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**ATTRIBUTES OF NARRATIVE GAME AESTHETICS FOR
PERCEIVED CULTURAL LEARNING**



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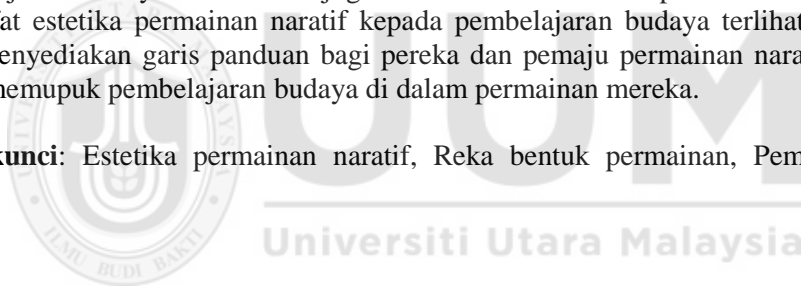
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Abstrak

Kajian terdahulu kebanyakannya mengambil berat kepada estetika permainan yang bukan holistik untuk pembelajaran dalam pelbagai platform media interaktif. Terdapat kekurangan kajian mengenai sifat-sifat permainan naratif estetika yang boleh menyumbang kepada pembelajaran budaya terlihat. Oleh itu, kajian ini bertujuan untuk mencadangkan satu model konsep estetika permainan naratif untuk pembelajaran budaya terlihat. Tiga objektif khusus telah dirumuskan: (i) untuk menentukan estetika permainan yang menyumbang kepada pembelajaran budaya terlihat dalam permainan naratif, (ii) untuk membangunkan permainan naratif berdasarkan estetika permainan yang telah ditentukan, dan (iii) untuk menghasilkan bukti empirikal mengenai sumbangan estetika permainan ke arah pembelajaran budaya terlihat. Metodologi kajian terdiri daripada tiga fasa utama: pembangunan model konseptual, pembangunan prototaip, dan penilaian pengguna. Untuk fasa pertama, model konseptual telah dibangunkan berdasarkan kesusasteraan terdahulu serta dikaji semula oleh enam pakar. Dalam fasa kedua, pembangunan prototaip kemudian dibangunkan berdasarkan model konseptual. Akhir sekali, penilaian pengguna telah diusahakan dengan menggunakan eksperimen kuasi yang melibatkan 43 peserta. Analisis data telah dijalankan dengan menggunakan analisis deskriptif, analisis korelasi, dan pemerhatian. Dapatan kajian menunjukkan bahawa enam daripada 10 sifat iaitu imej dan grafik; susun atur; rupa dan bentuk; tekstur; suara; dan muzik, mempunyai hubungan yang signifikan dengan pembelajaran budaya terlihat. Hasil pemerhatian juga menunjukkan bahawa sifat-sifat ini boleh menguatkan pengalaman permainan untuk pembelajaran budaya terlihat. Secara ringkasnya, kajian ini telah mengenal pasti sifat-sifat estetika permainan naratif untuk pembelajaran budaya terlihat. Ia juga memberikan bukti empirikal mengenai sumbangan sifat-sifat estetika permainan naratif kepada pembelajaran budaya terlihat. Hasil kajian ini akan menyediakan garis panduan bagi pereka dan pemaju permainan naratif yang berminat untuk memupuk pembelajaran budaya di dalam permainan mereka.

Kata kunci: Estetika permainan naratif, Reka bentuk permainan, Pembelajaran budaya terlihat



Abstract

Previous researches are mostly concerned on non-holistic game aesthetics for learning in various interactive media platforms. There is lack of studies on attributes of narrative games aesthetics which may contribute to perceived cultural learning. Therefore, this study aims to propose a conceptual model of narrative game aesthetics for perceived cultural learning. Three specific objectives were formulated: (i) to determine game aesthetics that contribute to perceived cultural learning in narrative games, (ii) to develop a narrative game based on the determined game aesthetics, and (iii) to produce empirical evidence on the contribution of game aesthetics towards perceived cultural learning. The research methodology comprises of three main phases: conceptual model development, prototype development, and user evaluation. For the first phase, the conceptual model was developed based on previous literature and reviewed by six experts. In the second phase, prototype development was then developed according to the conceptual model. Finally, user evaluation was employed using quasi experiment which involved 43 participants. Data analysis is conducted using descriptive analysis, correlation analysis, and observation. Findings indicate that six out of 10 attributes namely image and graphic; layout; shape and form; texture; voice; and music, are significantly correlated to perceived cultural learning. The observation results also indicate that these attributes can amplify game experience for perceived cultural learning. In a nutshell, this study has identified attributes of narrative game aesthetics for perceived cultural learning. It further provides empirical evidence on contributions of these attributes of narrative game aesthetics to perceived cultural learning. The outcome of this study will provide guidelines for narrative game designers and developers whom interested to inculcate cultural learning in their games.

