Master Degree Project

UNIVERSITY
OF SKÖVDE

THE CULTURAL ADAPTATION OF PLAYFUL LEARNING

Aspects to consider when culturalizing a children's educational game for the Chinese market

Master Degree Project in Informatics
One year Level 22.5 ECTS
Spring term 2019

Jon Victor Bankler

Supervisor: Per Backlund
Examiner: Jenny Brusk

Abstract

This study explores suitable applications of culturalization in the case of educational games for children, specifically in relation to the Chinese market. Culturalization, in the context of video games, are design choices and adjustments applied to a product in order to cater to the needs of different cultural environments. The characteristics of both this genre, and this target locale, determines to which aspects of the product culturalization should be applied.

Using three commercial educational games as a basis for discussion, the research was conducted through a series of expert interviews with pedagogues, localizers and game researchers in China. By analyzing the data gathered through these interviews, a series of aspects to consider for culturalization was defined. These were: usage of cultural references; the branding of the product; educational utility in relation to the local school curriculum; choice of gamification design.

Keywords: Game Localization, Culturalization, Educational Games, Serious Games, China

Table of Contents

1 Introduction

This thesis presents a case study designed to explore the need for culturalization of a children's educational game in order to suit it for the Chinese market. Culturalization refer to conscious efforts meant to make a product viable for one or more cultural environments. In the case of an educational game, such efforts could both include measures commonly applied within game localization, as well as considering the educational utility of the product in a target locale.

The research was conducted by means of expert interviews with Chinese professionals within game localization, children's education and game research. The interviews were formed as a discussion on a commercial children's mathematics game, how its format and content might affect the product's viability with regards to the Chinese market and what sort of adjustments could be beneficial in this regard. In this paper, when talking about viability, it refers to the product's attractiveness, accessibility and usefulness for the intended target audience, as such qualities can determine whether the product finds substantial audience and commercial success. This has been explored in order to provide useful insights that help educational game development for a global market, especially in regards to China that is the top buyer of educational games at this moment (Adkins, 2018).

While the findings of this study are specific for the Chinese market, the discussion regarding these has been kept broad in order to distinguish their transferability to other cases. From the focus point of this study, another case could mean another target market than China. However, it could also mean another subgenre of educational games than the one looked at in this study (i.e. a mathematics game for young children) in relation to the same target market. To also favor transferability to similar cases over time, the discussion is held with awareness of the impermanence of market trends and characteristics, including those of the market focused on here.

2 Background

This study is on the subject of game culturalization, and has a focus on both a specific genre and a specific locale. In particular, the study is about the application of culturalization as a product from this genre is introduced to the context of this locale. The specific genre in question is educational games for children, and the locale is China. Though narrowly focused by these specifications, the topic still remains big and complex. To approach it, a grasp on both the overarching subject of culturalization as well as the areas of focus is needed. In other words, culturalization of video games, what that might encompass in the case of educational games for children, and the relevant, cultural characteristics of the Chinese market, all need to be looked at. Overviews of all these aspects will be presented in this chapter.

As the topic of this research concerns the necessity and proper application of culturalization, this term, as well as the closely related term localization, becomes central, and thus vital to understand. In regard to localization, the subdomain of game localization is what is most relevant, as video games is the type of media focused on here. Notice that anytime the word "game" is used in this paper, video game is what is intended. That is, a game which can be played thanks to an audio-visual apparatus (Esposito, 2005), as opposed to a tabletop game or physical sport. A lot of the knowledge available regarding the practices referred to by these terms is found within the game and localization industries themselves, where it constitutes as a basis for the guidelines and approaches applied when preparing products to be distributed to specific markets (described by for example Honeywood and Fung (2012) or Chandler and O'Malley (2011)). In this study, one approach has been to take that knowledge, look at it from an academic point of view and use it for the purpose of exploratory research. But before discussing the practices and theories referred to by these terms, their basic definitions should be clarified. These definitions will be rooted in previous literature and relevant texts on this topic. While academic texts specifically focused on localization of educational games seem to be scarce[1], game localization as a broader topic has been written about both as a sub-domain of Translation Studies (O'Hagan & Magrion, 2013), and for the sake of developing guidelines and standards for the industry by academics, game associations and special interest groups (Toftedal, Backlund & Engström 2018; Chandler & O'Malley 2011; Honeywood & Fung, 2012). How the terms localization and culturalization

[1] Different combinations of the keywords "educational", "pedagogic", "mathematics", "games", "software" "localization", "culturalization", was used to search the following databases during research: Academia.edu; ERIC: Educational Resource Information CenterCentre; Google Scholar; Springer; WorldCat.

are defined in such texts, as well as what they cover in regards to their respective topics, will be presented in this chapter.

