Development of a Board Game in Teaching Speed and Velocity to Grade 7 Students

Authors

Rizza Paz S. Onganiza[1a], Elesar V. Malicoban[2, b], Monera A. Salic – Hairulla[2, c], Ivy Claire V. Mordeno[3, d], and Neal Alfie Y. Lasta[3, e]

Affiliations

1
Office of Graduate Studies, College of Education,
MSU–Iligan Institute of Technology, Iligan City, Philippines [a]
rizzapaz.onganiza@g.msuiit.edu.ph
2
Department of Science and Mathematics Education, College of Education,
MSU–Iligan Institute of
Technology, Iligan City, Philippines
[b] elesar.malicoban@g.msuiit.edu.ph,
[c] monera.salic@g.msuiit.edu.ph,
3
Integrated Developmental School, MSU–Iligan Institute of Technology,
Iligan City, Philippines
[d]ivyclaire.mordeno@g.msuiit.edu.ph, [e]nealalfie.lasta@g.msuiit.edu.ph

Abstract: This research aimed to develop a board game in teaching speed and velocity to Grade 7 students. The development of the board game was based on the learning competencies of the K-12 Curriculum Guide on Speed and Velocity. The theme of the board game is Ibong Adarna which is a 16th-Century Philippine epic poem. The experts rated the game as excellent which means that they found the board game a good alternative teaching strategy to add excitement and fun to the lesson. Additionally, they thought it was appropriate for children in Grade 7 because it is a pleasant approach to gauge pupils' learning. The overall perception of the students towards the developed board game shows that the developed board game is a good instrument for offering a different method for improving the learning of Speed and Velocity in an enjoyable, interesting, and engaging method. Based on the findings of the study, the developed board game can help Grade 7 students learn about Speed and Velocity. Although time consuming, the board game is enjoyable, entertaining, interactive, and shows a promising potential as a classroom tool.

Keywords: *Speed and Velocity, board game, game-based learning*

01 Introduction

Scientific literacy, as defined by Program for International Student Assessment is the ability of a reflective citizen to engage in science-related issues. Developing countries like the Philippines, must promote formal education to increase scientific literacy [3]. By the end of schooling, all students must acquire this skill [4]. A study found that students lack the motivation and interest in the subject (physics) [5] particularly in the topic Speed and Velocity. Studies show that game-based learning is an effective method in enhancing students' interest and improving learning efficiency on science education [2]. Board games have been used since ancient times as teaching materials to foster the players' critical thinking, problem solving, analysis, reasoning, planning, and communication skills. Game-based learning is an active learning methodology that provides students with immersive experiences. It gives them a sense of real-world situations for more in-depth learning, providing an opportunity to broaden their views of science [1].

02 Objective

The researcher conceptualized this study on the following objectives:

1. Develop a board game in teaching Speed and Velocity to Grade 7 students.
2. Evaluate the board game in terms of its creativity, attractiveness, rules, accuracy of content, question cards, game creation, and instructional effectiveness.
3. Determine the students' perception towards the board game.

03 Methodology

1.Subject of the Study
The study was participated by ten (10) experts who are in-service teachers and pre-service physics teachers. These experts evaluated and validated the board game. Then it was tried-out to thirty (30) Grade 7 students who gave their perception evaluation on the board game.

2. Research Design
This study focuses on the development of a board game which will serve as a supplementary method in teaching Speed and Velocity for Grade 7 learners. This utilizes research and development methods since the study's main objective is to develop a board game in teaching Speed and Velocity to Grade 7 Students through a validation process.

3. Instruments Used
In this study, the instruments utilized are the Board Game kit, Rubrics which was used by the experts to rate the board game, Activity Perception Questionnaire which was used by the students to determine their perception evaluation of the board game, and the K-12 Science Curriculum Guide which was used to determine the learning competencies for the topic Speed and Velocity.

04 Results

. Mean Rating of the Experts
The experts rated the board game based on its creativity, attractiveness, rules, question cards, accuracy of content, and game creation. Table 2 shows the ratings of the experts to the board game.

a. Mean Rating of the Experts
Table 2. Mean Rating of the experts

Criteria	Mean Rating	Description
Creativity	4.00	Excellent
Attractiveness	4.00	Excellent
Rules	3.20	Very Good
Question Cards	3.20	Very Good
Accuracy of Content	3.30	Excellent
Game Creation	3.70	Excellent
Instructional Effectiveness	3.50	Excellent
Overall	3.56	Excellent

Legend:1.00-1.74 - Poor, 1.75-2.49 - Good, 2.50-3.24 - Very Good 3.25-4.00 - Excellent

Based on the table above, the experts rated the Rules and Question Cards as very good and the rest of the criteria as Excellent. Overall, the experts rated the board game as "Excellent". The data shows that the experts saw the board game fit as an alternative teaching method to make the lesson more fun and exciting. They also found it appropriate for Grade 7 students because it is a fun way to assess the students' learning. In fact, one respondent commented that it is a great avenue for self-review in Physics.
This implies that the board game is suitable for Grade 7 students as it covers the learning competencies for the topic Speed and Velocity. It also implies that the board game is an excellent tool that would help the students understand the topic as well as the teachers as this can provide an alternative way in teaching the topic.

