Understand the Strategic Research and Evaluation of Beigang through Game Education Design

Li-Hsun Peng [1], Xin-Fang Yang[1], and Mohammad Adam Jerusalem [2]

[1] National Yunlin University of Science and Technology, Yunlin 64002, Taiwan, R.O.C.
[2] Universitas Negeri Yogyakarta, Jl. Colombo No. 1, Yogyakarta 55281, Indonesia
penglh@yuntech.edu.tw

Abstract. Game-based learning is a teaching method that combines educational objectives with game elements to promote learning through knowledge and skills actively learned by learners in games and enhance the practicality and value of learning. Under the implementation of Taiwan's 108 curriculum, educational games have become an innovative tool for educational purposes, encouraging students to work in teams in games, which can emphasize interdisciplinary learning and communication skills advocated by the 108 curriculums. Unlike traditional learning methods, game-based learning transforms historical and cultural knowledge into an engaging educational game, allowing learners to integrate humanities, Beigang history and culture, and daily life through a connected gamification-experience learning system. Therefore, the main objective of this study is to understand the strategic evaluation of Beigang through educational game design with data collection techniques using semi-structured interviews and literature discussion methods to analyze the core values of educational games. Then, the field survey method will explore the culture and history of Beigang and finally, the use of the semi-structured interview method to explore educational game design elements and emotional design. By using relevant factors to evaluate design strategies for integrating educational games into Beigang culture and the final results can provide valuable references for educational game designers, educational institutions, and related researchers to promote cultural education and implement heritage in a better form.

Keywords: Beigang Culture, Cultural Education, Educational Development, Educational Games, Game-based Learning.

1 Introduction

1.1 Research Motivation

The Ministry of Education promotes the education reform plan "108 Curriculum", which emphasizes students' core competencies, including three significant aspects: independent action, communication and interaction, and social participation [1]. It hopes to cultivate spontaneous thinking and active interaction mode by changing the teaching model to "learners" as the main body. However, the rapid development of

P. C. Kuswandi et al. (eds.), *Proceedings of the 6th International Conference on Current Issues in Education (ICCIE) 2023*, Advances in Social Science, Education and Humanities Research 847,
https://doi.org/10.2991/978-2-38476-245-3_37

technology has changed the information is obtained. Many "learners" will rely on mobile phones to obtain new information.

The rapid development of technology has indeed changed the way people acquire information, with many people now relying on their mobile phones to access new information [2]. However, it is important to note that increased access to information via mobile devices does not necessarily mean more learning. The impact of mobile technology on information processing after exposure is influenced by both physical access and cognitive access [3]. This highlights the potential of mobile technology in bridging the information gap and narrowing the productivity gap in various fields.

However, when a large amount of information pours in, learners can remain rational and vigilant to ensure that the information obtained is credible. To do this, learners need to develop critical thinking skills that allow them to evaluate the sources, arguments, and evidence of the information they encounter [4], [5]. Therefore, the motivation of this study is to deeply explore the humanistic history and culture of Beigang and integrate Beigang's history and culture into educational games. It hopes that "learners" can learn through educational games, increase their attention, and stimulate learners' learning motivation.

1.2 Research Purposes

The main objective of this research is to enable learners to understand Beigang culture in a relaxed way. The researcher designed a set of educational games that belong to the Beigang culture in Yunlin, Taiwan. This research is expected to promote the inheritance of Beigang culture and provide learners with a new way of learning. Based on research objectives, the following research questions are: (1) How do you design an educational game that can incorporate elements of Beigang culture and understand Beigang culture in a relaxed way? (2) Does learners' participation and interest in traditional culture increase after participating in the Beigang culture educational game? and (3) How does the educational game affect the inheritance and promotion of Beigang culture?

2 Literature Reviews

2.1 Educational Game

Educational games are a process that utilizes the natural human personality of having fun by using motivating games to encourage people to actively participate in things that were originally boring and offensive [6]. Common activities such as collecting points to exchange for rewards, checking in and sharing to send small rewards, and so on are undoubtedly designed to trigger people to participate to actively earn small rewards. However, in game design, different game elements will also lead learners to acquire different core competencies. The main concept of educational games is "edutainment", which provides entertainment, makes learning interesting, and stimulates learners' interest and participation.

