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Development and Validation of Localized Interactive Game (LIGA) as a Tool for Enrichment and Enhancement Activity

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Abstract

The use of game for mathematics teaching has widely been explored. However, development of localized game is limited especially in the context of Sorsogon province. This descriptive-developmental study developed a localized interactive game for grade 7 content topics which may serve as an enrichment activity for grade 7 and enhancement activity for grade 8. The localized concepts featured the local setting of Sorsogon province and was designed to provide students way to interact with the game and other students. The content of the game, up-to-datedness of information, and other details about the manipulative, passed the validation of 7 experts. Also, the game was found to be acceptable for the 32 student-respondents. Furthermore, revisions for improvement of the game were made for the game to better achieve its objectives.

Keywords: Assessment Tool, Board game, Enrichment, Enhancement, Interactive, Localized

INTRODUCTION

In the ever-changing landscape of education, the performance of Filipino students in Mathematics has always been a concern. Beside knowing the various importance of mathematics in different fields [1] [2], the performance of Filipino learners, as shown by various assessment locally and globally, are constantly out performing as compared to standards both norm- and criterion-referenced.

As the National Achievement Test (NAT) for High School results reveal, the students' Mean Percentage Score (MPS) for school years 2004-2005, 2005-2006, and 2011-2012 are 50.70, 47.82, and 46.37, respectively [3]. This pre-k-12 result is below the goal of 75% which indicates a low performance. Also, looking at the international and during k-12 results, PISA 2018 and 2022 revealed that Philippines ranked 2nd and 6th lowest for mathematics, respectively for the two years that the country joined the international assessment [4] [5]. This tells a low performance of Filipino students in mathematics for years.

It is mentioned in the study by [6] that Filipino students are indeed struggling in mathematics like in problem-solving. Specifically, Grade 7 students have high anxiety and numerical anxiety [7]. Based on the study by [8], it was concluded that the three most evident themes summarize the causes of the students' difficulty with the subject of mathematics - it is how the teachers deliver the instruction, the learner's abilities and experiences, and the school environment and facilities. Moreover, most students consider mathematics to be a difficult subject because it is aversive. Teaching style, difficulty following instructions, difficulty

understanding the subject, and difficulty remembering its equations and methods for solving problems [9]. Hence, the need of a tool for enrichment and enhancement activity is needed to improve student learning experience and reinforce their knowledge is implied.

Studies show that games are known to motivate, elicit, and enhance involvement that is used to enhance learning in mathematics and is valuable in encouraging social skills, stimulating mathematical discussion, helping in the development of mathematical understanding, learning new concepts, and developing logic and strategies [10]. It was found to have positive effect on students' performance and interest [11] [12]. One specific type of game that can be used as educational material is a board game. Board games are an important tool to provide hands-on and head-on skill and knowledge development for people of all ages on all subjects. Not only do well-designed games create an engaging atmosphere, but they also provide a nonthreatening, playful, yet competitive environment to focus on content and reinforce and apply what they have learned [13].

Landers' study [14] defines gamification according to the Gamified Learning Theory (GLT), as applying game attribute categories outside of a game to influence learning-related behaviors or attitudes. And gamification does not directly affect learning but rather encourages a learning-related behavior through a mediating or regulating mechanism. Learner-related behavior can be anticipated to some extent based on how learners perceive, understand, and apply knowledge. Gamification principles in education have shown promise in promoting active learning, problem-solving, and critical thinking [15] [16]. Thus, study aims to add to the growing body of literature on educational game development by addressing the specific needs of students while also taking into account age-appropriate content and curriculum alignment.

The choice to use the localization and interactive features of the game is rooted in the recognition of the importance of cultural relevance and linguistic appropriateness in educational tools may result to positive impact to students' performance [17] [18] [19] [20] [21]. By tailoring the game to the local context, the researchers hope to provide students with a more meaningful and relatable learning experience. Therefore, this study aims to a) Develop a localized interactive board game for enrichment and enhancement activity, b) Determine the experts' validation and students' acceptability of the developed game, and c) Revise the developed localized interactive game based from the respondents' validation and acceptability.