Keywords: Narrative game aesthetics, Game design, Perceived cultural learning.



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List of Abbreviations

DST	Digital Story Telling
HCI	Human-Computer Interaction
PCL	Perceived Cultural Learning
UI	User Interface
UX	User Experience



CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Cultural learning is critical because of cultural constructs society (Champion, 2006). Without culture, society may not be functioning in governing through its unique values and behavior (Champion, 2006). On the other hand, without societal influences, cultural may not preserve as well (Champion, 2006). As societal norms evolve, our culture is evolving as well. In order to preserve ones' culture, cultural learning must be exposed among youngsters.

According to “United Nations Educational, Scientific and Cultural Organization (UNESCO),” (2016), there are two types of cultural, which are tangible and intangible cultural. Both tangible and intangible cultural can be learned through a learning process. Learning process starts through interpretation and perception or perceiving of the differences between the environment and people (Bonini, 2008). Meanwhile, the process of feedback stimulates various and continuous levels of perceptive and cognitive interaction, as information or interpreted data converted into knowledge. Further explanation on how information of cultural learning perceived by players from game aesthetics are discussed in semiotics theory section (Section 2.4.2).

According to Costikyan (2000), players can learn from narrative games. Narrative games are played by most youngsters (Bryce & Rutter, 2001). In addition, games are the best computer medium for interactive engagement (Champion, 2003; Laird, 2001; Laird & van Lent, 2000). Moreover, according to Champion (2003), narrative game

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internal user
only

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Appendix A:
Instrument for Expert Review

**DESIGNING NARRATIVE GAMES WITH GAME AESTHETICS FOR
PERCEIVED LEARNING IN CULTURAL CONTEXT**

Dear Prof / Dr. / Sir / Mdm

EXPERT REVIEW OF GAME AESTHETICS IN NARRATIVE GAME

I am Abdul Syafiq bin Bahrin and currently pursuing Master studies in Multimedia at Universiti Utara Malaysia. I am delighted to inform you that you have been selected to participate in this research on reasons as follows:

- Your qualifications either in Multimedia (especially in game designer) or Instructional Expert in on Computer Science related areas, and/or
- You have been studying/researching/teaching Multimedia (especially in game design) or Instructional Expert in Computer Science areas for at least 5 years.

My Master research proposes the **Designing Narrative Games with Game Aesthetics for Perceived Learning in Cultural Context**. However in short, the objective of this expert review is to validate all the identified aesthetics in interactive product design (especially Game Aesthetics) by scholars that can be relates with Perceived Learning in Narrative Games, from the current game expert in current game industries. For better understanding, below are the operational definition of term in my study:

1) **Operational Definition:**

Operational Definition 1: Narrative Games

Narrative games is an extended term for a ‘game’ which use *narrative elements* (e.g. storyline: plot, character, theme, etcetera) that act as game flow for player to proceed from start until end of the game story. It is a domain for any digital type of narrative games in general, such as Massive Multiplayer Online Role Playing Game (MMORPG), Role Playing Game (RPG), and etcetera. It is also referring to a method of narrating a story in a game.

Operational Definition 2: Game Aesthetics

Game aesthetics is defined as game “attributes” that represent tangible look and sound of the narrative game and contribute to some degree of learning. It also represents game assets such as 2D sprites, 3D models, audio, and etcetera.

The term “*attributes*” in this research represents visual and aural appearance that can be changed. Visual appearance is the look of the game such as text, image, and color. Aural appearance is the sound of the game such as music, sound effect, and voice.

Operational Definition 3: Perceived Learning

Perceived learning are not the learning outcome of the game, but it is defined as *the player's perception towards their content-learning (i.e. cultural content) through the game*, such as ease of understanding/learning in a every/certain part of the game, like "can you understand the story?", "Is it easy or not to understand this/that?", "Can you feel or get the picture of the historical environment within the game?", "Are all the designed characters that participated in the game story helped you to understand the story?", "Is the dialogue/conversation used make you interested to know more about the historical stories?".

