SERIOUS GAME DESIGN BASED ON TOURIST EXPERIENCE TO PROMOTE HERITAGE TOURISM

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Abstract

Tourist experience has always been an important concept in tourism industry to provide ameliorate services or products to the tourist. Considering that, Information and Communication Technology (ICT) has been rapidly adapted to tourism industry for marketing purpose, providing products or services, access information and etc. One of the technology that popular and capable of giving inspiration besides persuade to travel is serious game. Serious game is a game that able to transfer knowledge to the player in the form of entertainment. However, studies related to designing serious game without interrupting its entertainment element in achieving the learning objectives based on tourist experience are still lacking. Tourist experience is an important element of this study as a tourist chooses their tour destination based on their previous tour experience. Therefore, this study is conducted to design serious game based on tourist experience to convey information in a fascinating way and to create brand awareness of the destination. The objective of this study is to identify appropriate elements of the tourism based serious game and identify travel motivation from travelers experience for designing serious game through the literature review and preliminary study. Produced game prototype is the guide and catalyst for future research that focuses on serious game design in heritage tourism. This study has succeeded achieving the objectives and scope of the study as well as solving the research problems that has arisen.

Keywords— serious game, game elements, tourist experience and tourist motivation

I. INTRODUCTION

Digital games are one of the most accessible games everywhere, no matter where and when. Digital gaming features have led to development of serious games to support players from different fields including education, healthcare, business and advertising. (Xu, Buhalis, & Weber, 2017). Serious game is a computer game that serves as an agent of persuasion in modifying user behaviour and gain new knowledge to the user; not only focus on entertainment such as traditional games (Ghanbari, Similä, & Markkula, 2015). One of the most thriving and unforgettable sectors to take advantage of this serious game concept is the tourism sector. Serious game is a relatively new technology and only a few applications have been developed so far in the tourism sector. At the same time, research has shown that the use of serious games as one of the marketing strategy has succeeded in attracting more tourists to the destination, boosting their knowledge and experience before, during and after the visit. (Stadler & Bilgram, 2016; Xu et al., 2017; Xu, Tian, Buhalis, Weber, & Zhang, 2015). Many researchers agree that games are used for fun and to meet the needs of consumers in the field of tourism (Corrêa & Kitano, 2015; Luimula & Trygg, 2016; Xu et al., 2015). From early reading there has been a lack of research on the serious game design based on the tourist experience.

This study conducted to identify serious game elements that are appropriate for designing serious games and also to identify tourist travel motivation to Malaysian popular destination in order to design heritage tourism based serious game. Hence, a prototype of serious game design based on tourist experience is developed that could inspire more tourist to visit Malaysia.

II. SERIOUS GAME

Generally, game playing is an activity involving fun and entertainment. Juul defines the game as a "formal system based on rules" (Xu, Weber, & Buhalis, 2014) where all types of game have rules to be follow by the players. Commonly, the game has several characteristics that categorize it as an entertaining game (Seaborn & Fels, 2015) such as rules, unpredictable results, conflicts, obstacles, interaction, plots and more. (Fernandes, Almeida, & Rosseti, 2013; Xu et al., 2017). In line with game purpose, Zyda (2005) describe serious games as the process of implementing game elements into non-entertainment domains such as education, medicine, military and so on (Bourbia, Gouasmi, Hadjeris, & Seridi, 2014). Academician suggest serious games for the transmission of knowledge/information in the form of entertainment across all fields (Xu et al., 2015).

Serious games are considered as a tool in inspiring people to travel, to create brand awareness and as a driver in decision-making (Nguyen Le, 2014). According to Mortara et al. (Mortara et al., 2014), serious games involving cultural heritage can provide an immersive experience to its players such as virtual museums, historic buildings and so on. For serious games that conceptualize cultural heritage generally have three (3) learning objectives such as creating cultural attraction, reconstructing monuments and buildings, creating heritageattraction (Mortara et al., 2014). Therefore, serious games should design carefully so that the elements of entertainment are not interrupted by the serious learning content in achieving their learning objectives.