METHODOLOGY

This study also employed a descriptive-developmental research design, similar to the study of [22], during its process. This type of research allows to systematically evaluate a products, tools, processes, and models to offer a reliable and usable information for both users and theories [23]. In order to apply this research design, the researchers utilized the ADDIE model (figure 1), to develop and validate the localized interactive game [24].

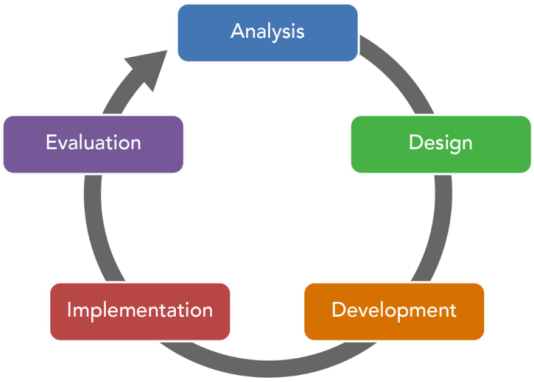

Figure 1. ADDIE Model

Analyze phase

Problem Solving and Critical Thinking are the twin goals of mathematics education in the Philippines under the K to 12 programs [25]. And the preparation of lessons integrating these goals is essential to towards

enhancement of academic performance [26]. Grade 7, as the first level of secondary education, topics in this stage are necessary of a well-rounded and well-founded mathematics learning as one of the values of spiral curriculum [27]. Based from the data gathered by the math teacher of the locale of the study, the word problems covering topics, Sets (and its applications), Scientific Notation, Problem-solving Involving Real Numbers, Operations of Polynomials, Kinds of Angles, and Circles (and terms related to it) are some of those that needs enhancement for the grade 7 learners and requires enrichment for grade 8. Thus, being the topic focused in the development of the study.

Design phase

The topics identified in the analyze phase were then designed as the topics covered in the development of the board game. Moreover, the consideration of localized and interactive features was integrated in the development. Localization is a sub-approach under Contextualized Teaching and Learning (CTL) approach which is process of relating learning content according to the curriculum to local information and uses materials that are available in a particular community [28]. It was found to have significant effect on students' performance [17] [18] [19]. Also, interactive approach which refers to students' active engagement to the lesson rather than being passive participants are employed in the board game [29]. Interactive learning assessments [20] and manipulatives [21] [30] are best for student learning. Overall, the game was designed as enhancement and enrichment of concepts and skills to increase student performance and engagement [31]. By definition, enrichment and enhancement are quite confusing but to distinguish, enhancement means to improve the quality of something by adding or deepening value while enrichment is to intensify or increase a certain quality or feature [32]. In addition, this study developed a board game to let grade 7 students learn mathematics by solving word problems and enhance their knowledge about the cultures and famous tourist spots in Sorsogon. This allows the students to learn while playing and having fun with their peers. Moreover, this board game also aims to serve as an additional activity for students to increase their interest in the subject.

Develop phase

The localized features were identified to be included in the board game such as local places, products, food and other landmarks. Also, for the interactive features, the design, materials and the mechanics were set to make it interactive to the users which aimed to increase the engagement in the process particularly through collaboration [33]. In creating the board game, the researchers took inspiration from a couple of pre-existing board games namely, Monopoly and Snakes & Ladders. Monopoly is a real-estate board game for two to eight players, in which the player's goal is to remain financially solvent while forcing opponents into bankruptcy by buying and developing pieces of property [34]. Meanwhile, Snakes & Ladders is a board game, a racing game, and a dice game all at the same time. It is a classic board game that involves moving tokens along a series of squares according to dice throws. Involving ladders that can take you up multiple squares and snakes that will decrease your progress, it can be used by two or more players [35]. Aspects like the mechanics in the use of dice, application of cards, and putting/formation of tiles are the main parts which were modified from these games. And the rest were originally from the knowledge and creativity of the researchers.