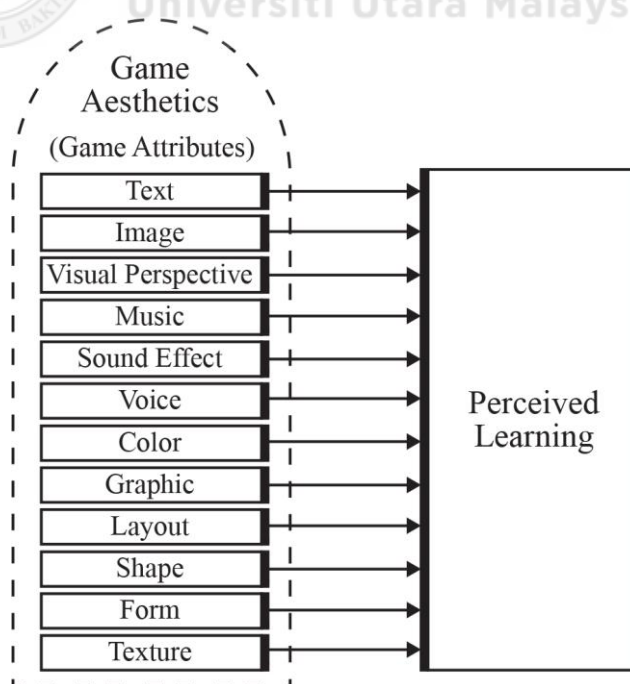
***INSTRUCTIONS:**

Please read and go through the **proposed conceptual model** and its **explanation/previous studies on relationship between game aesthetics and perceived learning** for narrative games development carefully. After that, please fill up the form starting from page 4 until the end. The information supplied will be treated as confidential and will be used for research purposes which may be reported anonymously in academic publications.

Please feel free to contact me by email (syafiqbahrin@gmail.com) in regards to any queries or my supervisor liana@uum.edu.my.

Thank you for your time and assistance.

2) **Proposed Conceptual Model:**



Proposed Conceptual Model of Relationship Game Aesthetics with Perceived Learning.

This conceptual model were derived from literature that related to interactive digital media including game design by scholars, where most of the previous studies were directly/indirectly concluded that there is relationship between Game Aesthetics and Perceived Learning. Further example/explanation for each relationship were provided in the table below.

3) **Explanation/Previous Studies on Relationship Between Game Aesthetics and Perceived Learning**

Based on my proposed conceptual model above, each of Game Aesthetics (i.e. *text, image, visual perspective, music, sound effect, voice, color, graphic, layout, shape, form, and texture*) has its own benefits towards learning by scholars, especially perceived learning. For example:

RELATIONSHIP OF GAME AESTHETICS AND PERCEIVED LEARNING	EXPLANATION/PREVIOUS STUDIES OF THE RELATIONSHIP
Text – Perceived Learning	Text may contribute into a few factors, such as emotion (Alm, Roth, & Sproat, 2005); connecting ideas in text, differentiate an important and unimportant content (Sáenz & Fuchs, 2002); provide instructions before reading, and awareness during reading (Abadiano, 2002), before analyze the meaning of the content as a whole.
Image – Perceived Learning	Image prediction study shows that it can measure the level of interestingness of a person towards the content of the picture, which indirectly relate to learning interest (Dhar, Ordonez, & Berg, 2011)
Visual Perspective – Perceived Learning	First-person game perspective can greatly increase players' arousal compared to a third-person game perspective (Anderson & Bushman, 2001; Schneider, Lang, Shin, & Bradley, 2004; Tamborini, Eastin, Skalski, & Lachlan, 2004)
Music – Perceived Learning	Music, sound effect, and voice are a part of sound/audio. It has been suggested by Wanderley and Orio (2002) that there are four essential features that should be main concern in sound/audio development, which are learnability, explorability, feature controllability, and timing controllability.
Sound Effect – Perceived Learning	
Voice – Perceived Learning	In addition, according to Herbert (2009), there are five factors of aesthetic sounds in aiding the (audio) continuity for the visual narrative (i.e. film, movie), which are environment; dialogue; rhythm; perspective and presence; and dynamic.
Color – Perceived Learning	Color may develop positive physiological and emotional effects. It also can support the function of the (layout) design, and the carried task in it (Engelbrecht, 2003).

<p>Graphic – Perceived Learning</p>	<p>There is lack of direct-to-graphic study. However, it is indirectly contributed to perceived learning as it defined by Oxford dictionary: - “Graphic” (2015), graphic is any kind of pictorial/visual representation of an item (i.e. pictures, words, shapes) that perceived and/or described in a very clear way.</p> <p>In games, graphic usually perceived as Heath Bar (HP), Windows for: volume adjustment, dialogue, and etcetera.</p>
<p>Layout – Perceived Learning</p>	<p>Layout aesthetics can be measured in six component, namely cohesion, economy, regularity, sequence, symmetry, and unity (Ngo, Samsudin, & Abdullah, 2000; Salimun, Purchase, Simmons, & Brewster, 2010) for general interactive product design, but it also reflect well in narrative game development.</p> <p>The finding in their study has proved that the higher level of layout aesthetic, the better the game experience/UX (i.e. user learning performance) and also perceived learning, which in term of respond time in a task of visual search (much suitable for narrative game with visual searching gameplay).</p>
<p>Shape – Perceived Learning</p>	<p>Both shape and form can easily provide shape/form recognition of something without having people to read the label on it. There is no bias (even among school children) in determining the intended message; either shape/form with or without the label on it (Ward, Becker, Duffin Hass, & Vela, 1991).</p>
<p>Form – Perceived Learning</p>	
<p>Texture – Perceived Learning</p>	<p>There is lack of study in term of texture studies. However, it may provide greater appearance in term of realism if it combined with another attribute such as color, which also affecting players’ recognition memory (Jeong et al., 2008), and perhaps with more attributes such as shape, form, and etcetera.</p>

4) **Instrument: Questionnaire Form**

EXPERT/REVIEWER DETAILS

Name* :

Age :

Gender : Male Female

Highest education level* :

Experiences* : years

ITEMS TO REVIEW

Section A (Question 1)

Based on the provided literature (in Section 2 and 3), please tick (✓) for your choice on which game aesthetics that contribute to perceived learning at most, and justify the reason based on each of your answer.

