APP-ASSISTED BOARDGAME AS AN EDUCATIONAL MEDIUM FOR ELEMENTARY SCHOOL'S CHILDREN'S COLLABORATIVE SKILL'S

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ABSTRACT

Boardgame is one form of game that is presently popular. The development of board games is also interesting from board games which were originally just paper and boards, now they are starting to penetrate the digital world. Starting from board games that are present digitally, implementing a hybrid concept between physical and digital, to those that use the latest technology. The addition of digital tools or applications to board games seeks to enhance the playing experience by making games more exciting, fascinating and interactive. With the presence of digital media in a board game, digital media interventions such as the use of audio, video, or even interactive displays are conceivable. In addition to serving as a form of diversion, board games can also serve as an educational tool. With board games as an educational medium, tedious learning can become more enjoyable. Boardgames as learning media are not new; there are already quite a few boardgame titles that contain science and soft skills-related learning content. Students must possess four competencies in the 21st century: critical thinking and problem solving, creativity, communication skills, and problem-solving skills through collaboration. During the pandemic, many online students encountered difficulties collaborating with their classmates. There is a need for learning materials that facilitate student collaboration, and board games are one such medium. Collaboration is nothing new in the realm of collaborative education; it has become an integral part of the existing educational structure. Collaboration is an integral element of the current education system in Indonesia, which emphasises character education, and is even included in the Pancasila student profile. Based on this phenomenon and aided by a review of the relevant literature, research was conducted to determine how board games with digital media are utilised as collaborative learning media for children. It is necessary to dissect the design and concept of a board game to determine how they affect the player's experience. Based on this experience, additional research was conducted to determine what children can learn from board games with digital applications.

Keyword: Hybrid Boardgames, Colloaboration Skill's, Education Boardgames

INTRODUCTION

Board games are a popular form of entertainment media in the form of games. The terms of "boardgames: can be defined as any of many games, for example chess, in which small pieces are moved around on a board with a pattern on it. Initially, the board game solely incorporated conventional physical mechanisms in its gameplay; nevertheless, throughout time, it encountered transformations. Digital technology in boardgames is not only undervalued by boardgame designers. Nevertheless, rather than fully digitising their board game, they chose to integrate physical and digital gaming approaches, aiming to minimise the degradation of the

fundamental aspects of physical interaction inherent in their board game. One approach is utilising digital application media as a means of enhancing the experience of engaging in board games. The utilisation of digital media in the context of boardgames, often known as app-assisted boardgames. Within the realm of education, board games are a familiar medium. There exists a considerable assortment of board games that incorporate educational themes and substance inside their design. The application of board games as an educational medium has tremendous potential for the education of young children. The educational content embedded inside a board game encompasses not only academic education, but also imparts knowledge and development of soft skills. In 2020, a study conducted by Shanizan Herman Bin Mohd Radzi et al. (2020) shown that board games possess the potential to enhance the players' soft skills. One of the numerous soft skills inherent in a board game is the capacity to engage in collaboration or cooperative effort.

According to Greenstein (2012), collaboration can be defined as a cognitive process wherein individuals engage in joint planning and cooperative efforts to explore other perspectives, engage in discussions through techniques such as brainstorming, active listening, and providing support to one another. Widana et al (2021) identified four essential qualities that students in the 21st century should possess. These competencies include critical thinking and problem-solving, creativity, effective communication skills, and the ability to collaborate in problem-solving activities. A novel issue has emerged in the context of the pandemic, pertaining to the capacity for collaborative work. It is imperative to implement educational resources that facilitate seamless student collaboration. Among the various media options available, board games emerge as a viable solution.

Collaboration is a well-established component within the education system of Indonesia, having been integrated into the current educational framework. In the present educational framework in Indonesia, characterised by its emphasis on character education, collaboration assumes a significant role and is explicitly incorporated within the Pancasila student profile. According to Minister of Education and Culture Regulation Number 22 of

2020, which outlines the Strategic Plan of the Ministry of Education and Culture for the period of 2020-2024, the Ministry has defined the characteristics and attributes of Pancasila students (Kemendikbud, 2021).