A. Game Elements

Game elements are described as basis component of a game and it shared by all type of games according to its suitability and not fix to any element (Deterding, Sicart, Nacke, O'Hara, & Dixon, 2011). Game aspect such as scoreboards, trophies, challenges, avatars, badges and rewards describe as game elements (Seaborn & Fels, 2015). Selection of game elements depends on the game genre, gameplay and frequency of sharing by most games (Xu et al., 2014). This is due to the positive impact that a game element can have on the player. Examples score and badges keep players playing for the best scores or collect as much badges as possible. Thus, to create meaningful gaming experience game elements that often used for tourism based serious game identified as in Figure 1 (Xu et al., 2017, 2014).

Achievement	Rules	Challenges	Chances	Competition	Cooperation	Feedback
Resource acquisition	Rewards	Time Pressure	Expression	Dramatic Tension	Sensation	Fantasy	Narrative
Challenge	Fellowship	Discovery	Badges	Gifting	Collecting	Groups Messages	Blogs
Chat	Profiles	Privacy Control	Notification Control	Progressive Bar	Levels	Leader Board	Roleplay

Figure 1: Game elements for tourism

III. TOURIST EXPERIENCE

Tourist experiences are described as experiences that result from interactions between travel agencies, tour guides, travelers and destinations that they visit (Tussyadiah, 2013). This experience can occur when a tourist is connected to a travel service, or while in the destination (Zatori, Michalko, Nagy, Kulcsar, & Balizs, 2017). Researchers agree that tourist experiences are subjective and include one's emotions and behaviors based on their involvement on the activities (Chang, 2013; Ingram, Caruana, & McCabe, 2017). The tourist experience is divided into three (3) stages: pre-travel, during travel and post-travel (Chang, 2013; Neuhofer & Buhalis, 2012; Neuhofer, Buhalis, & Ladkin, 2014;

Nguyen Le, 2014) that can be produced either physically or virtually at any of that stages (Neuhofer & Buhalis, 2012). Pre-travel is the experience that comes before doing travel activities that include information about a holiday destination, travel planning process, hotel reservations, flight tickets and more. During travel experience is generated during the tour activities which include facilities, interesting activities on location, destination scenery, amazing architecture and more. Finally, post-trip refers to the experience after they return from a destination of travel with sweet and bitter memories resulting from their travel and share experiences with their friends. This study also refers to experience pyramid by Tarssanen&Kylanen (2007) to design the prototype of the serious game since it's developed specifically for tourism products.

A. Experience Pyramid

This model is divided into two parts which is known as experience element and level of experience. The horizontal axis comprises six (6) elements of experience such as individuality, authenticity, story, multi-sensory perception, contrast and interaction. While the vertical axis contains five (5) levels such as motivation, physical, intellectual, emotional and mental levels as shown in Figure 2. Tarssane and Kylanen (2007) state all elements of the experience must be present at a tourism product or service in order to provide the optimum experience level which will resulting in the next level of experience (Nguyen Le 2014). It starts with the lower level of motivation that drives the tourist interest and ends with the mental change.
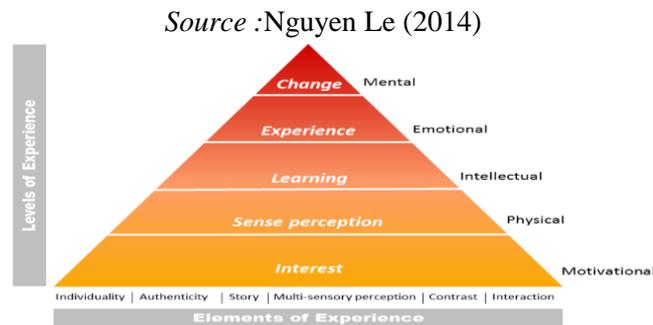
*Source :*Nguyen Le (2014)