Implement phase

The board game was then subjected for experts' validation using the LRMDS Evaluation Rating Sheet for Charts, Posters, Drill/Flash Cards and Manipulatives [36]. The experts were consisted of three Mathematics teachers (one has research on contextualization), two Social Science Teacher (expert in Sorsogon geography), an Art teacher and a game developer (with researchers in game development), a total of seven (7) experts. All of them are considered experts in their respective field with at least 5 years teaching experience and at least a Master's degree.

Upon implementation, the researchers presented the board game to the validators and provided copies of the mechanics, word problems, and the compilation of the cards. Then these experts evaluated the game in three aspects. First is the content which focuses on the ability of the game to reinforce learning content and competencies, the potential to arouse interest, whether the facts are accurate, information

provided is up-to-date, visuals are relevant to the text, clear, adequate, and are suitable to the age level and interests it is targeted to, there is no typographical error, and the size of the material is appropriate and easy to use and durable. Second is on other findings which is highlighted on conceptual, factual, grammatical, typographical, and other errors. Lastly, on additional requirements for manipulative, focusing on whether adequate support material is provided, activities are summarized, manipulative is safe to use, the size, composition, and suggested tasks are appropriate for the intended users.

In addition, the researchers also conducted a run through of the developed board game to grade 7 and grade 8 classes of Sorsogon State University Laboratory High School with 32 randomly selected learners (16 per level). Students were identified through the help of their mathematics teachers selecting students from the upper group (students with good performance in math) and lower group (students with low performance in math). First, the mechanics was explained to the students in a whole class set up. Then, the learners were divided into small group of 4 to take turns in utilizing the developed game. After, going through the whole game, all the students were provided a 4-point Likert scale checklist which was modified from the study of [37] to determine the learners' insight about the developed board game. Furthermore, comments and suggestions were asked for both the experts and students to gather qualitative description to support their responses in the respective instruments.

Evaluate phase

In this phase, the analysis of the results was done to determine the respondents' evaluation and acceptability of the developed game and to make the necessary revisions for improvement. Based on the LRMDS Evaluation Rating Sheet for Charts, Posters, Drill/Flash Cards and Manipulatives, the expert validator evaluated through a valid set of criteria – at least 30 of 40 (content), at least 12 of 16 (other findings), and at least 18 of 24 (additional requirements for Manipulative) [36].

Moreover, the students' acceptability of the developed board game through the 4-point Likert scale (developed by the researchers and validated by three experts) were analyzed through the given indicators and range of values: Strongly Acceptable (3.50 – 4.00), Acceptable (2.50 – 3.49), Unacceptable (1.50 – 2.49), and Strongly Unacceptable (1.00 – 1.49). Frequency count and weighted mean were used in the analysis and quantification of the data through Microsoft Excel and interpreted using the interval used from the study of (Reyes & Oreste, 2017). All numerical results from the experts' validation and students' acceptability were supported by the content analysis of the comments and suggestions of the respondents of the study.

RESULTS AND DISCUSSION

THE DEVELOPED LOCALIZED INTERACTIVE GAME (LIGA)

The developed game holds two main features – localized and interactive features. Localization is a sub-approach under Contextualized Teaching and Learning (CTL) approach which is process of relating learning content according to the curriculum to local information and uses materials that are available in a particular community [28] while interactive approach which refers to students' active engagement to the lesson rather than being passive participants are employed in the board game [29]. The game is termed as localized interactive game as it allows interaction between its players and is based on local setting specifically on its design and contents. It can also be called through its abbreviation LIGA (a tagalog term, "league" in English) since it showcases the union of different products, places, and events from different location in the Sorsogon Province. Table 1 presents the summary of the features and how it was applied in the developed board game.

