

# Infusing Storytelling and Game Elements in Designing Instructional Media

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## ABSTRACT

Storytelling and games have been utilized successfully in education to increase involvement and engagement. However, according to recent research, storytelling and games are not always appropriate to integrate into an instructional setting. Although considered enjoyable, it is not always evident how a storytelling session or game may help students learn or how it can be utilized in a class. The approach was used in creating the *Savior of the Kingdom Plantae* game, which assists in the learning of middle school Biology. In an ADDIE model, we used the 5/10 approach in the (analyze) design process of the instructional media. To gather more input in this exploratory study, we asked an expert in educational media design and five middle school students to try on the first version of the instructional media. The result from the expert and students showed a good remark during the validation level for both the story elements and the game elements in the media. All in all, as an initial project, the media design is considered good to be developed further.

**Keywords:** *Instructional media, Educational game, Storytelling, Educational Technology.*

## 1. INTRODUCTION

The term "storytelling" has a broad interpretation. Storytelling is described as the interactive art of revealing the parts and visuals of a tale via words and actions while inspiring the listener's imagination [1]. According to the approach, storytelling is done to promote engagement by fostering dialogue between storytellers and tale listeners [2]. In its most basic form, storytelling is the act of transmitting an event (or sequence of events) to an audience by words and/or physical movement [3].

Storytelling has been shown to be effective in developing students' cognitive (knowledge), affective (feeling), social, and cognitive (appreciation) aspects [4]. Storytelling engages students by reducing depersonalization, increasing motivation, enhancing cognition, and stirring emotion [4], [5]. According to Lisenbee and Ford, a proper story has five fundamental literary elements: location, topic, characters, plot, and conflict [6]. When these factors are addressed effectively, a narrative schema that aids understanding develops [7], and so storytelling is a useful technique to present knowledge and give learning assistance in an exciting and personal way [8].

Storytelling is also a trend in gaming. Some of the games are liked because of their plots and narrations. One of the famous storytelling games is Silent Hill II. This

game tells the story of James Sunderland, who searches for his wife after receiving a letter from her one year after her death. Another best storytelling game is Her Story, which tells its tale through player choice entirely told in a short video. Games that emphasize storytelling are more interactive than traditional video games. Storytelling can draw people in, immersing them in the world and lessons of the tale to be told [9].

In every game, there must be some important elements, so it can be said to be a good game. Several important elements must be in a game, including points, badges, and leader boards [10]. Basic elements in the game are points, levels, badges and high-score lists [11], performance graphs, meaningful stories, avatars, and teammates [12]. Based on that explanation, this initial study focuses on three elements, including points, levels, and badges.

In research across educational environments, the learning benefits of narrative and games have been ambiguous. Therefore, one of the recommendations is to make sure that the game objectives and the learning objectives are in sync. Because of a lack of clearly defined learning objectives and results, it is sometimes difficult to establish whether or not storytelling and games contribute to a student's learning.

## 2. METHOD

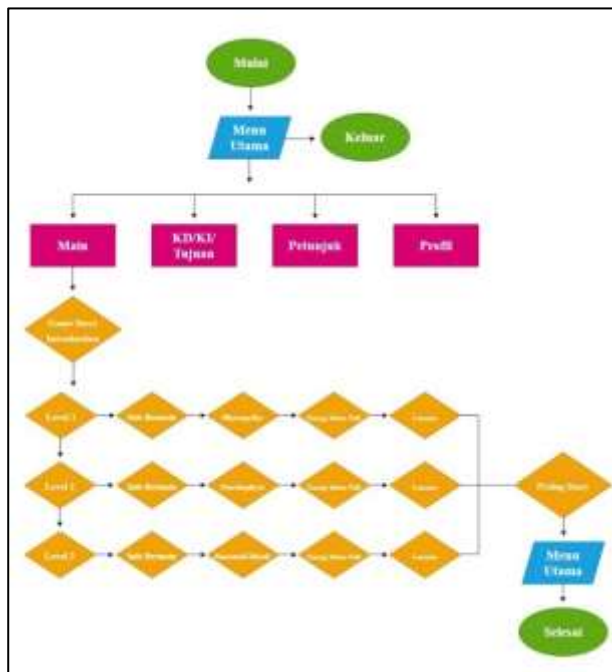
In this study, we applied the first two stages of the 5/10 method in the ADDIE model. The 5/10 is a method that provides guidelines for the design of a game-based multimedia with clearly defined learning goals and objectives and with a connection to the existing curriculum.

The first stage “analyze” consists of four steps; determine learning goals, analyze the learning materials and background, analyze existing teaching methods, analyze related educational games. The chosen subject is Natural Sciences – Kingdom Plantae topic in where the materials belong to learning facts category. In previous lessons, for the memorization process, the student’s activity focused on reading and doing exercises. This stage was done in a discussion with the class teacher involved. The result of this stage is the final draft for the lesson plan and the story plan.

At the second stage, "design," there were six steps involved; the first four steps, designing learning tasks, sequencing task classes, setting performance objectives, designing supportive information, are related to the plans for the lesson and the story.