1. Degree of important on the game aesthetics contribution for perceived learning:

	Game Aesthetics	Very important	Somewhat important	Not very important	Not at all important	Reason/Justification
a)	Text					
b)	Image					
c)	Visual perspective					
d)	Music					
e)	Sound Effect					
f)	Voice					
g)	Color					
h)	Graphic					
i)	Layout					
j)	Shape					
k)	Form					
l)	Texture					

Section B (Question 2)

Based on the **operational definition** (in Section 1), please tick (√) for your choice either Yes or No. However if the answer is NO, please kindly provide your suggestion the following row.

2.	The terms and explanation on each operational definition are easy to understand		Yes		No
<p>If the answer is No, please write your suggestion to improve my study. Suggestion:</p>					

Section C (Question 3 and 4)

Based on the **proposed conceptual model** (in Section 2), please tick (√) for your choice either Yes or No for all questions. However if the answer is NO (on each question), please kindly provide your suggestion the following row (on each question).

3.	The relationships, connections and flows of all the attributes with perceived learning in proposed conceptual model are logical		Yes		No
<p>If the answer is No, please write your suggestion to improve my study. Suggestion: I will share with you below on how my team and I refer to a conceptual framework for building narrative in a game.</p>					
4.	Overall, the conceptual model is understandable		Yes		No
<p>If the answer is No, please write your suggestion to improve my study. Suggestion:</p>					

5. Please write your further comments below (if have any):

Thank you

Appendix B:

Game Storyline and Gameplay

This section is the details of the game storyline and gameplay for the narrative game's development in this study. The game is estimated to end within 10 minutes of the gameplay.

A. Starting scene:

The story focused in a small Chinese village where the festival will happen one day before. There will be some dialogues among player and all NPCs: Alfred, Chew and Elder Leong. The dialogues tell about what is Dragon Boat Festival by NPC: Elder Leong. Meanwhile, the story also has side story:

[Side Story] - The player is an active Chinese kid. He has a few friends, which one of them is his “love” rival: Alfred. Spoiler: both player and Chew are actually siblings. It will be revealed at the game end. Refer to the conversation below for the dialogues’ details.

[Explanation] - To let the player know a little about what kind of thing that they will be playing soon. After having this starting scene, the player should already learn a bit of the game content and objective, so they can proceed to the game without having so much doubt on what is this all about.

Elder Leong asks the player and Alfred to find all the Zong Zi’s ingredients for Dragon Boat festival that will be held tomorrow. The player got challenged by Alfred, for tomorrow’s competition in order to determine who should give up on “dating” Chew.

Elder Leong : Good morning, kids.

Elder Leong : Tomorrow is the fifth day of the fifth Lunar month.

Elder Leong : It’s a DRAGON BOAT FESTIVAL day!!

Elder Leong : Aaron, Alfred. I want you both find ZONG ZI's ingredient.

Alfred : Hey Aaron, I'll find all the ingredient before you!!!

Chew : Good luck Aaron ^__^ I'll cook for the festival.

Aaron : Haha thanks Chew! Then I'll find lots of it :)
Alfred : AAaaaAAaaA!! I won't lose to youuuu!!!!
Aaron : Hey take it easy Alfred, lets do our best, kay? :)
Elder Leong : Enough talking! Hurry up find it before sunset!

Stage one starts here by focusing on the player in a third person view. Player can now freely move in the village to start searching for Zong Zi's ingredients.

B. Stage One Completed

Stage one will be completed when all Zong Zi's ingredients were collected. There will be another conversation among all characters.

Elder Leong : Oh thank you Aaron! Now we have all of the ingredients!
Chew : Congratulations Aaron! You really did bring lots of them!
Aaron : No Problem elder! Thanks Chew! This was nothing :)
Alfred : No!! How could I lost to you!! AAAaaaAA!!!
Elder Leong : Hey you two! This is not a competition.
Elder Leong : If you want a battle, tomorrow will be the day!
Alfred : I will win the DRAGON BOAT RACE and win Chew's heart!
Aaron : So this is what the fuss is all about, huh --

C. Middle Scene

The game will loading into next game scene. Elder Leong will explain more about Qu Yuan and Dragon Boat festival history. The side story will continuous as in the conversation below.