2.1 Game Localization

The Localization Industry Standards Association (LISA) defines localization as "the process of modifying products or services to account for differences in distinct markets" (Fry & Lommel, 2003). This would imply that localization is more than just a linguistic process, not only targeting translation of all the text and audio to a language appropriate for the targeted market, but also other adjustments that could enhance the product's or service's local viability as well:

> To be successful in this challenging environment, organizations must modify their offerings to give them the look and feel of locally-made products. This involves catering to a wide range of linguistic, cultural, content, and technical issues. Product presentation (size and shape, language, colours, graphics, icons, etc.) and functionality must be adapted to local conventions.
>
> (Fry & Lommel, 2003, p. 3)

The wide range of issues addressed by these adjustment practices is by LISA (Localization Industry Standards Association), divided and defined into three different categories (Fry & Lommel, 2003). These categories are: linguistic issues, which concern all matters of translation of text and UI; technical issues, which concern the potential need to redesign and reengineer the product so that it can, for example, handle written language with different structure; and finally content and cultural issues, which concern adapting the information, presentation and functionality of the product for a local audience. The last of these categories is the area most closely looked at in this study.

The term "game localization" is a sub-domain of the broader concept of localization that specifically concerns games. O'Hagan and Mangrion (2013) explain that game localization refers to the different processes involved when transforming video games for a new user environment with its specific linguistic, cultural, and technical conditions so that they remain commercially viable in the target territory. Within the game industry, the localization is either done in-house (by the developers themselves) or outsourced to localization firms and localization specialists translating and in other ways adjusting video games for specific markets.

Game localization differs from other types of software localization as games are complex cultural products that rely on narrative, taste and art in a way that other types of interactive

software do not. Thayer and Kolko (2004) point out differences between localization of what they refer to as productivity applications (a software program designed to facilitate work) and games, as games may contain narrative and plotlines, significantly different GUI and content that communicate goals and rules, such as tutorials. Video games are also entertainment software, which creates further complications when the products are localized to different parts of the world, as "what is regarded as funny and exciting is not necessarily universal" (Zhang, 2008, p. 47).

Now, when both definition and purpose of game localization have been made clear, it would be appropriate to take a look at what practices are involved in localization of video games. What practices that are encompassed by the term depends on what definition you go by, that is, what source you are looking at. For many, localization is the sort of adjustments that specifically target the linguistic aspects of the game, mainly consisting of translation and implementation of translated material. In *Best Practices for Game Localization* (Honeywood & Fung, 2012), the game localization process is divided into the following stages: Familiarization; Glossary and Style Guide Creation; Translation; Voice Over Production; Linguistic Quality Assurance; Master Up and Sign Off. The first of these stages, Familiarization, is the game localizers' task to get to know and understand the product they are translating so they see the context of their work. The next stage is Glossary and Style Guide Creation, which refers to the process of developing conventions and naming standards that to the extent possible preserves the linguistic content's stylistic quality of the original version of the game. Translating, the third stage, is, as the name indicates, the step where all written and spoken content, including in-game dialogue, textual content and UI, is translated. O'Hagan and Mangrion (2013) devotes a chapter covering a range of assets subject to this type of localization: in-game text, which covers anything from UI and menus to conversations held with non-playable characters in the game; art assets, such as signs and maps found in the game; audio and cinematic assets, referring to spoken voice lines for example in a cut scene or cinematic episode of the game; printed materials, that refers to the text found on packaging or in manuals that follows if you would purchase a physical copy of the game.

The next stage of IGDA Localization SIG's guide to the localization process (Honeywood & Fung, 2012), Voice Over Production, is when the translated content that appear as spoken language in the game is implemented in the localized version. This includes casting of voice actors as well as recording, mixing and implementation of sound files. Linguistic Quality Assurance and Master Up and Sign Off are the final stages of the localization process, when the work of the translators is reviewed and tested to see that the quality of the work holds up, as well as assuring that it has been properly implemented. Notice that among the stages

presented as a part of the localization process in this guide, the adjustment of non-linguistic content is not mentioned, though such adjustments is treated as a part of localization by several sources as seen in the previous paragraphs. Adjustments regarding non-linguistic content are however also addressed in SIG's guide as well, but rather in the context of culturalization, as a separate but related subject.