LITERATURE REVIEW

App-Assisted Boardgame

Initially, board games incorporated only traditional physical mechanisms into their gameplay, but this evolved over time. The existence of digital technology proves to be a fascinating aspect for boardgame designers. However, rather than fully digitizing their board game, they prefer to combine physical and digital game methods by minimizing the loss of the board game's physical interaction. Using a digital application to assist in playing board games is one option. The application of digital media to the process of playing boardgames, or app-assisted boardgames, is unique. One of the articles on MeepleMountain.com (one of the media that publishes Boardgame reviews) written by Reid Conley (2021) describes one of the digital media applications in Boardgame Alchemists, which was released in 2014. In this game, the application includes functions that are beneficial for dealing with randomization calculations. Although we can technically compute it on our own, doing so will hinder the core gameplay of this game. The application's function in this game is not particularly noteworthy; it is merely a supporting component. App-assisted gameplay is a method that combines physical game components with a digital application that supports the game (Kaikanen et al, 2017). App-assisted participation can be classified as Hybrid Digital Boardgames (HDBs) in the world of board games (Melissa J. Rogerson et al, 2021). This discussion is currently being scrutinized by a number of researchers, especially due to the increasing popularity of board games.

Boardgames as Educational Media

Board games have been identified as a valuable educational tool, with existing examples of several board games designed to facilitate learning (Sonia, 2021). The utilisation of boardgames as an instructional tool has gained significant popularity in recent times. In addition to its capacity to effectively convey subject-specific content, educational media can also facilitate the acquisition of supplementary knowledge pertaining to

soft skills, mental education, and critical thinking. According to Collins and O'Brien (2003), board games have the potential to facilitate active learning by encouraging children to engage in reflective activities that prompt them to contemplate ideas and their application. This implies that board games might facilitate a greater sense of freedom and expression in youngsters, hence enhancing the effectiveness of the learning process. Game media, whether used within or outside the confines of educational settings, serves as a dynamic and enjoyable medium for active learning. Moreover, it possesses the dual characteristics of being both cost-free and all-encompassing in nature. Additionally, it may be argued that this approach facilitates the acquisition of knowledge since it actively involves youngsters in enjoyable and socially engaged activities. According to Weisberg (2015), Games of this nature have the potential to facilitate effective learning in youngsters, surpassing conventional educational approaches. In addition to their utility as an educational medium featuring academic content, board games can serve as a platform for the acquisition and development of soft skills. According to the study conducted by Mohd Radzi et al. (2020), it was found that there is a substantial impact on the enhancement of soft skills development among participants in the experimental group. In this interactive activity, the individuals involved will assume distinct roles and must engage in cooperative efforts to successfully navigate the game and ultimately achieve the objective of reaching the designated endpoint.board games incorporated only traditional physical mechanisms into their gameplay, but this evolved over time.

Collaboration Skill's and Indonesian's Education

Widana et al (2021) identified four essential qualities that students should possess in the 21st century. These capabilities include critical thinking and problem-solving abilities, creativity, effective communication skills, and the capacity to collaborate in problem-solving endeavours. Within the existing educational framework in Indonesia, character education holds a prominent position, with collaboration being a crucial component. This is explicitly outlined in the profile of Pancasila students, as specified in the Minister of Education and

Culture Regulation Number 22 of 2020, which pertains to the Strategic Plan of the Ministry of Education and Culture for the period of 2020-2024 (2021).

According to Greenstein (2012), collaboration can be defined as a cognitive process that involves the collective planning and execution of tasks, wherein individuals come together to deliberate upon diverse perspectives and engage in active participation through activities such as brainstorming, attentive listening, and providing support to one another. In an educational setting characterised by collaboration, students will actively collaborate to establish shared objectives, engage in collective learning experiences, and participate in meaningful assignments. Moreover, they will collectively produce ideas and create a diverse range of artefacts or products from the ground up. Binkley et al. (2012) provided an explanation of collaboration, identifying three key components: knowledge, skills, and attitudes. In the realm of knowledge, it pertains to the ability to engage in successful interpersonal communication by discerning appropriate moments for speaking and listening, operating efficiently by acknowledging fellow team members, and overseeing the execution of a project, in this instance, engaging in recreational pursuits. The key elements of proficiency include the ability to effectively engage with fellow team members, demonstrating respect for the views and opinions of others, possessing leadership qualities, and motivating peers to persevere until the completion of the game. The components of attitude encompass the ability to engage in productive interactions and collaborations, which can be facilitated by a keen awareness of timing, a respectful demeanour towards others, a patient approach towards goal attainment, and a willingness to take responsibility for any potential consequences that may arise.

Based on Regulation of the Minister of Education and Culture Number 22 of 2020 (2021), which outlines the Strategic Plan of the Ministry of Education and Culture for the period of 2020-2024, the Ministry defines Pancasila Students as individuals who embody the ideals of Indonesian education. These students are characterised by their lifelong learning mindset, possession of global competence, and adherence to the values of Pancasila. The Ministry identifies six key characteristics that exemplify Pancasila

Students. The major values encompassed in this context are faith, the fear of God Almighty, and the cultivation of a noble character. Additionally, the ideals of global diversity, mutual collaboration, independence, critical reasoning, and creativity are emphasised. The concept of gotong royong encompasses various aspects, one of which is collaboration (Kemendikbud, 2021).

