



# Educational Mobile Game as an Interpretive Media Tool

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**Abstract.** The Kokdiang Fun Run mobile game is an example of an interpretive media tool used to attract tourists' interest to further explore tourist sites. Developed according to the requirements of an interpretive media tool, as recommended by Ginting and Sasmita (2018), the mobile game indicates the various attractions and facilities available for tourists. The study aimed to investigate tourism students' perception of an educational mobile game as an interpretive media tool, focusing on the usability and multimodal elements in the context of game design. In this qualitative research, the researcher conducted interviews and observations at a polytechnic to gather data among ten students who majored in Tourism Management. Then a thematic approach was used to analyze the retrieved data. The findings have shown that the use of mobile games in a course provided a positive usability experience for the students. The application of multimodal elements in the mobile game had increased their interaction and engagement with the content. By using the Kokdiang Fun Run mobile game in their lessons, students have developed a better understanding of applying mobile games as an interpretive media tool for tourism marketing which highlighted the usability and multimodal elements as the key features that should be considered in game design to capture stakeholders' interest. Finally, the results of this research that demonstrates mobile games as an interpretive media tool for teaching and learning or as another marketing tool to promote tourist attractions are valuable to two stakeholders, namely the polytechnic institutions and the tourism industry.

**Keywords:** Educational Mobile Game · Interpretive Media · Tourism

## 1 Introduction

Mobile games are defined as games installed and played on portable devices, including mobile phones or smartphones and tablets (Kyungjin, 2020). Frequently used for entertainment and edutainment purposes, mobile games have, the potential to be deployed as a marketing tool in the tourism sector. Various studies about the impact of games (Coghlan & Carter, 2020; Prakasa, Suyoto & Emanuel, 2021; Teoh & Md. Fudzee, 2022) on the tourism sector have revealed the advantages of games for multiple stakeholders, like travel agencies, local businesses, tourism developers and organizations, and tourists, as an interpretive media tool.

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F. Mustaffa et al. (Eds.): ICCM 2022, ASSEHR 706, pp. 75–87, 2023.

[https://doi.org/10.2991/978-2-494069-57-2\\_10](https://doi.org/10.2991/978-2-494069-57-2_10)

**Table 1.** Element of Tourist Facilities (Ginting and Sasmita, 2018)

No.	Facilities	Examples of Indicator
1	Accommodation	Hotel, lodging, restaurants, sport and entertainment facilities
2	Support Services	Parking, Toilets, Souvenir shops, Places of worship, Safety and Hygiene facilities'
3	Auxiliary Amenities	Visitor Information desk, Signboards

Through interpretive media tools, tourists can learn more about a location and its facilities, develop new knowledge and comprehend the location’s local culture and heritage (Mayorga & Cable, 2017; Coghlan & Carter, 2020). The three common types of tourist facilities are accommodation, support services, and tourism auxiliary amenities, as shown in Table 1.

There are two categories of interpretive media, either personal or non-personal. Personal media assist tourists in getting the information they require from people, whereas non-personal media help tourists receive information from a printed or electronic source. (Pendit, U.C., Zaibon, S.B. & Abu Bakar, J., 2015; Linh Phan & Schott, 2019; Tătărusanu, 2021). The Kokdiang Fun Run mobile game in this study can be classified as a non-personal interpretive media.

From these findings, it can be concluded that mobile games can be introduced to tourism stakeholders at an early stage, like the lecturers and students in tourism programmes at higher education institutions, as another interpretive media tool that promotes tourism sites and facilities. However, research shows that the tourism and retail sectors in Malaysia are slow in adopting new technology like mobile games or augmented reality (Tan, Lee, Lin, B. and Ooi, 2017; Alam, S.S., Masukujjaman, M., Susmit, S., Susmit, S. and Aziz, H.A., 2022).

**1.1 Background**

The DTM6014 Visitor Interpretation Services subject is one of the core subjects taught in Tourism academic programmes offered at Malaysian Polytechnics. The main objective of the subject is to expose students to the basic tourism principles and types of applications that enable the promotion of tourist attractions through improved communication and explanation of tourist facilities. This subject has mainly introduced students to interpretive media in the form of magazines, newspapers, videos, or social media as the latest technology. Mobile games have been fully utilised in major industries such as education, entertainment, and marketing. The use of mobile games should not be ignored in the tourism industry since this new media has the potential to be a means of engagement with tourists and can be beneficial like other interpretive tools for tourism marketing.