Table 1. Matrix of the features of the developed localized interactive board game

Inclusion of the Game	Description	Features	
		Localized	**Interactive**
The Board Game	the main platform for the whole game	crafted from the image of the map of Sorsogon province showing each municipality and what/where they are known for	have different tiles which represents tasks for both problem and mystery cards
Cards	presents the tasks players need to perform	classified as sili or *baluko* – products found in Sorsogon province.	have set of questions in which will let the students actively participate in the game either earning points or acquiring deductions
Dice	serves as the guide determining how many movements the players need to take	made from locally available wood that represents a crafted pili nut	labelled from -6 to +6 where students need to solve in order to proceed in the game
Mechanics Manual	presents the mechanics that students need to follow throughout the game	-	allows students to work together and facilitates the whole game

The board game. A board game is any material played by moving pieces on the board. There are various types of board game [38] and this developed board game has a unique purpose for utilization. The board game in this study is printed into a 2ft by 3ft tarpaulin which serves as the main platform for the whole game. This is what the players need to navigate and where they need to perform the tasks required for them to win. It is crafted from the map of Sorsogon province showcasing the municipalities and places/products in it. Generally, it aims to tour the student-players in the province while doing the activities. Figure 2 is the image of the developed board game.

Figure 2. The developed board game

Cards. While playing the game, the players will encounter word problems or mystery consequences that are localized in setup of the province. These tasks are presented in the cards of the game to add-up in the interaction of the game [39]. There are two types of cards: problem cards and mystery cards. These cards are randomly drawn when a player lands on a specific tile similar to the figure in the card. There are 32 cards each for the following:

Sili or Problem Cards. The Problem or Sili Card (figure 3) plays a huge role in the players and the board game. It features word problems from different Grade 7 Math topics that will test the players' learning mastery.

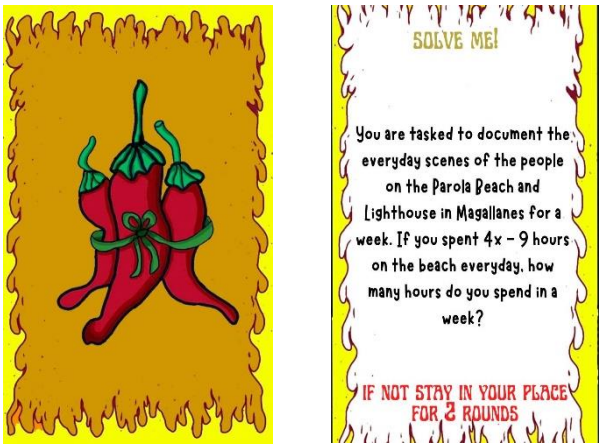

Figure 3. Problem card

Shell (Baluko) or Mystery Card. The Mystery or Shell (Baluko) (figure 4) provides a wide variety of opportunities to the players while playing the board game. It features different localized events that may affect the position of the players which can be an advantage or disadvantage.

Figure 4. Mystery card

The board game is intended for grade 7 students but can also be utilized by higher grade levels as a review tool for grade 7 topics. Throughout the game, the students are task, in the board game and the cards, to completely navigate the map like a race and different task particularly problem solving as main task in the game.

There are six topics and competencies, in total, covered by the developed localized interactive game that is, Sets and its applications (Solves problems involving sets with the use of Venn Diagram), Scientific Notation (Write numbers in scientific notation and vice versa), Problem-solving Involving Real Numbers (Represents real-life situations and solves problems involving real numbers), Operations of Polynomials

(Adds and subtracts polynomials), Kinds of Angles (Solves problems involving sides and angles of a polygon), and Circles and terms related to it (Illustrates a circle and the terms related to it: radius, diameter chord, center, arc, chord, central angle, and inscribed angle). These topics are from the Most Essential Learning Competencies provided by [40] which became basis for making the localized problems and tasks in the cards.