METHODOLOGY

The methodology used in this study involves content analysis, both through direct examination and by reviewing the outcomes of gameplay recordings. The Design, Dynamics, Experience (D.D.E) Framework by Wolfgang (2017) was selected as a dissecting instrument due to its capacity to examine the gaming experience from the perspective of the user or player. Testplay serves as a means of validating the data gathered during the research process. The subject of analysis is the board game "Yummy Yummy Monster Tummy," a game designed specifically for toddlers. The selection of this particular board game was based on the critical reliance on digital applications for its functionality, rendering it impossible to operate without such programmes. Additionally, the game's gameplay is rather straightforward, making it well-suited for children in basic education.

The testplay was conducted using a sample of three female primary school students in the fourth grade. During the test play process, the initial step involves assigning the children a job that necessitates collaboration both prior to and subsequent to the test play process (pre-test and post-test). The activity consists of three puzzles that are divided into separate sections, with participants required to complete each challenge. Subsequently, the many components of the problem are haphazardly intermingled, prompting the participants to undertake the task of resolving them. The provided instructions are outlined as follows:

1. They must complete all of the puzzles as quickly as possible.
2. They are free to do whatever it takes to complete the assignment as quickly as possible.
3. When all puzzles are done, time is computed.

Throughout the pre-test and post-test procedures, an evaluation was conducted to assess the collaborative disposition of the participants. This assessment was facilitated by the collaboration of

educators at the elementary education level, who contributed to the development of an assessment rubric. The rubric focused on aspects such as productive teamwork, respectful consideration of diverse viewpoints, willingness to compromise, and shared accountability. The rubric employed a rating scale ranging from 1 (indicating the lowest level of collaborative attitude) to 4 (indicating the highest level of collaborative attitude).

RESULT

Yummy Yummy Monster Tummy Boardgame Analysis

Figure 1. Yummy Yummy Monster Tummy Boardgames (source: boardgamegeek, 2023)

The board game titled "Yummy Yummy Monster Tummy" is a collaborative card game that incorporates the principle of "colour matching." It is specifically created for a player count of 2 to 4 individuals, with the objective of successfully progressing through each level by providing the monsters with objects possessing specific colours and effectively blending these colours to align with their visual cues. The monster's desires are inferred from its fur, as per the monster's intentions. In a general sense, the game revolves around a puzzle format that involves combining various elements to create colour combinations that correspond to the fur colour of the presented monsters. The existence of randomly ordered decks contributes to the intricacies of player mobility throughout the game. The game comprises two primary elements: a physical component represented by game cards, and a digital component represented by digital applications. The digital component included within this board game possesses a vital purpose, seamlessly merging with the overall structure of the game.

The game incorporates a tangible element in the form of a deck of playing cards, which serves the purpose of nourishing the virtual creatures that manifest within the digital interface. The game cards can be described as follows:

Figure 2. Yummy Yummy Monster Tummy Card Design (source: boardgamegeek, 2023)

The structure of playing cards is characterised by a relatively uncomplicated composition consisting of merely four fundamental components, hence facilitating comprehension for users. The object icons in this board game are designed in a visually appealing and child-friendly manner, aligning with the intended age group of players aged 6 years and above. Every individual card possesses its own distinct set, which is further categorised into many themes, like Grampa's Attic, Scrapyard, Museum, and forest. Each of these sets exhibits its own distinctive characteristics that align with the narrative of the game. The game cards feature objects that are visually depicted in a cartoonist manner, aligning with the thematic elements of the game.

Figure 3. Yummy Yummy Monster Tummy Digital Apps Screen (Source: Boardgamegeek, 2023)

In addition to its tangible elements, the Yummy Yummy Monster Tummy board game features a requisite digital programme that necessitates installation for gameplay purposes. Within this digital programme, a multitude of events transpire, encompassing the dissemination of game-related information such as stage details and tutorials, assuming the role of the game master, and managing game mechanics such as card scanning, monster spawning, and determining game termination conditions. The digital apps often feature a main menu display that consists of four distinct menu items. Digital apps often consist of various scenes that serve different purposes. These scenes may typically be categorised into three distinct types: the main menu, the story selection screen, and the in-game scene. The primary interface offers users the option to select between two game modes: story mode and party mode. Additionally, the interface includes an access button that allows users to navigate to the settings menu, as well as a quit game button that enables them to exit the game. The digital application has been intentionally designed to align seamlessly with its intended user base, featuring an art style that leans towards cuteness and cartoonishness, complemented by a diverse range of colours. The game incorporates the presence of monsters

who embody the notion of cuteness and endearment, as evidenced by their vibrant fur, large eyes, and expressive, open mouths.