Figure 2: Tourist Experience Pyramid

According to the experience pyramid motivation is the stage of attract interest and inspire tourists to choose their holiday product, service or destination. In order to create interest of a destination, seeking the tourist travel motivation is vital for this study. Travel motivation is the process of decision making of the travel destination and the factors that influence tourists in choosing a destination (Pool, 2006). Therefore, researchers has identified few tourist motivations factors in choosing a travel destination such as cultural, natural scenery, relaxation, entertainment, historic sites, knowledge and education seeking, facilities, shopping, visit friends or relatives and also for business trip. Meanwhile Yao (2013), identified tourist motivation factors towards heritage destination is cultural and heritage, knowledge and education seeking and also relaxation and entertainment (Yao, 2013). However, this study further investigates on the factors to identify the most significant factors in designing the game prototype.

IV. RESEARCH METHODOLOGY

User-centred Design (UCD) is used for the development of this serious game prototype based on the tourist experience. User-centered design models are used and selected to ensure the design results meet the needs of the user. The UCD model has four main phases: (1) Analysis; (2) Design; (3) Implementation; (4) Evaluation. This model emphasizes on user-driven development with each stage of the design process emphasizing the usefulness of a product, user characteristics, environment and product function by engaging the user throughout the process (Ritter, Baxter & Churchill 2014) . In addition, this model is iterative and can be repeated to meet the needs of the user on the system being developed.

In analysis phase, a preliminary research was conducted using a questionnaire to identify tourist main interest for visiting Malacca. Three main factor of tourist motivation to visit heritage destination such as 1) Cultural Heritage Attraction; 2) Knowledge and Education Seeking; 3) Relaxation and entertainment; used for identify the most significant motivation to travel Malacca. A total of 100 respondents from 21 to 40 years old answered this survey. The result shows that 83% of tourist attracted by cultural and heritage of Malacca. Malacca known as heritage destinations and the popularity of Malacca attracts more tourists from all over the country and oversea to visit this destination. Moreover, the travelers also want to see and feel themselves the historical sites in Malacca rather than reading in books, websites or social networking sites to enhance their experience. Hence, a prototype of serious game design is developed based on this needs and discussed in next section.

V. PROTOTYPE OF SERIOUS GAME DESIGN

The serious game design can be explained through the MDA (Mechanics, Dynamics, Aesthetics) model (Hunicke, LeBlanc, & Zubek, 2004). MDA considered as most basic and appropriate model in the design of a serious game (Deterding et al., 2011; Xu et al., 2017). However, MDA has design issues where this framework only emphasizes on the mechanics, dynamics and aesthetics component of a game (Walk, Gorlich, & Barrett, 2017). Therefore, MDA enhance to DDE (Design, Dynamics, Experience) framework (Walk et al., 2017). The design part in DDE model remain mechanics besides includes interface to solve the design problems. Game mechanics part that player dealing with game actions, behaviors and game control (Hunicke et al., 2004) such as jumping, running, shooting,challenges, opportunities, competition, cooperation, feedback, resource acquisition, rewards and transactions (Xu et al., 2017). Interface in DDE model concentrate on game design such as graphic asset, text, narrative and sound implementation in a game development (Walk et al., 2017) which also act as intermediate medium in-between player and the game to communicate information. This design part also consists of the content and pedagogy which would be part of serious game design and development. Therefore, DDE adapt to the game design of this study as a guidance to design tourism based serious games. Framework model of the prototype as shown in Figure 2 is developed to show an overview of the serious game design for tourism.

Content and Pedagogy
- Destination Information
- Monumen History
- Malaysian Culture

Game Interface (3D)
- Reconstructing the historical monument
- Reconstructing local food stalls
- Reconstructing Environment of destination