2. Mean Rating of the Students' Perception Evaluation

24. I felt like it was not my own choice to play this game.	2.9	NAAT
25. I would be willing to play this game again because it has some value for me.	6.6	VT
Overall Rating	5.6	VT

Legend: 1.0-2.5 - Not at all true (NAAT) 2.6-5.5 - Somewhat true (ST) 5.6-7.0 - Very True (VT)

The mean rating of the students towards their perception of the board game which was determined using the Intrinsic Motivation Inventory (IMI) questionnaire adapted from Intrinsic Motivation Theory showed that the students reacted positively to the game as most of them rated the board game between 6.00 - 7.00. It shows that the students enjoyed the game very much that they are willing to play it again because they think that it would help them improve their study habits and do better in school. The playful and immersive nature of board games facilitates attention, concentration and motivation of players. The data shows that the students find the game beneficial and useful for their improvement especially in concentration. Furthermore, the students' weren't forced to play the game. It was their own choice to participate in the activity. Their overall perception towards the developed board game is 5.6 which has a description of Very True (VT). This shows that the developed board game is an excellent tool in providing an alternative avenue in learning speed and velocity in a fun, enjoyable, and engaging way. This also proves the study of Cheng et al. (2015), which states that game-based learning is an effective method in enhancing students' interest and improving learning efficiency on science education.

3. Final Design of the Board Game
a. Board design

The theme of the board game is based on the Philippine epic called Ibong Adarna to promote our own culture and literature. It follows the characters Don Juan, Don Pedro, Don Diego, Haring Fernando, Reyna Valeriana, Ang Manggagamot, Ang Ermitanyo, and Ang Matandang Leproso as they venture into the forest in order to reach Mt. Tabor and capture the legendary bird.

b. Question Card Design

Initially, the design used English language for the questions but the experts suggested to use Filipino language to further contextualize Ibong Adarna to the game. Choices were included in order to lessen the time spent by the student on each question and in order to help the students answer each questions. The final version of the question cards have choices on each question.

c.Token Design

The final designs of the tokens were made circular so the students can easily fit the token on the tiles of the board. The names of the characters were also added so the students can identify the characters of Ibong Adarna. Being familiar with the characters would help them know and understand the story that the game is trying to tell. It would also help them connect to the characters that represents them during the game.

d. Rules of The Game

Objective: To be able to incorporate fun into learning Speed and Velocity and to engage students into learning the subject.

Time limit: 2 hours

Four (4) to eight (8) players can play the game.
The players will toss two dices. Whoever gets the biggest score will be the first player. The player with the least score will be the last.
The players must choose one (1) player to tally the scores of the other player.
All players must choose the tokens that would represent them during the game.
All players must put their tokens at the starting point which is The Kingdom of Berbania.
Each player will take turns drawing cards from the Mahiwagang Baul.
The card contains a question that the player must answer.
If a player gets the correct answer, he/she will get a point and move towards the direction indicated in the card.
If a player gets a wrong answer, he/she will lose a point and move towards the direction indicated in the card.
The players can use calculators.
10.If the player lands on a portal, he/she will be transported to its sister portal.
11.If the player lands on a blackhole, he/she will lose three (3) points.
12.If the player lands on snow, he/she will lose a turn.
13.The first person to reach Mount Tabor will be the winner.

05 Conclusion

Based on the results and findings of the study, the developed board game is a useful instrument in teaching Speed and Velocity to Grade 7 students. Although it is time consuming, the board game is enjoyable, entertaining, interactive, and shows a promising potential in being utilized inside the classroom.

06 Recommendations

Based on the findings and conclusion of this study, the researcher recommends the following:

1. The rules of the game could be enhanced by using paragraphs form like "A game session is . . .", "The player should receive . . .", "At the end of the game, . . ."
2. The materials of the game is durable enough but it could be enhanced to make it sturdier.
3. The board game could be tried - out in a classroom setting since the researcher were unable to do it due to the implemented lockdown which forbids mass gatherings.
4. The study can be implemented to validate whether the developed board game is effective in teaching Speed and Velocity to Grade 7 students.
5. The developed board game could be further enhanced by teachers who would take interest in utilizing this tool as a supplementary instructional material.
6. The board game could be adapted to fit other subjects as well.

Related Literature

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