In this game there are 2 types of creatures or monsters that can appear in the application, namely monsters and rabbits. Each creature possesses distinct and exceptional attributes, which can be delineated as follows:

1. Monster, They really enjoy eating foods that match their fur's colour and truly detest vitamins. If the monster is fed vitamins, it will set off a vitamin alarm (during the next three cards, if the player feeds vitamins to monsters, all players will lose). Moreover, in the event that the hue of the card distributed does not precisely correspond to the hue of the fur, all participants will likewise be deemed to have suffered defeat.
2. Rabbit, there are rabbits who don't care about the colour of the card but only about the vitamin icon, and if they aren't fed vitamins, the game ends and the player loses.

The gaming mechanics of this particular game are characterised by their simplicity. In essence, players are tasked with nourishing the various animals that manifest inside the game environment. This is achieved by strategically employing a collection of cards in order to generate a hue that closely matches the coloration of the creature's fur. Consequently, this gameplay mechanic may be classified as a mix-and-match puzzle. The primary directive in this interactive game entails providing sustenance to the many monsters or creatures that manifest on the electronic device employed by the user. The feeding process is straightforward, as players are instructed to select an item card from their hand in a free order fashion. This card is then used to feed the animals by scanning the QR code present on the front camera of the device being utilised. Players are permitted to communicate the colour and ability of the cards they want to play to fellow players, but they are prohibited from physically revealing their own cards. In addition, players have the ability to engage in communication with one another in order to establish the sequence of turns for feeding the creature. Once the card has been scanned, the player is unable to alter their decision or retract it. Furthermore, Following the scanning of the item card by each participant, it is

imperative that said card be promptly discarded from their respective hands. The special abilities of cards will be promptly activated upon use.

Upon the player's act of feeding the monster in sequential order, the digital application will afterwards relay information to the player regarding the creature's satiation status through the manifestation of a contented and sated gesture. In the event of such occurrence, the player is granted the opportunity to draw a single card from the uppermost section of the deck and thereafter proceed to interact with another creature. In the process of nourishing extant organisms, participants are required to combine multiple item cards in a manner that aligns with the fur coloration of said organisms. In the event that the colours fail to align, it results in the collective defeat of all players in the game, necessitating a restart of the level from its initial state.

The game will conclude either when the player successfully feeds all the monsters in a single level or when the player engages in an offence, such as administering vitamins to monsters subsequent to the activation of the Vitamin Alarm, neglecting to provide vitamins to rabbits, or failing to match the colour combination of the monsters' coats. During every round, a visual representation in the form of a "bar" will be presented to indicate the level of satisfaction of the monster. This bar will consist of three stars that the player must acquire.

D.D.E Analysis Of Yummy Yummy Monster Tummy

The chart below shows the analysis results of Yummy Yummy Monster Tummy utilising the D.D.E Framework with the following detailed explanation. Diagrams are created as a result of the process of connecting game mechanics and design to the dynamics of what occurs to the players. The dynamics that evolve will then form the experience that players have.