The main concept of educational games is "edutainment", which combines entertainment with teaching to make learning interesting and engage students. This

approach integrates game design principles into educational contexts, such as web pages, learning control systems, or corporate intranets [7]. Educational games are digital products that combine learning subjects with challenging elements and attractive visualizations [8]. This game aims to stimulate thinking and improve concentration, especially in children [9]. By incorporating the concept of games, educational games provide a common experience for students, teach new skills and knowledge, and reinforce existing information and abilities [10]. The goal is to create interactive, interesting, and fun learning media that can be used to help the teaching and learning process, improve reading and writing skills, and increase the enthusiasm for learning in early childhood [11]. Overall, the concept of "edutainment" in educational games aims to make learning fun and increase learner engagement.

2.2 **Yunlin Beigang**

Beigang Township in Yunlin County borders Xingang Township in Chiayi County. The city was collectively known as "Bengang" in the early days. The city has a long history and rich culture and is a must-pass route for transportation from the north to the south of Taiwan. In addition, the Beigang Chaotian Temple is the center of the Mazu faith. The temple has a long history dating back hundreds of years. Because of the traditional religious crafts, cultural and martial arts arrays, traditional folk customs, industrial snacks, and alleyways originating from the Mazu faith, this lane has become an invaluable cultural asset representing Taiwan's historical and cultural heritage in the century-old city of arts [12].

1.1.1 1religious Culture

Every year from March 19 to 23 in the lunar calendar, Beigang Chaotian Temple welcomes Mazu. This is a religious activity that has been passed down for 300 years. It was also registered as an important national folk custom as an intangible cultural asset by the Ministry of Culture in 2011. However, this decision is the basis for this article discussing the importance of the Mazu welcoming event at Beigang Chaotian Palace in Mazu culture and Taiwanese folk tradition. In addition to Beigang's belief in Mazu, the surrounding sacrificial circle includes Sheng'an Palace, which worships the Five Emperors of Wenchang, Beigang Yimin Temple, one of the few tombs and temples in the country, Beigang Wude Palace, which is a place to seek wealth, and Nankun Yudai Tianfu Branch-Daitian and Zhen'an Palace, which are listed as county historical sites.

1.1.2 Cultural and Creative Products

Cai Xiangrun, a cultural and historical worker in Beigang, combined the familiar Monopoly game with local culture to promote Beigang culture and continue to inherit it. He developed the Beigang Monopoly "Eryi Bagua Street Tour Beigang" to appeal to young people in the most relaxed and fun way - a way to get in touch with local culture and immerse yourself in Beigang travel. There are currently two versions of the Monopoly board game. A total of 40 attractions are recommended in the

attractions chapter to promote local attractions in Beigang and allow people to understand Beigang culture when visiting; the food chapter also introduces 40 types of food.

Fig. 1. Eryi Bagua Street Tour Beigang Monopoly Board Game (Source: Beigang Visitor Center).

2 Method

This article is a literature analysis and field investigation. The research respondents were 50 respondents to conduct preliminary semi-structured interviews to understand their views on the core value of Beigang educational games and use the KJ method to filter and analyze the relative adjectives divided into three categories according to the design elements, as shown in Table 1 and create a five-point scale for the design of educational games.

After that, 12 experts and scholars who participated in designing and developing the educational game using the Likert Scale discussed the design strategy of cultural education in Beigang (Figure 2) to promote better cultural education and implement heritage.

Table 1. Criteria for problem-solving abilities.

Function	Connotation	Modeling
Educational	Storytelling	Unique
Interactivity	Cultural	Innovative
Sociability	Informative	Colorful
Challenge	Personalized	
A feeling of achievement		

