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## e-PROCEEDING

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## Atomic Adventure

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### ABSTRACT

Acquiring the skill of learning effectively is essential for enhancing students' quality. Bringing enjoyment in the learning process is vital to every student. This is attributed to the fact that enjoyment sparks the feel of curiosity and motivates students to explore further. Physics is one of the vital parts of science that demands the learners to master the importance of theory, concept, and consumption of formulas. In this case, majority of students are facing difficulty in memorizing and grasping the abstract principles of physics. Thus, it has led to the production of a hybrid board game called "Atomic Adventure". The objective of this innovation is to ensure that students derive both enjoyment and educational benefits from playing board games and aid the students to memorize and understand the basic physics concept. Atomic Adventure is produced by combining multiple board games and simulation. It is featured with few conventional board games features such as the use of dice. When players step on the box that has a question mark or exclamation mark, the player must answer questions related to the physics concept. Based on our research, students often find it challenging to visualize and conceptualize when learning physics, this game helps students understand physics easily while having fun with their friends. In conclusion, Atomic Adventure is looking forward to expanding and helping students to better understand and deepen the subject of physics to be used in everyday life.

**Keywords:** enjoyment in learning process; hybrid board game; basic physics concept.

### 1. INTRODUCTION

As it is known, physics is one of the vital parts of science that demands the learners to master the importance of theory, concept, and consumption of formulas. Physics is a science that deals with structure and interaction between the fundamental constituents when observed. By nature, students have a hard time understanding physics due to its numerous topics whether learning it by heart or for big exam. It might come off as hard for the majority of people, especially those who are interested in diving deeper but do not know where to start. This research group has resolved to come up with a learning innovation to help this particular group of people which is students and new people wanting to familiarise themselves with physics. The researchers decided to make a board game called "Atomic Adventure". This board game allows players to memorize and understand physics with enjoyment while enhancing their knowledge of physics basic concepts. The majority of students face challenges in their learning journey because of their lack of expertise in making strategies, finding sources of information, or managing their time to study. It can cater to a wide audience if it is retained right. The main objective is to

make sure that the students are delighted while playing Atomic Adventure and assist students in memorizing and understanding the basic physics concepts.

The researchers have asked around for some response among UiTM students as to acknowledge problems that they often face in learning the subject of physics. Based on the data collected, most of the students face a problem when it comes to memorizing and understanding the abstract concept of physics. This causes the students to not answer well during the test and eventually fail the test. Without a solid conceptual foundation, students may struggle to understand and they may not be able to distinguish between physically meaningful solutions and those that do not make sense. Therefore, students might lose interest in the subject if they do not see the boarder picture or the real-world applications of the concepts they are studying.

Atomic Adventure is a hybrid board game which is a combination of multiple board games and simulation which are played simultaneously. The board game will determine the movement of the player when rolling both dice. It is featured with few conventional board games features. For instance, the use of dice as the signature element for the board game. There are several physics concepts that have been implemented in this product.

Based on the research conducted during the development of this board game, it has been determined that its objective is effectively met through the positive feedback received from the researchers' target audience. Thus, Atomic Adventure is eager to expand its reach and assist students in comprehensively understanding and applying physics concepts in their daily lives.

### 1.1. Objectives

- To ensure the students can enjoy playing board games while learning.
- To aid the students to memorize and understand the basic physic concept.
- To reduce the teacher's burden on sacrificing time to make extra classes.

## 2. METHODOLOGY

The first part of the Atomic Adventure is the mounting board. This board will act as the base for the board game due to its hard material, allowing better gameplay. A4 paper is used to make the design for the board game and the card. The design will contain pictures and words relating to physics concepts. For example, the ladder will act as ruler and snake will become pendulum for this game. By using clay, characters are molded. Top hat, dog, cat, shoes, boat and pan are many of the model for the players. In addition, we used two dice for the board game. The board game will determine the movement of the player when rolling both dice. Each player will roll both dice and make moves along the boxes that contain numbers 1 to 100.

When the players get to one of the snakes (pendulum) box of the mounting board, the players must answer question related to the physics concept. If player fail to answer the question, player will go down the pendulum and get asked a question by another player. If the player still fails to answer the question, a punishment will be given by another player. In this case, the player that gets punishment will always remember the answers to the physics questions that are imposed on him/her. Next, when a player steps on the box that has question mark or exclamation mark symbol (pop quiz), the player must choose between four categories card which carry physics subjects such as force, wave, light and heat. Each stack of card holds fact, question,

experiment and formula for each subject. The difference between an exclamation mark and question mark boxes are, on exclamation mark box, player must answer within certain timeframe while no time limit is set on the other one. But player must beware, the longer they take to answer the question given, they will roll a single dice to be moved backwards.

## 2.1. Product diagram



Figure 1. Product Diagram

## 3. RESULTS AND DISCUSSION

Based on the findings during the development of this board game, it is found that the objective of this board game is successfully achieved by the positive feedback from the target audience, Over the course of 2 months, this product was tested among 50 students. It is discovered that by utilizing the role of moderator to facilitate the game, there is a 20% increase of player engagement and 50% improvement in the flow of gameplay. When there is a moderator, the game will run smoother because the moderator will only be focusing on facilitating the game to help players navigate through the board. For example, if the players find it hard to answer certain questions, the moderator can adjust current situation of the game to favor towards the players so that they can enjoy playing while also maintaining the game balance in terms of win-loss conditions.

Furthermore, to fully take advantage of the role of moderator, a feedback mechanism was included through the gameplay. According to the data collected, this feature increases understanding by about 40% for both players and moderators. For each question card, not only is there a question but also an answer so that the moderator can explain back to players when they face difficulty in answering a question. This way not only can players benefit from it, but the moderator will also understand and retain the physics concept. So, both the players and moderator can further enhance their understanding in physics while also enjoying the fun and excitement of playing a board game.

## 4. CONCLUSION

In conclusion, Atomic Adventure is looking forward to expand and help students to better understand and deepen the subject of physics to be used in everyday life. By combining enjoyment with educational benefits, this hybrid board game offers a novel approach to teaching and comprehending physics concepts. Through our concept of project, which involved careful design and implementation of game mechanics, we have successfully created an engaging learning tool. The incorporation of familiar board game elements, such as dice and player pieces, along with physics-related challenges and questions, has facilitated an enjoyable

learning experience for students. Moreover, the role of the moderator in facilitating gameplay and providing feedback has further enriched the learning process. By ensuring smooth gameplay and offering explanations when needed, the moderator contributes to a supportive and interactive environment where players can deepen their understanding of physics concepts. Moving forward, the researchers aim to expand the reach of this educational tool, enabling more students to benefit from an enjoyable and enriching approach to learning physics. As education continues to evolve, innovative solutions like the Atomic Adventure play a crucial role in enhancing student engagement and comprehension in STEM subjects.

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