Dice. In this game, the two dice are in a shape of a dodecahedron (12-sided solid) labelled from -6 to +6. Each die has distinct color either bordered or not bordered. In the game, the dice will be rolled at the same time. The movement of the player in the board game is determined by adding the integer values in the dice which results to repeatedly applies the topics on the operation of integers. To determine the number of moves of the players, they must add the pair of dice in this order: (Number of the Bordered Dice) + (Number of the Not bordered Dice) = Number of moves. In addition, the sign of the resulting integer also determines the direction of the movement. If positive, the player moves forwards and when negative, the player moves backwards. If in case the availability of the tiles is not equivalent to the required number of moves, the player will stay on such available tile particularly at the start or at the end. Furthermore, the dice will also help determine of who will play first – highest number will play first.

Mechanics Manual. A manual is a book of instructions on how to do or use something (Cambridge Dictionary, n.d.). This mechanics manual is a small booklet presenting the mechanics of the developed localized interactive game. This aims to guide the students particularly the first timers to use the developed game. It includes the steps-by-steps procedure, how to use each material, and even the references used in the localized interactive game.

As a whole, the developed game has the following materials in order to completely utilized as a game specifically, the board game itself, dice, cards and mechanics handout. Each of these included materials has particular functions to make the game friendly to students.

EXPERTS' VALIDATION OF THE DEVELOPED LOCALIZED INTERACTIVE GAME

Evaluation is one the key basis of the success of the developed game. It provides a systematic method to study the material and understand how well it achieves its objectives [41]. The summary of the experts' validation of the developed localized interactive game is presented in Table 2.

Table 2. Summary of the experts' validation of the developed localized interactive game

Criteria	Points to pass	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Mean Score
Content	at least 30 of 40	36 (P)	34 (P)	31 (P)	40 (P)	40 (P)	40 (P)	35 (P)	**37 (P)**
Other findings	at least 12 of 16	15 (P)	15 (P)	12 (P)	15 (P)	16 (P)	16 (P)	13 (P)	**15 (P)**
Addt'l req. for Manipulatives	at least 18 of 24	24 (P)	20 (P)	18 (P)	24 (P)	24 (P)	24 (P)	24 (P)	**23 (P)**

* P – Passed

All the experts who served as validators in the study agreed that the developed game passed each criterion in the LRMDS evaluation instrument. This infers that the content of the game reinforces, enriches, and leads to the mastery of the competencies it is intended for. As one of the validators commented, "The game should be given during [the] fourth quarter. [The] game is best for Grade 8 review." This suggests that the game has the potential to serve as enrichment and enhancement activity for student learning. The material also has the potential to arouse the interest of the target users like what one validator said, "The idea of this research will really be of use and interesting. The collaboration of subjects and integration of it to the local culture and tourism is commendable."

Moreover, the facts, information, and visuals are suitable and accurate as needed in the board game. Even the layout, size, and materials used are appropriate and durable. However, adjustment should be made in the color and layout of the board game. Majority of the experts commented that the colors were too dark, the path was too small, and there is too much space taken by the board game name and whale shark. As they said, "Some text in the game is not readable, use other colors of text, or enlarge the text, or use light colors

for the manipulative like pastel colors." and "Improve the image/visuals to convey the message of the topic. Take into consideration the (images, pictures, text, etc.) make information more interesting, readable, and address learner's different learning styles." This is to ensure that the appearance of the game will not affect the whole process of playing the game.

Meanwhile, for other findings, the experts agreed that there are less to no conceptual, factual, and grammatical errors spotted in the board game. However, some jurors identified very minor errors particularly in the questions for problem solving and the placement of places/objects in the board game. As one of the experts said, "there are some misrepresentations of some mathematical expressions" and it was suggested to "use proper mathematical expressions or proper font style." In addition, for the placement of details in the game it was suggested the researchers should consider the most familiar (e.g., structure, products) of each municipality/city and use a reliable source for the layout of the map.