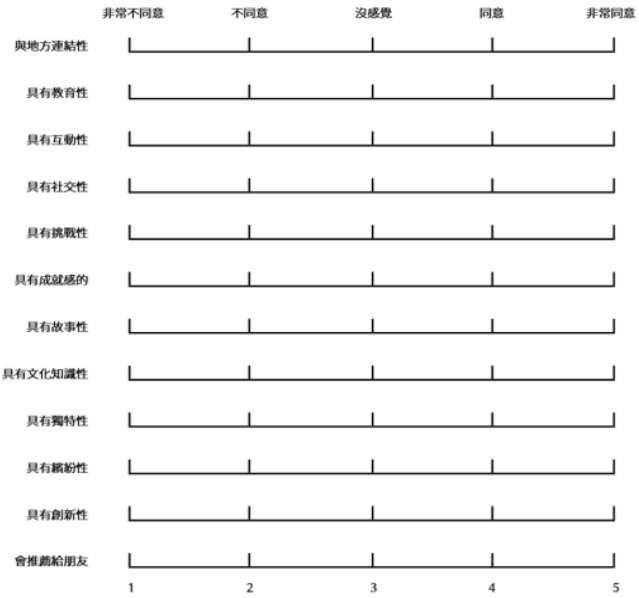

Fig. 2. Educational game scale.

Table 2. Basic information of experts.

Code	Personal Profile	Code	Personal Profile
A 1	Mr. Chiu Age: 46-50 Occupation: Professor of Design	A 7	Miss Liu Age: 21-25 Occupation: Designer
A 2	Miss Chen Age: 21-25 Occupation: Designer	A 8	Miss Chou Age: 26-30 Occupation: Designer
A 3	Mr. Liu Age: 46-50 Occupation: University professor	A 9	Mr. Pan Age: 31-35 Occupation: Designer
A 4	Miss Wei Age: 26-30 Occupation: Designer	A 10	Mr. Teng Age: 51-55 Occupation: University professor
A 5	Mr. Lin Age: 26-30 Occupation: Elementary School Teacher	A 11	Mr. Hong Age: 26-30 Occupation: E d actuators
A 6	Miss HSIEH	A 12	Mr. Tsai

Age: 31-40			Age: 41-45
Occupation: Teacher	Elementary	School	Occupation: Professor of Design

3 Findings and Discussion

This research adopted a Likert Scale questionnaire analysis survey, conducted measurements and semi-structured interviews with 12 experts and scholars, and provided strategies for educational game design.

3.1 Questionnaire Analysis

In this research, the author divided the questionnaire into three questions, namely functionality, connotation, and appearance, with 12 questions. These questions explored what design elements an educational game design should have. The higher the average, the greater the respondents' recognition of these design elements. Conversely, respondents agree these design elements are less necessary if the average is low. It can be seen from Table 3 that the highest average is education, with an average of 4.666 (equivalent to 93/100 points), which is close to a perfect score, meaning that subjects have relatively high expectations of the educational properties delivered by the Beigang Culture educational game design.

The second is a sense of achievement, with an average of 4.583 (equivalent to 92/100 points). In addition, the lowest average was Innovativeness, with an average of only 3.916 (equivalent to 78/100 points), representing the test subjects. We maintain a low-expectation attitude toward the fact that the design of Beigang cultural and educational games should be innovative.

Table 3. Basic information of experts.

Variable	Mean	Standard deviation	Minimum value	Maximum value	Valid sample	Invalid sample
Local connectivity	4.416	0.7592	3	5	12	0
Educational	4.666	0.4714	4	5	12	0
In interactivity	4.500	0.5000	4	5	12	0
Sociability	4.250	0.5951	3	5	12	0
Challenge	4.250	0.5951	3	5	12	0
Sense of achievement	4.583	0.6400	3	5	12	0
Storytelling	4.166	0.6871	3	5	12	0
Cultural knowledge	4.333	0.7453	3	5	12	0
Unique	4.000	0.5773	3	5	12	0
Colorfulness	4.000	0.5773	3	5	12	0

Innovativeness	3.916	0.6400	3	5	12	0
Recommended	4.250	0.8291	3	5	12	0

3.2 **Research Questions**

After the measurement, the researcher conducted semi-structured interviews as a basis for drawing and deciding on conclusions, i.e. working with the education community to ensure best practices and incorporating gamification elements to enhance social interaction.

Based on the results of the questionnaire, we can see the respondents' attitudes towards the design of the Beigang cultural educational game. The design elements mainly focus on education, sense of accomplishment, and interactivity, which means that respondents believe that educational game design should focus on the educational aspect, including the interactive relationship between the sense of accomplishment learners get during the game and cooperation and competition among peers. Therefore, we should work closely with educational experts, psychologists, and game designers to ensure that game design conforms to educational principles and best practices.