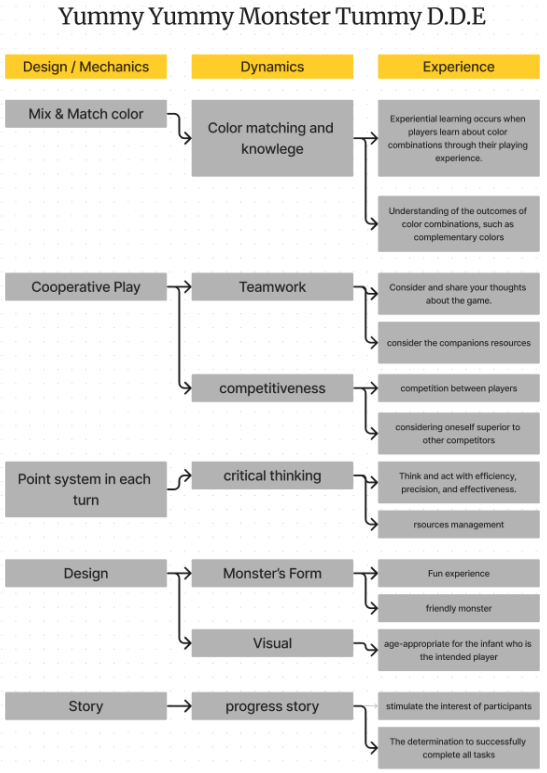

Figure 4. D.D.E Framework Analysis Chart

- Dynamics

In the previous explanation, it is known that in the Yummy Yummy Monster Tummy board game the main mechanic used is Mix & Match, by combining 2 different colors to become 1 specific color. This subsequently brings forth the complexities associated with the fusion process and the comprehension of colour. During gameplay, participants are instructed to merge two or more cards of a designated colour in order to correspond with the fur colour of the appearing monsters. The degree of similarity between the colours directly influences the level of optimisation achieved.

The mechanics or principles of cooperative play in the board game give rise to the dynamics that manifest among players. The principle of cooperative play facilitates the collaboration of players in order to accomplish their respective objectives. Players have the opportunity to engage in discussions with one another regarding the cards they now possess and the colour selections they intend to employ. Furthermore, this collaborative gameplay might engender competitive attitudes among participants, as there is an inherent inclination to exhibit prowess in the game despite the underlying objective of teamwork.

During each iteration of the game, participants are required to gather stars or points. This necessitates a critical perspective from anyone participating in the activity. Additionally, the consideration of monster design and graphics constitutes a distinct topic, as it is tailored to cater to the specific age demographic of the game's customers. The design of the monsters prioritises the creation of visually appealing and adorable aesthetics. The game also incorporates the concept of a progressive

narrative, wherein the player's progression through the plot is contingent upon the successful completion of preceding stages.

- Experience

The preceding discourse has established that the design, concept, and game mechanics possess the capacity to generate dynamics, which in turn contribute to the user's overall gaming experience. Yummy Yummy Monster Tummy incorporates the interplay between knowledge and colour combinations to generate experiential learning for players, specifically in relation to understanding the outcomes resulting from the amalgamation of various colours. This further enhances the player's comprehension of complementary colours. The acquisition of this knowledge may occur subsequent to experiential learning pertaining to colour combination, as players often employ predictive strategies in selecting colours based on initial analysis conducted during video game play. This assertion is further substantiated by the inclusion of a gaming system that permits the replaying of specific levels. Experiential learning is a prevalent phenomenon observed in games including a stage repetition structure, particularly in games that need flawless execution in order to progress through the stages.

The dynamics that arise from the principle of cooperative play pertain to the interplay of cooperation and rivalry among players. The act of collaborating among players facilitates the acquisition of knowledge pertaining to providing thoughts and input to fellow players during decision-making processes. Additionally, collaboration fosters an understanding of the circumstances and conditions of one's partners, ultimately leading to the establishment of shared objectives. This phenomenon is advantageous since it fosters engagement among players, hence enhancing the liveliness and interactivity of the game. The interactions that occur encompass both positive and bad aspects. bad interactions may manifest through behaviours such as blaming and mocking one another in response to decisions that are deemed incorrect. Moreover, cooperative play facilitates the potential creation of rivalry within the context of the game. While the primary purpose of the multiplayer function is to facilitate cooperation among players, it does not

preclude the potential for rivalry among individuals seeking to demonstrate their ability to steer the game towards a more favourable outcome. Competition possesses a dual nature, as it encompasses both negative and good connotations. It engenders a positive impact by fostering a heightened sense of caution and creativity among participants, as they strive to select the most advantageous card in order to avoid defeat or potential scorn from their peers. This aligns with the cognitive processes in which participants are encouraged to engage in critical thinking. By adhering to the requirements of completing stages in order to maximise points, players will have the opportunity to engage in a cognitive and behavioural process that emphasises efficiency, attention to detail, and effectiveness. In this game, players are also compelled to consider their available resources in order to prevent unfavourable outcomes in subsequent round. One instance arises when a player opts not to employ a specific colour during their turn due to its prior utilisation by a fellow player. Consequently, it is deemed more advantageous to reserve that colour for a subsequent turn.