In addition, the manipulative was found to support innovative pedagogy, and is safe to be used by the students and/or other possible players. The materials and elements of the game are compatible with the motor skills of the students as well as the activities included in it. Overall, the experts' evaluation and their collective comments supports the development of the localized interactive game.

STUDENTS' ACCEPTABILITY OF THE DEVELOPED LOCALIZED INTERACTIVE GAME

To validate the response of the experts, the students also evaluated the acceptability of the developed localized interactive game. Table 3 presents the acceptability of the developed localized interactive game for enrichment and enhancement.

Table 3. Summary of student acceptability of the developed localized interactive game

Level of Acceptability	Grade 7		Grade 8		Total
	Upper	Lower	Upper	Lower	
Strongly Acceptable	4	4	3	3	14
Acceptable	4	4	5	5	18
Unacceptable	0	0	0	0	0
Strongly Unacceptable	0	0	0	0	0
Total	**8**	**8**	**8**	**8**	**32**

The table above shows the acceptability level of the thirty-two (32) students of the developed localized interactive game. This result was categorized as follows: Strongly Acceptable (3.50 – 4.00), Acceptable (2.50 – 3.49), Unacceptable (1.50 – 2.49), and Strongly Unacceptable (1.00 – 1.49) (Reyes & Oreste, 2017). The table tells that all of the students accept the developed localized interactive game with fourteen (14) strongly acceptable and eighteen (18) acceptable. Moreover, there is no difference between the level of acceptability of upper and lower group students in and between each grade level. Also, there is almost no difference from the numbers of strongly acceptable between grade 7 and grade 8 with 8 vs 6 and 8 vs 10, respectively. This implies that the general acceptance of the game for each grade level and groups was established.

To have a closer look on the indicators that influenced this acceptability, table 4 is present:

Table 4. Students' Acceptability of the developed LIGA

INDICATORS	4	3	2	1	MEAN	Descriptive Interpretation
I liked playing "Localized Interactive Game (LIGa)". *Nagustuhan ko ang paglalaro ng "Localized Interactive Game (LIGa)".*	17	15	0	0	3.53	Strongly Acceptable
I would play this game again. *Maglalaro ako nito uli.*	14	14	4	0	3.32	Acceptable
I would play this game in my free time.	8	9	14	1	2.76	Acceptable

continued

Maglalaro ako nito sa aking libreng oras.						
I would recommend this game to grade 7 students. *Irerekomenda ko ang larong ito sa ibang mga estudyante sa grade 7.*	24	6	1	1	3.66	Strongly Acceptable
I would recommend this game to students in other grade levels and schools. *Irerekomenda ko ang larong ito sa ibang mga estudyante sa ibang baitang at paaralan.*	22	9	1	0	3.66	Strongly Acceptable
I would play this game with my family and/or friends. *Maglalaro ako nito kasama ang aking mga kapamilya at/o mga kaibigan.*	17	8	6	1	3.28	Acceptable
I understood the mechanics of the game. *Naintindihan ko ang mekanika ng laro.*	20	11	1	0	3.60	Strongly Acceptable
I understood the use of the dice while playing the game. *Naintindihan ko kung paano gamitin ang dice sa laro.*	26	6	0	0	3.82	Strongly Acceptable
I understood the structure of the map (board game). *Naintindihan ko ang pagkakayari ng mismong board game.*	21	8	3	0	3.57	Strongly Acceptable
I understood how to use the cards. *Naintindihan ko ang paggamit ng mga baraha.*	17	11	3	1	3.38	Acceptable
I can perform the tasks indicated in the cards. *Nagagawa ko ang mga gawain na nakalagay sa mga baraha.*	6	15	9	2	2.79	Acceptable
Playing "Localized Interactive Game (LIGa)" helps reinforce the knowledge I have learned from my grade 7. *Ang paglalaro ng "Localized Interactive Game (LIGa)" ay nakatulong na pagtibayin ang aking natutunan mula sa mga aralin ng grade 7.*	16	10	5	1	3.29	Acceptable
			Overall Mean		**3.38**	**Acceptable**