It is further concluded that respondents believe that challenging and socially interactive educational game design can effectively enhance cultural knowledge transfer, and the introduction of social elements into educational games, such as cooperation or competition between people, can enhance cooperation and communication among learners. You can learn new cultural knowledge in the game and more social skills by developing skills.

4 Conclusion

Today's technology is becoming increasingly developed, and people must focus on one thing. Through semi-structured interviews, we can understand the problems educators encounter in implementation and the pain points that should improve in today's teaching plans. The goal of this study is not only to solve the problem of insufficient concentration caused by current technological development. The problem lies more in providing a sustainable reference point for future education. Therefore, in the subsequent design of educational games, this study will follow the above suggestions, focus on personalized learning experiences, and develop lesson plans for Beigang cultural educational games. After passing the test, it expects to bring the lesson plans into the Beigang community and lead learners. Together, we use innovative methods to re-engage learners' learning experience, understand their life circle through games, and finally leave this lesson plan in the community so that the community can have more diverse tools when promoting culture. In addition, allowing the community to use it in various learning scenarios creates the possibility of sustainable development.

References

1. National Institute of Education, “Twelve-year national education curriculum syllabus.” National Academy for Educational Research, 2014. [Online]. Available: https://www.naer.edu.tw/PageSyllabus?fid=52
2. J. Dunaway and K. Searles, “Gaining access and losing information,” in News and Democratic Citizens in the Mobile Era, Oxford University PressNew York, 2023, pp. 1–19. doi: 10.1093/oso/9780190922504.003.0001.
3. A. Gupta, J. Ponticelli, and A. Tesei, “Language barriers, technology adoption and productivity: Evidence from agriculture in india,” Cambridge, MA, May 2020. doi: 10.3386/w27192.
4. R. Parikh, “Rational thinking – A skill For young minds,” edtechreview. [Online]. Available: https://www.edtechreview.in/trends-insights/insights/rational-thinking-a-skill-for-young-minds/
5. L. Suskie, “6 ways to ensure your assessment practices are fair and unbiased,” wiley. [Online]. Available: https://www.wiley.com/en-us/network/education/instructors/teaching-strategies/6-ways-to-ensure-your-assessment-practices-are-fair-and-unbiased
6. D.-Y. Wu, “From game to gamification: Preliminary research of gamification marketing theory,” Journal. Res., no. 124, pp. 215–251, 2015, doi: 10.30386/MCR.201507_(124).0006.
7. R. Roedavan, Y. Siradj, and S. Stefany, “Educational game scenario model based on imperative game goal typology,” J. Games, Game Art, Gamification, vol. 8, no. 1, pp. 18–23, Jun. 2023, doi: 10.21512/jggag.v8i1.9497.
8. I. P. Sari and B. Putri, “Media pembelajaran berbasis game puzzle meningkatkan keterampilan baca dan tulis usia 4-6 tahun,” Rabit J. Teknol. dan Sist. Inf. Univrab, vol. 8, no. 2, pp. 213–220, Jul. 2023, doi: 10.36341/rabit.v8i2.3473.
9. S. A. Baowidan, “A survey on application of game design element in edutainment,” in International Conference on Human-Computer Interaction, 2023, pp. 39–50. doi: 10.1007/978-3-031-35930-9_3.
10. M. Ahmad, “Educational games as software through the lens of designing process,” in Research Anthology on Game Design, Development, Usage, and Social Impact, IGI Global, 2022, pp. 872–890. doi: 10.4018/978-1-6684-7589-8.ch042.
11. M. Aman, “Implementasi game edukasi pengenalan binatang buas pada anak usia dini,” Insa. Pembang. Sist. Inf. dan Komput., vol. 9, no. 2, Jan. 2022, doi: 10.58217/ipsikom.v9i2.199.
12. Tourism Bureau of the Ministry of Transport, “Beigang Town,” www.taiwan.net.tw. [Online]. Available: https://www.taiwan.net.tw/m1.aspx?sNo=0042291&uid=6