The plot of the "Yummy Yummy" board game generates its own dynamics, in addition to its playing mechanics. The inclusion of a narrative component in the game ensures a cohesive and evolving storyline. Each level of the game presents a distinct topic that influences the composition of the cards and the items they depict. This subsequently engenders a sense of intrigue among the players over the progression of the narrative or the nature of forthcoming obstacles. Furthermore, this phenomenon elicits a sense of accomplishment in the player, as they strive to achieve optimal performance in order to unlock the subsequent narrative progression that is presented. Furthermore, the game's design effectively showcases the interplay between the aesthetic elements and the physical forms of the creatures included in the game. The creature's form, characterised by its endearing and vibrant appearance, along with its charming demeanour, effectively enhances players' enjoyment. This is substantiated by the presence of application-assisted gameplay, which facilitates a heightened level of dynamism and interactivity in visual representation. Additionally, this conveys the notion that monsters do not

necessarily evoke fear, as there exists the possibility of encountering monsters that possess endearing and amicable qualities. Despite the game's visual appeal and its ability to cater to the specific preferences of the target audience, especially children, it is still subject to acceptance by said audience.

Testplay

Several phenomena were seen among the players during the test-play process, based on the findings obtained. One notable observation is that, during the initial stages of the game at a lower level of difficulty, players often lack coordination and primarily prioritize acquiring a foundational understanding of gameplay mechanics. A noteworthy aspect of this situation is that despite receiving instructions regarding the gameplay method, which permits them to inquire about each other's cards, the participants exhibit seldom utilization of this option.

During the test play phase at the "medium" level of the game, participants encountered significant challenges while attempting to play it. A total of three attempts are required to complete the game, as the previous two attempts were unsuccessful in achieving this objective. The absence of communication among players in the game results in an inability to effectively manage their resources, leading to a state of being overwhelmed when confronted with a color that is not present on the card held in their hand. Nevertheless, the second experiment revealed the presence of an interaction in which one of the participants attempted to inquire about the color of the card possessed by the other player. Consequently, this leads to the manifestation of reciprocal engagements within the participants. The second and third trials resulted in failures due to a lack of comprehension among the players regarding the maintenance and management of their resources, despite engaging in interactions. Nevertheless, after three attempts, the participants successfully completed the game. Throughout the experiment, there were numerous instances of interaction among the players, including an event where one player sought another player's input regarding the selection of a card or color to play.

Following their experience playing the game at the "medium" level, all three individuals expressed a keen interest in

engaging with a more challenging level of difficulty, specifically the "hard" level. The outcome revealed that they were proficient at playing the challenging level. After engaging in two sessions of gameplay at the "hard" difficulty level, the user has consistently achieved victory without experiencing any losses. The collaborative approach observed in this context is notably effective, since participants engage in active inquiry regarding the contents of each other's card hands. Furthermore, when confronted with a monster that necessitates all players to contribute cards of identical or similar colors, individuals engage in pre-play negotiations to ensure optimal decision-making. This observation indicates that there exists an experiential learning process during gameplay. Initially, when players are operating independently, they encounter challenges in successfully completing the game. However, as time progresses, they come to the realization that cooperation and collaboration are necessary in order to achieve game completion.

Figure 5. Participant in Testplay phase

The players possess an incomplete comprehension of the concept pertaining to the primary mechanics of the game with respect to color combination and coordination. The individuals possess comprehension of the concept of aligning the hues present on the card held, nevertheless they continue to lack a comprehensive understanding of the concept of color blending. The players' gameplay strategy appears to involve selecting colors that they perceive to be similar to those typically associated with monsters. The occurrence of this phenomena also piqued their curiosity subsequent to the conclusion of the game, prompting them to inquire with the researchers regarding certain color combinations.

The test-play method also involves the consideration of resource management. Towards the conclusion of the game sessions, one participant

imparted knowledge regarding the imperative task of safeguarding a specific hue in the subsequent turn, owing to the impending arrival of a forthcoming creature.

Another noteworthy aspect is that, throughout the gameplay, the three participants frequently emulate the motions or conduct of the creatures depicted on the screen. This finding demonstrates that the monster's design possesses sufficient allure to capture the attention of individuals, without inducing fear or boredom. The test-play findings yielded data indicating a progression in the collaborative process that transpired during the game. Initially characterized by a lack of communication and silence, the activity gradually transformed into a collaborative endeavor. This observation indicates the presence of a process of experiential learning within the game. Experiential learning encompasses not only the acquisition of knowledge pertaining to colors and game mechanics, but also the collaborative process as a means of acquiring knowledge. During the course of engaging with heightened degrees of challenge, players experience first failures in the early stages of the game, prompting them to develop effective communication skills and seek input from their peers. Furthermore, the process of communication that transpires also evolves, progressing from a mere request for cards when one's own cards are unavailable, to a more advanced stage where individuals engage in the exchange of ideas pertaining to which card should be played.

The outcomes of the pre-test and post-test procedures revealed notable disparities, particularly in the post-test phase, wherein the participants engaged in communication pertaining to the allocation of tasks.