Elder Leong : Today, we will celebrate DRAGON BOAT FESTIVAL
Elder Leong : The festival commemorates the death of the poet and minister Qu Yuan
Elder Leong : Qu Yuan suicide in Miluo river because he failed to defense his kingdom.
Elder Leong : As a way of paying respect, we will throw ZongZi into the river.
Elder Leong : And beat on drums and have a Dragon Boat race.
Alfred : Aaron, I will win this main event!! Hahaha!!!

Chew : Good luck Aaron ^__^ and have fun!!!
Aaron : Haha thanks Chew! Ok lets do this Alfred! :)

Stage two will start here. The player will have a Dragon Boat race with Alfred.

D. Ending Scene

There are two ending in this game, either when the player win or lose the final stage.

Winning ending:

The Mayor announcing the winner and congratulates the player's team. Chew feel so happy for the player. Alfred ignore the bet and do not want to give up for the next year's event.

Elder Leong : The winner is...!!! Aaron team!!! Haha!!! Congratulations!!!
Chew : You win again, Aaron! I'm so proud of you, big brother! ^__^
Aaron : Thanks Chew, my cute little sis! It was nothing... hahahaha...!!
Alfred : Noo!!! Not again!! Arrghh!! You won't beat me again next year, Aaroonnn!!!

Losing ending:

The Mayor announcing Alfred's team as the winner and congratulates them. Chew feel so happy for Alfred's, but still supporting the player for the effort. Alfred laughing out loud to the player, showing off his victory, and proud for winning his own bet.

Elder Leong : The winner is...!!! Alfred team!!! Haha!!! Congratulations!!!
Alfred : Awesome!!! I've won!!! Hahaha take that Aaron!!! Hahaha!!!
Ya-hooo!!!
Chew : Don't give up Aaron, You can try again next year, my big brother!
^__^
Aaron : Haha yeah I guess so, Chew. Thanks my cute little sis!!!! :)

The game will return back to main page.

THE END

Appendix C:

Questionnaire for Evaluation Process

This section is a questionnaire instrument that will be used in the evaluation process.

MEASURING CONTRIBUTION OF GAME AESTHETICS FOR PERCEIVED CULTURAL LEARNING IN NARRATIVE GAME

Researcher's Name : Abdul Syafiq bin Bahrin
Department : School of Multimedia Technology and Communication,
College of Arts & Sciences, Universiti Utara Malaysia, Sintok
Telephone : 012-5956252
Email : syafiqbahrin@gmail.com

Purpose

The purpose of this study is to test on to what extend game aesthetics contributed to perceived cultural learning in the narrative game, based on specific criteria:

- The genre of the game are role-playing, adventure and fantasy.
- The theme of the game is a traditional Chinese cultural and historical of Dragon Boat Festival, which learning content also included.
- The selected player are used to play 3D video games, which will ease and shorten the time of testing process in term of controllability/playability.

Instructions

Please write down your details as in the blank below. After that, please fill up the form starting from page 2 until the end. The information supplied will be treated as confidential and will be used for research purposes which may be reported anonymously in academic publications.

Please feel free to contact me by email (syafiqbahrin@gmail.com) or my supervisor (liana@uum.edu.my) if there is any query.

Thank you for your time and assistance.

Name : _____

Contact No : _____

SECTION A: Demographic participant

Tick your answer where appropriate.

1. Gender:
 Male Female
2. Age:
 7-12 years old 13-18 years old 19-24 years old
 25-30 years old 31 years old and above
3. Gaming skills:
 Beginner Intermediate Advance
4. Money spent for games monthly (in average):
 RM0 = No cost RM1–RM500 RM501-RM1000
 RM1001-RM1500 RM1501 and above

SECTION B: The usability and user experience of the narrative game

Circle the number that fits your response best for each statement. Use the following scale:
 1-Strongly disagree | 2-Disagree | 3- Neutral | 4-Agree | 5-Strongly agree

Indicator Statements	Scale
1) I like the interface of the game	1 2 3 4 5
2) I like the graphics/ pictures	1 2 3 4 5
3) The layout menu are simple to understand	1 2 3 4 5
4) I like the colors used in the game	1 2 3 4 5
5) The text is easy to read	1 2 3 4 5
6) The shapes and forms used in the game are recognizable	1 2 3 4 5
7) I like the perspective view in the game	1 2 3 4 5
8) The game has realistic texturing	1 2 3 4 5
9) I like the background music in the game	1 2 3 4 5
10) The sound effect aroused/motivated me to enjoy the game	1 2 3 4 5
11) The voice increases my make-believe of the game	1 2 3 4 5
12) I could progress through each of the levels of the game	1 2 3 4 5
13) There is/are level(s) which is hard to play	1 2 3 4 5
14) The instructions on how to play are easy to understand	1 2 3 4 5
15) I am used to play this kind of game	1 2 3 4 5
16) It is easy to control the character	1 2 3 4 5
17) It is easy to control the camera view	1 2 3 4 5
18) The interactions of interface are easy to manage	1 2 3 4 5
19) The interactions within the game world are easy to manage	1 2 3 4 5
20) The goals of the game are easy to understand	1 2 3 4 5
21) The hint/feedback is given when I need it	1 2 3 4 5
22) I always felt immersed in the game environment while playing	1 2 3 4 5