Mechanic
- Challenge
- Chances
- Competition
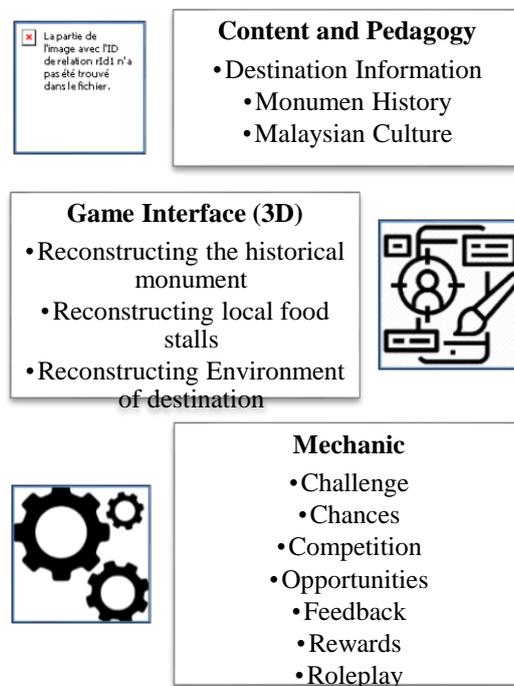- Opportunities
- Feedback
- Rewards
- Roleplay

Figure 3: Framework Model for Design Serious Game

Through the literature and early research there are three aspects identified to develop this framework model of the prototype design which is game elements, factors affecting tourist motivation and content. The learning objective of the game is to attract more domestic and international tourists to Malacca through reconstructing history and creating awareness of heritage. Therefore, destination information, and monument historical information's would be the knowledge for the players in this serious game. While, heritage destinations and famous food at Malacca suggested to build in 3D concept as a game environment. It has been identified that cultural and heritage factors are among the main factors that make traveller choose Malacca as a tourist destination. Tourists want to visit the famous monuments and scenery in Malacca and experience in-real the historical city. When a real environment is built and implemented it can enhance the appreciation of history among players (Mortara et al., 2014). Besides that, tourist also attracted towards Malaysian cultural such as local foods, tradition, customs and so on. Game mechanics chosen according to the gameplay such as rewards, feedback, opportunities, challenges and role-play and etc. As a result of the mechanical and dynamic components of this game, players will gain fantasy, challenge, narrative and discovery experiences through exploring the serious game.

VI. PROTOTYPE INTERFACE AND DESIGN

The prototype of this serious game for Malacca is still in development phase and few scenes has been developed and testing successfully. Figure 3 illustrates an example of the prototype interface design and the implementation of it.
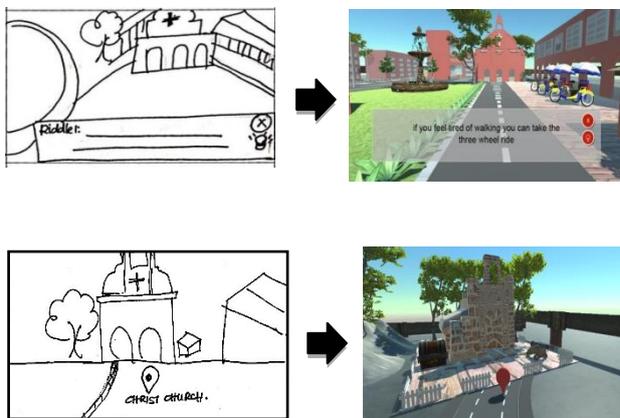
All scenes designed with 3D concept and embedded with interaction to allow player to play and choose their activities in the game. The designer and a few potential players experimented informally during the design and development process to ensure that the prototype scenes were running without error; the control interfaces were working seamlessly and all the user interface components were correctly positioned. Once the design of the prototype has been completed, a standardized review and evaluation will be conducted by the intended user to ensure the prototype's efficacy and usability. Then the details of the evaluation data will be evaluated and discussed.

VII. CONCLUSION

This study has identified tourist motivational components and game design framework that contribute to the serious game design prototype. This game prototype can be used as a reference for serious game development in the context of heritage tourism to attract tourists to heritage destination such as Malacca. Hopefully this game prototype could give a benefit to the tourism industry by motivate more tourist to Malaysia as well as creating brand awareness. With this serious game prototype, we hope tourist has another way in gain information about Malaysia's famous destination Malacca in an interesting and interactive way. However, this game prototype developed according to the Malaysia's popular tourism destination Malacca. Therefore, further research needed in identifying tourist motivation according to the type of tourism for appropriate serious game design.

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