From the twelve (12) indicators, the game was identified to be acceptable to strongly acceptable by computing the mean. Generally, the game is acceptable to students with an overall mean of 3.38. This implies that the students from all groups and grade level like to play the game. As some students mentioned, *"Ang masasabi ko lang po ay masaya itong laruin"* (I can say this is fun to play); "This game is fun. Can't wait to play the real game"; "A fun game to play with friends". Most respondents agreed that they will play the game again and would recommend this to grade 7, and to students of other grade levels and schools and with their family and friends. As a student commented: "this game is good to be played by other grade levels or students, even family and friends." The game has an easy-to-follow mechanics and elements. However, performing the tasks in the card had a low acceptability among other indicators with a mean of 2.79 although 21 (66%) accepts its utilization. The respondents commented, "Some questions are hard"; "Questions are tricky".

Moreover, though students accept to use and play localized interactive game, they are hesitant to use this during their free time with a mean of 2.76 where fifteen rated unacceptable and strongly unacceptable. Hence, this result supports that this is best used during class hours and as enrichment and enhancement activity where students are tasked and the utilization of the game is part of the classroom activity. Some other comments focused on making the tiles big, improving the color of the game, reducing the negatives in the dices, adjust the difficulty level of the questions, make characters that represents the player, and provide solving sheets. But overall, 26 (81%) students believed that LIGA helps reinforce the knowledge they have from the competencies used in the game.

THE REVISED LOCALIZED INTERACTIVE GAME

After gathering the experts' validation and students' acceptability as well as the comments and suggestions of the respondents, minor revisions and some add-ons must be done to achieve the objectives of the localized interactive game. Hence, the following revisions were made particularly in the board game and cards were made to improve the developed game.

Enhanced colors of the board game. Most of the expert validators and the students agreed that the board game is too dark which may result to low interest of the expected users to the game. Since colors in instructional materials were found to play an important role in capturing students' emotional reactions and attention that also affects cognition [42] [43]. In contrast to the first one, the colors of the revised board game are brighter and clearer for its users as presented in figure 5.

Reduced and Enlarged tiles. One of the problems during the implementation phase is that the coins used to represent each player does not suit the tiles in the game. In addition, the details in the tiles are not visible to its players. Hence, the tiles are enlarged. The researchers revised it to make the path smoother, larger, and properly spaced. Moreover, to make way in the enlargement of these tiles, there is a need to reduce the number of tiles in the game. Thus, 100 tile it was reduced to 55 tiles (from start to finish), which was 45% reduced. The path had been slightly modified with changes from Bulusan to Matnog in this order: Bulusan, Santa Magdalena, Irosin, Juban, Magallanes, Bulan, and Matnog. Shortcuts had increased with new shortcuts are as follows: Pilar to Magallanes (Tile 7 to 46), Sorsogon City to Gubat (Tile 18 to 23), and Juban to Bulan (Tile 43 to Tile 47). These revisions are presented in figure 5.