SECTION C: Perceived cultural learning in narrative game

This section will measure on how far your perceived cultural learning towards the content of the narrative game. Circle the number that fits your response best for each statement. Use the following scale:

1-Strongly disagree | 2-Disagree | 3- Neutral | 4-Agree | 5-Strongly agree

Indicator Statements	Scale
1) I have learned about Dragon Boat Festival	1 2 3 4 5
2) I have learned that the Dragon Boat festival occurs every year on the fifth day of the fifth month on the Chinese lunar calendar	1 2 3 4 5
3) I have learned that Zong Zi is the main Chinese traditional food for Dragon Boat festival	1 2 3 4 5
4) I have learned the ingredients for making Zong Zi	1 2 3 4 5
5) I have learned the festival commemorates the death of the poet and minister Qu Yuan	1 2 3 4 5
6) I have learned the history of Qu Yuan's death	1 2 3 4 5
7) I have learned that the dragon boat racing is the main event in Dragon Boat festival	1 2 3 4 5

SECTION D: The preference on the narrative game

- 1) What are the features of the games which you just have played and liked it?

- 2) What are the features of the games which you just have played and didn't like it?

SECTION E: The preference on general narrative game

- 1) What are the features of other narrative game which you have played before and liked it?

- 2) What are the features of other narrative game which you have played before and didn't like it?

Appendix D: Transcription of Reasons Given by Experts

Table 1

Degree of Importance of Game Aesthetics for Perceived Cultural Learning in Narrative Games

Game Aesthetics	E1	E2	E3	E4	E5	E6
Image	<p>How I group the elements of conveying narrative:</p> <ul style="list-style-type: none"> - Cutscene, cinema - Dialogue [ingame interaction], theatre - Flavor Text [worldbuilding], poetry - Typography [part of interface design], calligraphy - Environment [part of level design], architecture, landscaping, sculpture - Sound [sound design], music and singing - Costume [worldbuilding], fashion and culture - Animation, dance - Setting [worldbuilding], prose and painting <p>Provided is also the corresponding Fine Arts or Performing Arts in the analog space of our world that assists in mastering the principles to create the respective narrative elements for a game.</p>	<p>All Game Aesthetics are important because it can make a player(s) 'invested' in their time and effort (interested/pay attention) for the game. (This does not mean that learning are included in their 'investment')</p> <p>The biggest reason they (player) do not want to learn is they do not have the "illusion of choice", which are:</p>	-	-	-	For a learning game to become interesting, the use of images is very important.
Text			-	-	Depend on the game design on what genre and how the game should be played	Text can be somewhat important, but for a learning game on cultural content, text may become very important so that new terms/words/concept can be introduced.
Visual Perspective			-	-	Mostly important	For a learning game on cultural content, visual perspective may become very important so that players may experience or take a closer look at the cultural content from players' perspectives. The game will become more interesting and the learning content can be memorable.
Color			-	-	Components that need to be addressed, especially in certain target user / special need	Color is a very important feature. Choices of colors play an important role in controlling players feeling and creating the game environment. It may transform the players emotion, the look & feel, and turn the game environment into a comfortable one or otherwise.
Graphic			-	-	Mostly important	Graphic is somewhat important. Sometimes it may be omitted.
Layout			-	-	Mostly important	Layout can be considered as a very important feature. Deciding on a layout for a game needs further analysis on the human-computer interaction aspects to optimize the effectiveness of the learning game.

Sound Effect	<p>The reason I do this is because we noticed the exposure level of a designer in real world disciplines, tend to reflect the depth and quality of design ideas in gameplay or narrative provided by the designer. A designer really is only as creative or useful as the amount of time spent living an enriching and educated life.</p> <p>This is why for your Section A Question 1, I marked all elements as very important, because, a person can find ways to turn each visible or aural element of a game towards a narrative focus that becomes a primary means of storytelling, provided the designer has such a skill level to execute it.</p>		-	-	-	Sound effect is normally shorter in length than music and more preferably be used in a learning game than music. So, the sound effect is somewhat important. If it is provided, always allow users to be able to turn the sound on/off.
Voice			-	-	Components that need to be addressed, especially in certain target user / special need	If the voice plays important roles or is part of the cultural content, then it may be very important. Otherwise, it is not very important. If it is provided, always allow users to be able to turn the sound on/off.
Music			-	-	-	Unless music is part of the cultural content than music may not very important features. If music is part of the cultural content, then it will become a very important feature. If it is provided, allow users to be able to turn the music on/off.
Shape			-	-	Depend on the game design on what genre and how the game should be played	Shape can be considered as accessories to layout and therefore can be considered as somewhat important features in a learning game. However, if shapes play an important role in the cultural content, then it can be a very important feature.
Form			-	-	Depend on the game design on what genre and how the game should be played	Form can be considered as accessories to layout and therefore can be considered as somewhat important features in a learning game. However, if forms play an important role in the cultural content, then it can be a very important feature.
Texture			-	-	Depend on the game design on what genre and how the game should be played	Texture can be considered as accessories to layout and therefore can be considered as somewhat important features in a learning game. However, if textures play an important role in the cultural content, then it can be a very important feature.

