. Two tests were carried out, namely a product effectiveness test (N-Gain) and an effectiveness test based on student responses.

1) Product Effectiveness Test (N-Gain)

In this process, a pre-test is held before using the product and a post-test after using the product to determine the increase in students' knowledge of the material provided and to find out whether the product is effective enough in providing the material.

Table 2. Product Effectiveness Test (N-Gain) Results of Mencari Bintang Boardgame

No.	Aspect	SDIT Arofah 5 th grade		N-gain	Category
		Pre Test	Post Test		
1	Total Students	25			
2	Average score	60	90	1,5	Tinggi

Source: (Research Data, 2024)

The results of the N-Gain test show that the score obtained is 1.5 (High). This shows that the product can be declared effective, moreover the results of the pre-test and post-test show an increase in the average, thus showing that students have succeeded in understanding the educational material on the dangers of children's game addiction.

2) Test Product Effectiveness based on Students

In this process, a questionnaire is filled out after product implementation to determine the level of success of the product from the perspective of students as users.

Table 3. Product Effectiveness Test Results based on Students

No	Aspect	Score	Category
1	Unique	80	Good
2	Interest	84	Excellent
3	Motivation	80	Good
4	Satisfaction	87	Excellent
5	Response	85	Excellent
Percentage%		83,2	Excellent

Source: (Research Data, 2024)

The results of the test above show that the percentage found was 83.2%, which means that the student response was very good to this product and this product was categorized as effective according to the students.

Discussion

From all the test results carried out, 3 analyzes were found. The first analysis is a validator evaluation test analysis to show whether the product is valid and suitable for use or not. This test assessment was carried out by 3 validators, namely psychologists, teachers and parents. From this test, a percentage of 86% has been obtained in table 1, so that if reviewed according to the assessment criteria it can be categorized that the product is declared very valid. From this, it is known that the product that has been designed is ready to be implemented for 5th grade students of SDIT Arofah Boyolali.

In the second analysis, the effectiveness of the N-Gain product was tested. This is to find out whether the product is effective in conveying the material. This test uses Post Test and Pre-Test scores to determine the increase in student knowledge. The assessment is carried out

by observers. In this analysis, an N-Gain score of 1.5 was found, which if adjusted to the assessment category, the product was categorized as effective.

In the third analysis, a product effectiveness test was carried out based on students. Basically, this test aims to find out students' responses to the product after they use it. The assessment was completely carried out by 5th grade students of SDIT Arofah Boyolali through a questionnaire. From this test, the percentage was found to be 83.2%. If reviewed according to the assessment category, this product was declared effective by students, and students were satisfied with the product. Students show a positive response in using board game products to educate children's game addiction. So, it can be stated that the Boardgame product as education for preventing game addiction in elementary school children can be declared valid and effective both in the delivery of material and in the media.

CONCLUSION

This educational board game to prevent children's game addiction can be declared valid, good and effective in both the delivery of the material and the media. This was concluded from 3 test results. The validator evaluation test results show a percentage of 86% so it can be categorized as a very valid product. Then the results of the N-Gain product effectiveness test showed a score of 1.5 so it could be categorized as a high effectiveness product in delivering material to students. Then, the results of the product effectiveness test based on students showed a percentage of 83.2% so it could be categorized that the product was very effective in the students' opinion, and students showed a positive response after using the product. This shows that the design of educational board games to prevent children's game addiction can be used for education and learning media for elementary school students in understanding the dangers of children's game addiction.

The novelty of this research is that previously no one had the concept of a board game to provide game addiction education to elementary school children. This concept is a great solution because board game media is a conventional game medium so it can avoid the bad effects of using digital games but still fulfills the essence of children, namely playing.

However, there are potential for future researchers to conduct and explore what can be developed in implementing this board game. And recommends more in-depth implication about game addiction in this game so that children could understand better the dangers of children's game addiction.

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