As an example, the Digital Media Prima Lab, a Malaysian multimedia company, has developed the *Mak Cun* Adventure mobile game as a marketing strategy. Rafiq Razali, the CEO, said that “*Mak Cun’s Adventure Game gives added value to its brand (local delicacies) while and commits to promoting the Malaysian food industry*” (Ridwan & Landau, 2018). A polytechnic lecturer who has been teaching the subject for ten years



**Fig. 1.** Screenshots of the Kokdiang Fun Run mobile game

further explained that “*The ready-to-play games in the market were mainly developed for the action genre and it is difficult to find a media application that meets the theoretical principles and characteristics of a good media interpretation application* (Ismail, S.L., Mohamed Bakhari, N., & Suid, I.S., 2020). To further explore this issue, the polytechnic students’ perception of mobile games as an example of the interpretive media tool was studied in this research, specifically in the context of games design.

In this study, the Kokdiang Fun Run mobile game was used in the DTM6014 Visitor Interpretation Services subject to introduce mobile game as an example of the interpretive media tool for tourism. The Kokdiang Fun Run mobile game had been developed according to the characteristics of interpretive media tools, as recommended by Ginting and Sasmita (2018), to include the facilities indicators such as eating places, safety facilities, places of worship, shops, hygiene facilities, and sign boards. The design of the game included multimodal elements like sounds and visuals to present the tourism facilities in Kokdiang, as well as usability elements via an interactive interface design (Fig. 1).

## 1.2 Problem Statement

Visitor Interpretation Services is a compulsory subject in the Diploma in Tourism Management Programme which is being offered by all polytechnics in Malaysia. In this subject, students are learning basic concepts and the application of media interpretation services for promoting tourist attractions. The Interpretive Techniques and Media topic of the subject introduces students to the role of interpretive media and the marketing techniques, functions, and characteristics of interpretive media (DTM 6014 Course Outline, 2019). According to a lecturer of the course, students are exposed to technologies such as Augmented Reality and 3D animation. However, mobile games have never been introduced to students because it is difficult to find games that adhere to the theoretical characteristics of an exemplary media interpretation tool ((Ismail, S.L., Mohamed Bakhari, N., & Suid, I.S., 2020). As a result, students are not aware that mobile games

could be implemented as a media interpretative tool. This study may serve as a standard to include mobile games as another example of an interpretive media tool in the course.

### 1.2.1 Research Objectives

The research objectives of this study focused on examining the perception of students towards implementing mobile games as an example of an interpretive media tool from the context of usability and multimodal elements in games design. The research objectives are:

**RO1:** To identify the perception of students towards the usability elements of mobile games as an example of an interpretive media tool.

**RO2:** To investigate the perception of students on the application of multimodal elements in mobile games as an interpretive media tool.

## 2 Literature Review

### 2.1 Usability Element in Mobile Game

Usability can be defined as the ability of users to achieve certain goals with a specific tool that is measured through the tool's effectiveness and efficiency besides the satisfaction of users (Zurita, Baloian, Peñafiel & Jerez, 2019; Yadav & Oyelere, 2021). According to a study by Yanez-Gomez, Cascado-Caballero, & Sevillano (2017), the usability aspect is measured in terms of engagement, acceptance, and satisfaction elements. The identified elements are based on an in-depth study on the usability of educational games for health intervention.

Another study measured the usability of a mobile game to improve knowledge on heart attacks among adults with heart problems and the respondents had a positive experience of using the mobile game for gaining knowledge about heart failure diagnosis through the game's engaging and easy-to-play features (Radhakrishnan, Toprac, O'Hair, Bias, Kim, Bradley, & MacKert, 2016). Despite various studies that have provided the usability elements of educational mobile games for achieving learning outcomes, Zurita et al., (2019), argued that an additional critical element that should be emphasized is the interface design. Hence, in her research analysis, she concludes that the usability of an educational mobile game is determined by how the game is designed to achieve specific learning outcomes. Since a game's interface design is an integral element of usability, designers should consider incorporating fundamental principles of user interface (UI) design (Lee, Oh, Shi, & Doh, 2021).

### 2.2 Multimodal Elements of Mobile Game

Wouters & Oostendorp (2017) studied how multimodal elements such as sounds, and visuals had an impact on students' motivation to learn through mobile games. Through visual analysis, the study showed that instructional methods that were adapted into serious games with cartoon-like visuals are effective for learning difficult concepts. The analysis discussed the impact of sound and graphics in supporting visual interaction and task performance.