Up-to-date details in the map. During experts' validation, the validators specifically the social studies experts and the validator which had research on contextualized learning, recommended to use up-to-date and reliable map of Sorsogon as well as the attractions/landmarks being featured in the game. In response to this, information was adopted from the official government website of Sorsogon Provincial Government to make sure that all details are up-to-date and reliable. In the board game, for Donsol, Butanding or whaleshark was mentioned since it became a haven for this creature which made the town famous worldwide. In Pilar, since it is reputed to be a shipbuilding town and the way to travel Masbate province, ships were featured. The St. John the Baptist Parish Church in Castilla that was established in 1816 and has been the silent witness of faith of its citizens (Castilla Sorsogon, n.d.) was also included in the board game. Moreover, the Sports Complex of Sorsogon City became so famous since its constructed attracting tourists from different places, Prieto Diaz is the recipient of 1998 Best Community-Based Coastal Resource Management Program from USAID making it a model site for its natural mangrove forest that is why Mangrove Forest is featured and Gubat for its sandy Beaches. In addition, thousand roses in Casiguran [44], the ruins in Barcelona, Mt. Bulusan in Bulusan, and old colonial houses in Juban were placed in the board game. Instead of the Lighthouse, the famous Gibalong was located in Magallanes. Furthermore, the Padaraw Festival in Bulan, Beach in Sta. Magdalena, Paray in Irosin being the rice granary of the province, and Subic in Matnog being famous for its sexy pink sand were featured in the revised board game [45]. All of these are presented in figure 5.

Figure 5. The Revised Board Game

Improved game cards. The researchers decided to make three distinct types of cards: the Surprise card; the Problem-Solving card; and the Power card. Each card has its own function, and the visual narrative of each card was given an additional sense of wonder in addition to enhancing the game's aesthetic appeal. The card was inspired by Pokémon cards [46]. The appeal of Pokémon, which is well-known for its eye-catching and colorful graphics, acted as an inspiration for the visual makeover of the game. These are namely, *Surprise Card* which is considered a mystery that can be beneficial or not. It has a drawing of the shell of a *Baloko,* because *Baloko i*s known in Sorsogon. It mainly contains the surprise a message for the players. The second one is the *Problem-Solving Card* that is just the same as the *sili* card, but this one is leveled up in terms of the design. It contains the revised word problems since most the students mentioned that the questions in this card is very difficult that they hardly complete within the game period. Hence, revisions in the questions are also made specifically the construction and its length. Lastly, the *Power Card* that is collectible which can be used whenever the player wants. It holds an image of pili in it. This card contains the advantages that can help the player all throughout the game. Figure 6 presents the improved game cards.

Figure 6. The Revised Game Cards

Other revisions or add-ons. Other comments are provided by the respondents of this study not directly on each of the inclusions but has a significant point for the study. Hence, revisions were also made. One of the problems during the implementation is the frequent occurrence of the negative numbers on the dice leads to stagnant game which consumed most of the players' time. They suggest that negative numbers must be lessened to keep the students going. However, instead of reducing the negative numbers, the researchers decided to add on the mechanics two different colors of tiles. The blue tile for the 1st Congressional District of Sorsogon where the result of adding the two occurring numbers in the dice will take its absolute value. Meanwhile for the while tile for the 2nd Congressional District, the movement of players will be the actual result not getting the absolute value. This revision in the mechanics and the game will let the students move forward in the first phase of the game and encounter difficulty on the latter parts of the localized interactive game. In addition, the respondents also commented that instead of using coins as material to represent the players in the game, they suggest to develop small characters. Hence, the researchers decided to make small characters represented by superficial characters in the Sorsogon (or even the Philippines) culture – the aswang, tikbalang, tiktik, and kapre. Lastly, it was also suggested to provide a solution sheet for problem solving, to deal this need, each player will have their computational board attached in the mechanics manual.

CONCLUSION

The developed localized interactive game is based on some grade 7 most essential learning competencies to be used as enrichment and enhancement activity for grade 7 and grade 8 students. The game passed the evaluation of experts and was acceptable for its intended users. However, some minor revisions are

suggested to allow the game meet its objectives. Revisions were done in the board game particularly enhancing its colors, adjusting the numbers and types of tiles, adding new cards, and putting characters which will represents each player in the game. The utilization of the developed localized interactive game in classrooms as tool for enrichment and enhancement activities is recommended. Furthermore, it is also highly recommended to test the effectiveness of the use of this game to the student learning outcomes.

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