The story planned for this game is presented through animation and narration, providing a background story so that students can understand the plot of the game. The designed storyboard tells a story of a king who must save the kingdom "Kingdom Plantae" from drought during the dry season by collecting the right plants for the kingdom. By doing the challenges, the player will collect scores and badges. When all the plants can be collected, it will rain so that the kingdom will be fertile again. The storyline in the game Savior of Kingdom Plantae has a structure that is in line with Diamantaki’s statement that basically, the storyline must have several components such as the beginning, setting, characters, incidents, and the climax of the story [13]. According to Kim, Lee & Lee, the storyline is the key element that can improve the quality of the game [14].

The last two steps in the second stage are: designing procedural information and designing challenges and levels. These two are related to the game design and are described in the map of the instructional media (see Picture 1.)



Picture 1. The map of the instructional media

The game elements included are points, levels, and badges. Points are given whenever the student can match the right plants based on their characteristics. (see picture 2). Different levels mean the different categories of plants. In the first design, we planned three levels (see Picture 3.) Badges are given when the students can reach specific scores (see Picture 4).



Picture 2. Points on game



Picture 3. Levels of the game



Picture 3. Badges on game

The data collection method used to validate the design is a questionnaire in the form of a validation instrument given to a material expert – the teacher, an expert in instructional media, and three students in middle school. The results of the data were analyzed quantitatively to determine the feasibility of the game to be used. Furthermore, there was a discussion with the experts concerning the results.

The instruments were developed to explore mainly the two aspects – the storytelling and the game in the instructional media. The items in the instruments are the following: 1) the storytelling aspect: a. how is the quality of the story idea? b. how is the performance (visual) of the story animation? c. how is the performance (audio) of the story animation? d. how is the relevancy of the story to the topic? 2) the game aspect: a. how is the quality of the game idea? b. how is the performance (visual) of the game elements? c. how is the performance (audio) of the game elements? d. how is the relevancy of the game to the topic?.

In order to determine the feasibility of the game, the validation instrument is given a Likert scale with the answer choices "1-5" and the calculation is carried out using the following formula: The guideline to determine the feasibility of the media is to interpret the results of the percentage of questionnaire data with criterion sizes. If the total score obtained is 86% - 100%, then it is included in the "Very Eligible" criteria, the total score is 66% - 65% included in the "Eligible" criteria, the total score is 56% - 65%, including the "Less Eligible" criteria and a total score of 0% - 55% is included in the "Not Eligible" criteria [15].

### **3. RESULT AND DISCUSSION**

#### **3.1. The storytelling aspect**

There were 4 items asking about the quality and the appropriateness of the storytelling in the instructional media. The results showed that the media is very eligible in the quality of the story idea, the performance (audio)

of the story animation, and the relevancy of the story to the topic. The performance (visual) of the story animation is eligible. In the further discussion, it was the result from the students that stated that the visual performance of the story animation could be improved.

Many experiments have been conducted in recent years in the digital narrative sectors by educators and designers to involve children gradually in the story environment in order to guarantee that the experience is pleasant and pleasurable while keeping educational values [16]. Moreover, the storytelling genre in this media is fantasy. According to Park et al, children immerse themselves in fantasy and imagination, then try to solve the problems in the story [17]. So that the storyline can be the basis for students to solve problems and complete the game.

One key piece of input for improving the Savior the Kingdom Plantae game as an instructional media is the visual performance of the storytelling animation. Given how children use video games on their devices and how advanced video games have become, it is anticipated to receive such feedback, particularly from children. The researchers would need to include the relevant elements depicted in the narrative animation for the next investigation.

#### **3.2. The game aspect**

The game was developed using Construct 2 software which is able to create 2D games and also has a multiplatform output so that it can be used on the Android operating system. There were 4 items asking about the quality and the appropriateness of the game elements in the instructional media. The results showed that the media is very eligible in the relevancy of the story to the topic. While for the quality of the game idea, the performance (visual) of the game animation, and the performance (audio) of the story animation are considered eligible. In the further discussion, it was the result from the students that stated that the quality of the game design could benefit from additional challenges.

As previously indicated, in this initial study, we concentrated on using three-game elements: points, levels, and badges, aside from the storytelling aspect. Students get points for completing each obstacle in the game (scores). This score can be considered as a reward for student achievement and ongoing direct feedback [18], [19]. The level is the grade that students must achieve. Each level in the game Savior of Kingdom Plantae has a different difficulty level. It was quite challenging to decide on these levels, knowing that difficulty might prevent the students from going further.

Students are expected to earn badges while playing at various levels. A player's achievements may be tracked by how far they go to a higher level of play [20]. The three-game aspects in this instructional video are designed to encourage students to keep learning and develop their abilities.

#### 4. CONCLUSION

This initial study focuses on the development of instructional media that integrates storytelling and game elements. The results reveal that the design is eligible to be further developed as an instructional media. However, in further development, some aspects of the media need to be improved, such as the visual performance of the storytelling and the challenges of the game.

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