A term often used in the context of localization, "internationalization", is related to this topic. Though not central in this study, the term's definition should be looked at for the sake of distinction. LISA define internationalization as enabling a product on a technical level to be localized, that is, structuring it so that it can be translated, reengineered and adjusted for specific markets (Fry & Lommel, 2003). In IGDA's guide for the translation and culturalization of video game content, the relationship between localization and internationalization is made clear, as the process of localization is described as "producing localized resources or assets, implementing the assets in an internationalized build" (p. 17) and internationalization is described as a "process that enables game localization to take place" (p. 5) by preparing the code base, architecture and user interface of the game to be capable of processing and displaying the game content in different languages. In other words, these practices are two steps in the process of making a software, such as a video game, available to users of different languages, where internationalization serves as a necessary preparation for localization.

2.2 Culturalization

Contained within the research questions, culturalization is the most central concept in this study, and in order to understand what the research is about, it becomes central to understand what the term means when used by localization and game industry professionals. Without describing any specific practices, the term culturalization "...refer to the process of modifying any elements, verbal and nonverbal, of an original video game that are deemed obscure, offensive, difficult to grasp by the target audience, or perceived as not tailored to them because of some cultural incongruity" (O'Hagan & Mangrion, 2013, p. 215). This is a step beyond simply making the game available for users with different languages, as it is an attempt to also adjust the product's content for members of a certain culture in order to increase its viability.

The need for this is described like this by O'Hagan and Mangiron:

> In addition to a focus on linguistic questions the malleable nature of software brings with it the need for broader cultural, social, and political issues to be addressed in such a way as to present the product as if it were originally created for the target

> market. Software as the object of translation presents, at least theoretically, a tabula rasa on which may be exercised a broad range of manipulations that go beyond linguistic conversions of verbal signs. In particular, such possibilities become even more applicable in video games as they are designed to engage the user often emotionally, in turn calling for careful assessment during the localization process of a wide range of issues including historical events, legends, mythology, and religion, as well as factors affecting age rating considerations specific to different markets.
>
> (O'Hagan & Mangrion, 2013, p. 95)

From one perspective, such adjustment efforts are a step beyond the "mere" translation of what Thayer and Kolko (2004) refer to as *Basic localization*, as it would open up for modifying various non-textual content of the game. That does not mean that culturalization does not involve the textual content of the game as well, as story elements might be adjusted as a way to tailor the localized game version for a specific market.

Whether culturalization is a part of localization or encompass practices that go beyond localization is a matter of definition. According to Edwards (2012), some culturalization measures are not necessarily a part of producing a localized version of a game. She divides culturalization into three different phases: *reactive culturalization*, *localization and internationalization*, and *proactive culturalization*. Note that localization, referred to as "the process of achieving legibility through translation" (p. 1), is described as a single phase of the broader undertaking of culturalization here. Reactive culturalization, as she defines it, is to "avoid disruptive issues to allow a game to remain in the target market" (p. 1). This could for example be removing symbols or parts of the game's story that could be offensive to players of a certain cultural affinity or get the game banned by the government in a specific country. Proactive culturalization, on the other hand, is to "adapt and provide locale-specific options to allow the game to be locally relevant" (p. 1) or "Identifying and adding elements that will enhance the local experience and relevance" (Edwards, 2018). Both these steps are about increasing a games viability for different or specific markets, though one of them concerns the removal or modification of disruptive content and the other one about adding content that could increase the games commercial potency. These different types of culturalization thus represent two different types of efforts to keep or increase the viability of a game product for certain markets. In a similar way, Cederskoog (2012) describes the depth of adaptation of a product to a certain market in three degrees of localization: Simple localization, which includes text translation, simple UI changes and voice over recording, partial culturalization, which means minor tweaking of art, story and music, and full culturalization, which would deal with the same type of conscious content adaptation but to a higher degree. As Cederskoog (2012) points out, how far the game producers are willing to

take their adaptation of their game is a business decision, as localization can be as costly and time consuming as any other step of the game development.

Edwards (2012) list four "top variables" to consider when taking steps to culturalizing a game. These are: historical matters; religion and beliefs; ethnicity and cultural frictions; geopolitical imaginations. This selection of variables might not be surprising, as religion and political matters are sensitive topics in many contexts, and unfavourable depictions of a group of people could be found offensive. Historical and geopolitical matters have also been particularly sensitive in the case of China, which will be covered later in this chapter.

So how can the concept of culturalization be applied by game developers in practice? Edwards (2012) suggests some key steps for developers to be more proactive with their culturalization strategy. The first step she suggests is to make sure to gain awareness of potential cultural issues, pointing out that many are already aware that markets such as China and the Middle East can be sensitive in regards to content loaded with historical and political meaning. The second step is to make sure to ask questions about the content of the game, such as if some of the game content can have specific, unintended meaning to some people. Finally, she suggests that game developers should have dedicated team members responsible for culturalization. Edwards also suggest to consider cultural and geopolitical representations that could cause issues from a localization perspective to be bugs that should be subject to similar bug tracking as you would with technical issues. These key steps suggested by Edwards, to seek cultural awareness and ask questions regarding the game's content, are aspired through this study's research method later described.