Figure 6. Post-Test Phase (participant helping each other)

During the pre-test phase, the three children directed their attention towards each other's puzzles. Upon completion of one child's work, the individual refrained from engaging in any activity and patiently awaited the completion of the tasks by their two companions. During the pre-test phase, it was observed that one youngster

encountered challenges in successfully completing the puzzle task. The overall duration necessary for this procedure amounts to 3 minutes and 47 seconds. During that period, the tasks assigned to them were not done simultaneously.

During the post-test phase, it was discovered that there was a communication mechanism pertaining to their assigned task. The three children engage in the active provision of puzzle pieces to their pals upon discovery, and this procedure exhibits continuity among the three individuals. In addition, among the three children, it was discovered that one of them encountered difficulties when engaging with puzzle games. The child demonstrates a diminished capacity to successfully complete the task. Nevertheless, the results of the post-test revealed that the participants who had completed their own tasks also assisted in the completion of their friends' projects. Subsequent to a query posed by one of the juveniles regarding the provision of assistance to their struggling comrade, the following events transpired. The duration of the post-test process amounts to 1 minute and 49 seconds.

Based on the obtained results, it is evident that the duration required for the three youngsters to accomplish the activity was about twice as quick, with an approximate increase of 200%. It is evident that the contacts and partnerships observed during the post-test phase exhibit a higher level of liveliness compared to those observed during the pre-test phase. This observation indicates that the individuals in question have undergone character development subsequent to their engagement with the Yummy Yummy Monster Tummy game.

The act of sharing puzzle pieces owned by other players serves as an illustrative instance of the collaborative process in action. The act of inquiring about the permissibility of assisting friends demonstrates an acknowledgement that the effort at hand is a group endeavor rather than an individual one. This action also signifies a genuine concern for the well-being of friends who may be experiencing challenges. The occurrence in which two players assist their friends exhibits a distinct quality, as they appear to undertake the activity without perceiving it as burdensome. Rather, they engage in a collaborative and jovial manner while providing aid to their acquaintances. The outcomes of the

evaluation of collaborative attitudes utilizing a pre-established scoring rubric are as follows:

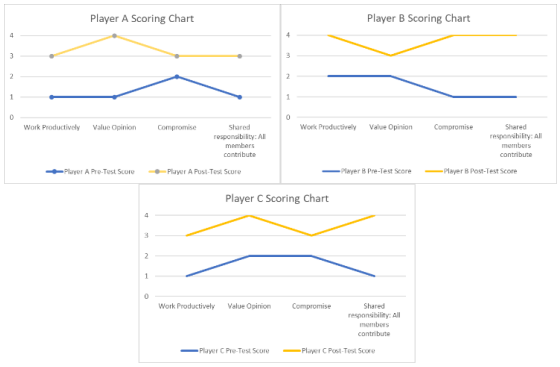

Figure 7. Pre-test and Post-test score

There has been an observed rise in multiple metrics within the evaluation domain. The above tables and graphs collectively demonstrate a discernible rise in both the proficiency and consciousness pertaining to the collaborative disposition among players. The feature of shared responsibility is the most notable area of development, when individuals assist one another in completing their friends' chores. Furthermore, when one person falls behind, the other two not only remain supportive but also offer assistance. The duration of the pre-test session was found to be almost 3 minutes longer than the post-test session, with the former taking nearly 4 minutes more to complete the assigned activity. Conversely, the post-test session required less than 2 minutes to accomplish the same assignment.

DISCUSSIONS

The Based on a comprehensive set of data collection and analysis procedures, a number of findings have been derived about the impact of App-Assisted Board Game on the enhancement of collaborative abilities in youngsters.

The topic of discussion pertains to the field of game design and concept development. Based on the conducted investigations, it has been determined that visualization and storytelling have the most significant impact in the realm of design. The utilization of digital applications enables the creation of contemporary visual representations, including amusing and interactive animations, as exemplified by the monster animation and Yummy Yummy Monster Tummy board game images.