Appendix E:

Learning Content

A. Dragon Boat

Dragon Boat Festival celebrated traditionally by Chinese in every year. This traditional celebration is to commemorate Qu Yuan's life and death, a famous Chinese scholar in ancient Chinese era of 340-278 B.C ("Dragon Boat Festival in China," n.d.; Wu, 2015). The festival is held on every fifth day of the fifth month in Chinese (Lunar) calendar (Chittick, n.d.). Figure 1 visualizes the festival held in Hong Kong.



Figure 1. Dragon Boat Festival in Hong Kong (Wu, 2015)

B. Zhong Zi

Zhong Zi (Zongzi/Dzong-Dzuh) is the most related Chinese traditional food with the Dragon Boat celebration. It is believed among Chinese that by throwing the rice lumps into the river may stop the fish from eating Qu Yuan's drowned body (Wu, 2015). During the festival, Chinese loves to eat Zhong Zi along with Realgar wine because they believed that in ancient time, the wine was able to cure any poisons,

drive any evil spirits away, and effective to kill insects. (Wu, 2015). Figure 2 shows the image of Zhong Zi along with the wine.



Figure 2. Chinese traditional food (Zhong Zi) and Realgar wine (Wu, 2015)



Appendix F:

Player Preferences on Narrative Game

A. Player preferences on the developed narrative game

Table 1

Player Preferences on the Narrative Game

Good Responses	Adverse Responses
Good camera control; Attractive and interesting music; Easy gameplay; Challenging gameplay; Storyline; Adventure genre; Direct learning; Clear instructions; Attractive and cute character design; Interesting and beautiful graphic; Relaxed game; Easy character control; Hint (feedback) given; The gameplay of racing in stage 2; Learn something from the game; The gameplay of finding items in stage 1; Easily recognizable image material for ZongZi; Can be played by most ages; Free to go anywhere within the environment area; How to play instruction; Difficulty level on each stage; Colors; Cultural theme and information; Storyline is easy to understand;	Hard mouse (camera) control; Hard player control; Too easy; Have to talk to many NPC to get the information; No option to change mouse (camera) sensitivity; Hard Dragon Boat control; No compete with another player(s); No time limit; Hard to find all area; Game and storyline is too short; Unconvincing laws of physics; Confusing searching task; Too many female characters in stage 1 (repeated characters); The gameplay of finding items in stage 1; Dragon Boat movement in stage 2 is hard to control; The environment area is too small; Bad images; Character controller; Cannot move the player faster; Unattractive instruction; Slow dialogues; Not enough pressure; Difficulty is too easy; Not interesting;

Based on Table 1, not all participants have exactly the same preferences towards the narrative game. For example, some of the participants felt that the player and camera controller is good while some others felt it was difficult to handle; Some of the participants prefer the gameplay and objective of finding items in stage 1, while the rest prefer the gameplay of racing in stage 2; Some of the participants felt happy with the difficulty of the narrative game while the rest were vice versa; Some of the participants felt satisfied with what they called - relaxed game, while some others felt that the narrative game does not have enough pressure or excitement for them to play.

B. Player preferences on other narrative game

Table 2

Player Preferences on other Narrative Game

Good Responses	Adverse Responses
Attractive graphic; Challenging gameplay; Adventure genre; 3D game; 2 way communication using microphone (multiplayer); Fighting music in fighting stage; Quest and map on screen; Character with super power or fighting ability; Realistic 3D graphic; High graphic and resolutions; Low graphic and resolutions; Interesting character and storyline; Time limit; Compete with other player(s); Have many levels; Relaxed game; Fighting monster action; Easy to control; Simulation genre; Good graphic and sound effect; Cute character design; Time management gameplay (e.g. Cooking Dash game); Clear and understandable game goals; Complex and complicated storyline; Interaction with other player; Wide environment space; How to play instruction; Branches (nonlinear) dialogues; Easy to play; Faster loading, dialogues, so the player can play faster (ludologist); Killing something; Colors; Interaction; Fighting mechanics and style; Multiple main character to choose to play with; Story branches with different results; Less music; Long storyline;	Computer lag; Require high graphic and PC performance; Illogical environment, gameplay and story; Too many talking scene and no skip button; Too broad camera setting; Hard to proceed to next level; Unclear instruction; Not challenging; Elusive user interface; inappropriate graphic and music, especially on female characters; Unattractive graphic; Unattractive storyline and no moral value; No hint provided; Hard to understand storyline; Time limit to reach next level; Unclear game goals; Fighting or shooting gameplay; Unclear game goals; Too many of glitches (game bugs); Puzzle genre; Sound effect; Crowded area with other players; Voice; Too much repetition; Insane difficulty; Lack of “wow” impact; Complicated storyline; Too many characters;

Results from Table 2 tells that there were both ludologist and narrative ideologist participants during the evaluation. The ludologist prefer less talking scene; has skip button to skip the dialogue; and easy to understand the storyline. The narrativist prefer longer, attractive and complicated storyline.