The finding supports the studies of other researchers on multimodal elements, especially graphics and sounds, that are applied in games. The multimodal elements enabled students to engage with the content which motivated them to achieve their desired goals (Tan, & Suparjoh, 2022). A user learns better when interactivity elements are added to an application. Interactivity happens when learners have to make decisions in the game to solve a problem or perform a task (Quan, Haipeng, Zhenhui, & Xiaojuan, 2021). Interactivity allows user control and freedom to select and use the diverse features provided in a game which in turn facilitate the user's learning and motivation.

### **3 Methodology**

The target population for this research is higher education students who frequently play mobile games during their leisure time and are exposed to basic knowledge of tourism studies. Therefore, for the sampling of this study, ten students from the DTM 6014 Visitor Interpretation Services subject volunteered to be the respondents. The perception of mobile game usage can only be discovered when the respondents had prior knowledge of the topic of study in the educational mobile game (Riihiaho, 2018).

This study was conducted using a qualitative research method, where an interview was employed as the instrument to collect all the data in this research. The open-ended interview was chosen as the method could gather comprehensive information and opinions to discover students' perception of the usability and multimodal elements of mobile educational game for the promotion of tourism facilities that observes the characteristics of a good media interpretive tool that could be adapted to the DTM 6014 Visitor Interpretation Services subject in Polytechnics. The interview session was held online via the Zoom Meeting application and was recorded for further analysis and observation.

An observation session was conducted to analyse the students' interaction with the multimodal elements provided in the game. The data collected from this observation was expected to show how a user's experience can impact the user's behavior. The usability was measured through the quiz achievement and the number of tasks completed within 15 min.

During the interview session, several questions were asked including the respondents' demographic information details. Ten interview questions were divided into two main elements that are usability and multimodal elements. The three sub-category questions under usability are questions on the effectiveness, efficiency, and satisfaction of users while the two sub-category questions under multimodal elements include sound and visual elements. Two additional questions added in the interview are open-ended questions to obtain richer information. Finally, through this study, effectiveness is also defined as the ease of use, satisfaction is based on students' attitudes, and efficiency is identified through ease of learning while using the Kokdiang Fun Run mobile game.

## **4 Results**

### **4.1 Findings from the Interview Session**

The interview session involved ten respondents who had volunteered to participate and give their opinions on the research topic. The first section of the interview question

focused on the usability elements, including satisfaction, efficiency, and effectiveness of using the Kokdiang Fun Run mobile game.

#### 4.1.1 Usability Element

From the findings, all respondents have similar perceptions about the functions of the mobile game to help improve their knowledge about the district of Kodiang in Kedah. The Kokdiang Fun Run mobile game was used by students in order to examine their perception of using mobile games as an example of an interpretive media tool in the Visitor Interpretation Service class in Politeknik Tuanku Syed Sirajuddin.

For the usability element, respondent three (R3) provided the following feedback:

*“Yes, it helped me because even though I live in Kodiang, I just knew an international school exists there” ... (R3)*

while respondent six (R6) informed:

*“It is good for a first-time visitor to improve their knowledge of Kodiang and get to know places to eat like Mee Rebus Noodles and so on” ... (R6)*

The findings from these questions revealed the same conclusion as a study by Wong & Ghavifekr (2018) that discovered educational mobile games can result in meaningful exploration through the combination of gaming and learning experience, which reflected the ease of learning and efficiency during their studies.

The last element of usability in the first research objective is effectiveness. This element is asked during the interview session to obtain a deeper insight into the ease of mobile game usage as an interpretive media. The question, ... *“Did you find this game effective to be used as an example of a media interpretive tool in class? Why?”*, and most of the students responded with significantly positive opinions that using mobile games can help and be very useful as an example for students in the class.

Respondent one (R1) shared her view that... *“Very effective tool since when the users play, they are able to gain knowledge and have fun at the same time. As a result, the students of DTM6014 will be more creative in their thinking given the clear example of an interpretive media tool” ... (R1).*

In another interview session, respondent four (R4) said ... *“Very effective and interesting. Other than college students and primary students; ordinary people are also suited to play this game because the concept is easy to understand and the information conveyed is clear.” ... (R4).*

Among all, one respondent stated that the use of this mobile game was effective because of current trends in education. She states that *“It is effective because, for me, the younger generations nowadays are attracted to this kind of technology.” (R5).* This statement is similar to the opinion of Mitch Swanson in his article entitled *Gamification in 2021: A More Matured Approach* (gamify.com) in which he said that gamification will play a deeper role in the main industries such as education, healthcare, finance as well as upskilling training.