One intriguing aspect of integrating applications or digital media is the potential to decrease cognitive load, enabling children to concentrate on specific learning tasks without the need to engage in complex mechanics and mathematics that may be challenging for them. The notion of cooperative

gameplay serves as a platform for fostering the development of collaborative abilities in children. Individuals have the opportunity to acquire knowledge and understanding of attitudes and values through direct personal experience. The inherent requirements of game mechanics in collaborative processes necessitate the acquisition of collaborative skills among participants. The efficacy of collaborative efforts throughout the test-play process becomes evident when individuals effectively cooperate, enabling the completion of even the most challenging stages inside the game. This accomplishment is independent of their gameplay style, as it predominantly relies on experiential learning rather than their familiarity with color concepts. This phenomenon is not inherently negative, as it aligns with the natural developmental trajectory of children, encompassing both physical and cognitive growth. Through the process of experience learning, individuals can get an understanding that effective collaboration and teamwork are essential components in successfully completing tasks designated for a group. Furthermore, within the tested board game, youngsters demonstrate an understanding of the necessity for effective communication among participants in order to facilitate a successful collaborative process.

The efficacy of the cooperation capability has been established through the examination of the app-assisted board game. The existence of communication in youngsters, wherein they exchange thoughts and suggestions regarding the appropriate course of action, serves as evidence in support of the knowledge aspect. The competence aspect is evident in the manner in which the relationship unfolds, characterized by a smooth and conflict-free procedure between the individuals involved. Additionally, their recognition of the need for assistance further highlights this aspect. In terms of attitude, the individuals make efforts to engage and collaborate efficiently, as seen by the post-test results surpassing the pre-test results.

It has been found that basic gaming principles have the potential to effectively enhance the development of children's talents. Despite its simplistic rules, the game Yummy Yummy Monster Tummy effectively facilitates the process of collaboration. The concept of "Yummy Yummy Monster Tummy" demonstrates

the potential for a collaborative process facilitated by an application-based board game, specifically designed to cater to players within a suitable age range.

In addition to acquiring academic knowledge, the incorporation of character education content can also be utilized in an indirect manner. In addition to Yummy Yummy Monster Tummy, it presents content on character education through the framework of cooperation and collaboration. According to many sources, this mode of learning has been found to be more efficacious in fostering the development of children's character. One reason for this phenomenon is that individuals are not only inherently inclined to collaborate, but they are also actively engaged in practical scenarios that necessitate direct intervention. The appropriateness of game content should align with the age and cognitive abilities of the child. For children in elementary education, it is unnecessary to provide sophisticated content. Instead, it is preferable to provide content that is simple and easily comprehensible.

Within the realm of game content analysis, a notable phenomenon known as experience learning becomes apparent. This phenomenon refers to a learning process wherein individuals integrate knowledge, skills, and values through firsthand experiences. The aforementioned phenomenon is further elucidated in the findings of the D.D.E study conducted on the board game, wherein it is demonstrated that both games engender novel experiential outcomes for players as a result of their strategic decision-making and gameplay activities. The Yummy Yummy Monster Tummy board game exemplifies experiential learning as players come to see the importance of teamwork in completing group-oriented tasks, as evidenced by the testplay process.

The findings from the test play of the Yummy Yummy Monster Tummy board game, which utilizes an app to enhance the gameplay experience, indicate that this educational medium effectively facilitates the development of collaborative skills. The results demonstrate the board game's efficacy in delivering the intended learning content. In addition to the acquisition of academic knowledge pertaining to color, the incorporation of collaborative learning also proves to be advantageous within the context of the testplay process. The content provided is characterized by its

illumination and practicality, as well as its straightforward and comprehensible mechanics.

CONCLUSSION

This paper demonstrates that app-enhanced board games have the potential to be used as educational tools. The presence of digital applications can increase participants' enjoyment and interest in the game. The simpler the game's mechanics, the easier it will be for children to comprehend. In the basic education system, we conclude that in the process of playing, there is a process of experiential learning that is beneficial as a stimulus for children to do and learn something; in case studies, this is collaboration in resolving existing problems. Existing testplay methodology also validates the D.D.E Framework analysis outcomes. It can also be seen from the results of the test play that the infant already has the sensitivity and ability to collaborate; it is simply a matter of how to stimulate it.

It appears, based on the evaluation of the board game system and mechanics, that cooperative gameplay can facilitate a reasonably effective collaboration process. This can also be applied to higher education levels with the appropriate mechanical adjustments and collaboration weights. Digitally enhanced designs and concepts have successfully increased player engagement with the game. Digital applications can make it simpler for players because they no longer need to perform complex calculations and can instead rely solely on their experience.

In this study, additional research is still required, particularly with increasingly diverse participants. In terms of collaboration abilities, additional research is required because, in this study, collaboration emerged from an experiential learning process that may have occurred only at that time. Additional research is required so that this learning occurs not only in games, but also in the players' daily life.

AKNOWLEDGEMENTS

This research is funded by Introduction to Islam Interactive Learning Media Development for Elementary School Student Bottom Up Community Service Program fiscal year 2023.

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