There were also diversified of genre preferences among participants, such as fighting, shooting, adventure, and simulation genre. Most of the participants prefer cute and attractive character design with high graphic and screen resolutions.



Appendix G: Completion Time during Quasi-Experiment

A. Time to finish stage 1

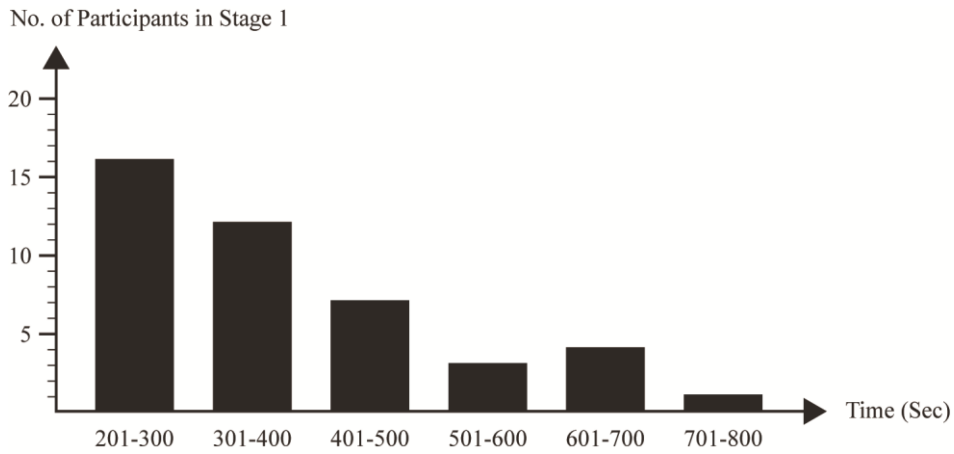


Figure 1. Time to Finish Stage 1

The fastest participant took 207 seconds to finish the stage 1, while the slowest was 735 seconds. However, majority of the participants has completed the stage 1 within 201-300 seconds. It is observed that participants who consumed more time to finish the stage 1 are among the participants who has difficulties with handling the camera movement as mentioned in Table 6.18 (Section 6.1.6). Even these participants were emotionally stressed finding the Zong Zi's ingredients with the difficulties, they tried their best and managed to find all of the ingredients in the end.

B. Time to finish stage 2

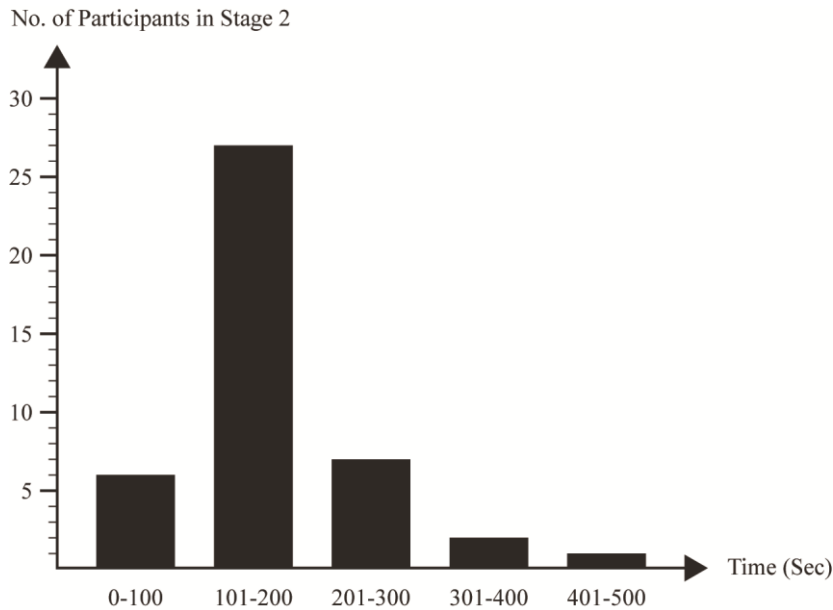


Figure 2. Time to Finish Stage 2

The fastest participant finishes the stage 2 took 55 seconds, while the slowest was 408 seconds which include the repeated stage. The majority of participants took about 101-200 seconds to finish the second stage. Stage 2 is shorter than stage 1. However, this stage has an option for those failed to repeat an unlimited number of attempt. It is observed that all participants managed to completed stage 2 for one time within 0-300 seconds. Those who have failed choose to repeat the stage until they win. The maximum number of attempt is at least four times.