#### 4.1.2 Multimodal Element

The next research objective (RQ2) in this study is to get a deeper insight into how students perceive the application of multimodal elements in a mobile game that can be

used as an example of an interpretive media tool in class. The thematic elements coded for this analysis have been categorized into three multimodal elements: sound, visual, and interaction. The data analysis for the question ... *“Did you find the audio used in this game helped to enhance the learning experience? How?”* reflected that suitable sounds added in the game could give a better learning experience for the user:

*“The sound succeeded in connecting myself to the game and enabled me to experience the Kodiang surroundings” (R5)*

*“The sound makes the user more excited and motivates users when the questions are answered correctly” (R2)*

A few respondents suggested that the sound effects in the game can be improved to give more impact to users:

*“Sound effects are okay but can be improved for the part when the character died which should be clearer and users would notice their character is dead. The background music is suitable for the kampong (countryside) atmosphere and its nature” (R1)*

*“The music selected is suitable for the game. We just need to add more sound effects like the sounds of the buffalo, and other animals at the market (R6)*

*“There is no problem with the sound; maybe the sound effects needed to be applied accordingly during the actions of users in the game like when the character hits the question mark on level 1” (R7).*

Several respondents, however, explained the audio used in the game increased their excitement and motivation to complete the task in the game. Respondent three (R3) and respondent four (R4) shared their feeling:

*“The sound composed for the cartoon provides a kampong mood that may influence a user’s emotion” (R3).*

*“The sound used is appropriate and not boring. So the user wanted to continue playing” (R4).*

The next question is to examine the use of visual elements in multimodal... *“Do you find the game assets used in this game suitable with the objective of this mobile game? Why?”*

The result of the findings supports another outcome from a previous study that discovered cartoon-type graphics are more effective than a photo or realistic designs (Wouters & Oostendorp, 2017).

*“The assets fit with the graphic and with the information text shown at level 1. At level 2 all the paddy graphics portray the atmosphere of Kodiang” (R2)*

*“Yes, all the assets are suitable and similar to the facilities in Kodiang. For example, the Kodiang monuments are the same as the real one” (R3)*

*“Character and graphics are suitable for this game because it portrays the Kodiang environment for the youngsters” (R4)*

*“Graphics used is suitable for this game because the game is supposed to be relaxing and fun, and don’t need to be stressful or ‘skema’ in promoting the place” (R6)*

*“Very suitable in terms of color and icon used in the game as seen in the real Kodiang” (R7)*

However, one respondent gives a contrasting insight on the mobile game in relation to multimodal elements:

*“Yes the game assets are suitable but, there are some graphics in the game that doesn't resemble Kodiang because it looks too cartoonish” ... (R1)* Respondent one (R1) explained in the next interview question that she prefers realistic style graphics,

*“I prefer a more realistic style approach for the graphics because for me the graphics feels too child-like and maybe not be suitable for adults (R1)*

Most of the answers in response to the question of ... *“Did you like the cartoon-like visuals used in this mobile game to help you gain information about tourism facilities? How? ...”* explained that cartoon-like visuals help to portray information about the tourist facilities in Kodiang:

*“The cartoon-like visual helps to portray information about the facilities because the graphics clearly represent the types of facilities available” (R2)*

*“In my opinion, I like the cartoonish visual style because based on previous games I have played, the games that attract users are usually the ones with attractive colours and interesting characters. Maybe you can add a choice of male or female characters” (R5)*

*“Even if the visual is a cartoon, it's not a problem as long as it portrays the general experience of the location. Maybe the monster can be changed to a bee. Maybe you can add obstacles like a manhole, a goat, or a cow. Besides collecting coins, maybe the user can increase the energy of their characters in the game by eating local food such as Ais Kacang, Cendol Kodiang, or Laksa Utara Kak Ta.” (R5)*

*“Yes, because the cartoons attract many people, even though I am an adult, I feel the game's visuals have succeeded to encourage me to finish the game.” (R6)*

*“The cartoon visuals fit the game perfectly because the visuals are fun. The graphics are beautiful and the games' objective to promote the tourist place is achieved” (R7)*

The results from these statements show how respondents perceived the visual elements in the multimodal application through this game.

Two respondents disagree on using cartoon-like visuals due to their preference for realistic style graphics which they consider more suitable for adults:

*“I prefer a more realistic style approach for the graphics because for me it feels too childish and maybe not suitable for adults” (R1)*

*“The cartoon visuals may not be suitable with adults. Maybe you can include a more realistic picture or a 3D graphic” (R3)*

These two statements prove that visual impact depends on different perspectives based on the respondents' personal preferences. (Kapralos et al., 2017).

The next three interview questions asked during the data collection session were about the interactivity elements in the Kokdiang Fun Run mobile game. To understand the perception of students towards mobile games as an interpretive media tool example, the students' opinion of the interactivity element in the game was sought. Interactivity refers to the interactions users experience in the gameplay when players are required to make decisions and do an action in order to gain feedback from the games (Ibrahim & Jaafar, 2009). Findings from this study found that some respondents prefer to have the game character resume playing at the current point or level after being defeated.

All of the respondents prefer to have control over the game platform. According to Ibrahim & Jaafar (2009), the feedback given in games helps to provide a sense of





**Fig. 2.** Respondent shows satisfaction when she was able to answer correctly.



**Fig. 3.** Respondent claps her hand after she has completed all game levels.

learning. The analysis of the interview findings supported the importance of interaction. For example, two respondents (R2) said,

*“The button helps me get information by hitting the button which causes the information will pop up” (R2)*

*“When we play the game, the character moves from one place to another and from there we get the information” (R3)*

## 4.2 Findings from Observation

### 4.2.1 Usability

Video observation was conducted to support the findings from the interview session where the researcher observed user interaction during user-testing. Only several students completed the quiz with 1 or 2 wrong answers. Most of them managed to answer all questions correctly. The time duration to complete the game task was less than 15 min for all respondents (Figs. 2 and 3).

The results of the quiz based on the video showed that five students had achieved perfect scores.

### 4.2.2 Multimodal

Their first impression of the game somehow reflects the students’ interaction with the game until they completed all levels. The results from this observation found that all respondents showed excitement to play the game when they started, except when they experienced defeat during the game. As the game was designed to have manageable challenges, all the respondents continued playing even though some of them were defeated more than three times. However, their satisfaction and motivation towards the game



Fig. 4. Respondent's reaction after the character was defeated.



Fig. 5. Respondent's Reaction when answering game quiz.

can be observed through their expressions especially when they had chosen the correct answer in Level 2 and completed the learning activity (Figs. 4 and 5).

The research findings from the interview data and observation method demonstrated significant results regarding the usability and multimodal elements. The respondents perceived that the Kokdiang Fun Run mobile game gave them satisfaction, and believed that the game's efficiency and effectiveness contribute to the game's usability. The respondents perceived the multimodal application elements such as visuals, audio, and interactions in the mobile game were useful for engaging and motivating students. Hence, the mobile game could be implemented in class as a teaching and learning tool since overall the respondents agreed that the mobile game is suitable to be used as an example of the interpretive media tool in the Visitor Interpretation Services subject. Since the game is still a prototype version, it is recommended that the game developer gives more attention to the technical aspects of the game to offer better performance, accessibility, and experience to the end-user.

## 5 Discussion

This study indicates that engagement can be increased through satisfaction, efficiency, and effectiveness elements of an educational mobile game that can be achieved through proper design and implementation of visuals, audio, and interactivity to boost the motivation and performance of students during the learning process. The findings also confirmed the findings of an earlier study which reported that satisfaction elements can be the factor that helps users feel motivated (Yáñez-Gómez et al., 2017), Students tend to keep playing the game as they feel satisfied and motivated to complete all the challenging tasks in the game.

Students perceived the multimodal application elements such as visuals, audio, and interactions in the mobile game as engaging and motivating features that need to be

implemented in an educational mobile. However, despite gaining information through the game, students feel that the game developer should be more attentive of the technical aspects of the game, to further improve the performance, accessibility of the game, and offer a better experience to the end-user.

## 6 Conclusion

In conclusion, this study has revealed students' perception of an educational mobile game; specifically the Kokdiang Fun Run, as an interpretive media tool example for the Visitor Interpretation Service subject. The use of mobile games in class can be additional support to students by offering a better learning experience for students regardless of their discipline. The use of the Kokdiang Fun Run mobile game in the Visitor Interpretation Services subject could help to enhance students' understanding of integrating technologies for the tourism industry.

Usability elements such as satisfaction, efficiency, and effectiveness are essential elements that need to be emphasized during the design process in order to deliver information effectively. More attention should be given to multimodal elements, which are video, audio, and interactivity, during the development process as these elements cause the most impact on engaging and motivating users to continue and achieve their desired goals.

**Acknowledgments.** The author would like to extend gratitude to the Jabatan Pengajian Politeknik dan Kolej Komuniti (JPPKK), the Ministry of Higher Education for their support in granting the funding needed for this research.

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