A lot of culturalization has nothing to do with complex political and historical matters. Some cultural adjustments are purely a matter of following regional conventions, as "various country-specific conventions such as formats in date, time, postal codes, the use of commas as decimal points have been acknowledged as often requiring adaptation in the process of localization" (O'Hagan & Mangrion, 2013, p. 93). In fact, any adjustment of a product done for it to adhere to the local convention can be regarded a culturalization. For example, in the case of localizing cars, redesigning the car to have the driver's seat on either one or the other side (depending on country) is an act of culturalization (Fry & Lommel, 2003), as it is an effort to adapt the product for the conventions different locales. In the case of a mathematics game, adjusting the game so that it adheres to the local conventions regarding mathematical symbols and units of measurements becomes a central act of culturalization.

2.3 Localization of Educational Games

An educational game is not only a game in the way a game designed solely for entertainment purposes, as it serves an additional purpose as pedagogic material. This means that its viability needs to be measured in an additional way, namely its ability to fulfil its educational purpose. Furthermore, when considering the viability of a children's educational game, it is important to remember that more than just being attractive to children (the end users), the content needs to be perceived as useful to their parents or educators (the consumers).

Amiel, Squires and Orey (2009) suggest that cultural adaptation of learning objects (i.e. a product designed for educational use) is not necessarily a desirable design choice, as exposing the user to another cultural context than what they are used to also could be regarded as a sort of education. They suggest four approaches to designing an educational product for diverse cultures. The first of these they call LO, short for the word Learning Object, which by this definition means a conventional educational product designed without the intention of applying cultural adjustments, which could be an intentional choice made in order to promote cultural learning among the end users. The next approach is LOMA (Learning Object with Multicultural Affordances), which is the same as LO but with an additional conscious effort to also include explanations and presentations of cultural-specific elements in the product in a pedagogical manner. The third approach is n-Culture, which is including developers with diverse cultural backgrounds in to the development team to get multiple perspectives on the design in order to adapt it to cultural diversity. Finally, LOCA (Learning Objects with Cultural Adaptability), is an educational product prepared to be culturally adapted by for example local developers or stakeholders for each cultural environment. The latter one would be closer to the sort of culturalization talked about in the context of game localization, but which approach is best suited for children's educational games is not obvious. The open-endedness of this study's research method is meant to give novel insights on how different approaches such as these might affect the viability of games of this type.

In Nikolopoulou's article on early childhood educational software (2009), she uses the term localization synonymously with adaptations made to meet the linguistic and cultural requirements of a specific target environment, which is more or less the same definition used for game localization in some of the sources cited earlier in this chapter. She points out a few additional points of consideration specific for the case of products that both have young children as target audience and are designed to fill an educational purpose. Concerning young children, she points out that there is heavier dependency on pictures, animations and sounds, as opposed to written information. Nikolopoulou (2009) claims that a common

reliance on culture-independent content such as neutral graphics and storyline features in young children's educational software favour its localization. This would make the sort of issues emphasized by Edwards (2012) less relevant, as the theme of Children's educational games does not normally revolve around sensitive topics such as geopolitical conflicts. In the same way, sexual content, very graphic violence, racism and depictions of drug-abuse, which are also often the reasons for censorship or total rejection of games in most countries (Chandler 2005, p. 26–27), should neither be a common problem with educational games aimed at young children, that rather rely on cartoon versions of everyday activities and talking animals. With that said, even if a game is set in a fantasy scenario, and thus not seem to belong to any specific culture, it is inevitably a product of the culture in which it was produced.

Nikolopoulou (2009) also points out additional difficulties that arise when the software subject to localization has a pedagogical purpose, namely the issue of different curricula found within different educational environments. This would mean that taking cultural, linguistic and other content issues into account might not be enough in terms of localization for this type of software, as the target audience could have different needs depending on their educational background. In the case of China, this manifests in an apparent difference in mathematical proficiency of Chinese children when compared to their western peers (Mu & Siegler, 2008). For example, Chinese children has been observed to outperform U.S. American Children of the same age both regarding numerical knowledge as well as with novel, unpractised mathematical tasks.

Less current research has previously had similar results. Tests comparing the ability of children from Beijing and Chicago respectively to solve computational tasks, as well as tasks requiring application of mathematic knowledge, showed that Chinese children's performance was consistently superior (Chen, Fan, Fang, Lummis, Shin-ying, Stevenson & Stigler, 1990). Even comparative tests with Chinese populations outside the Chinese mainland showed that Chinese children outperformed Western children (Ching, Huntsinger, Jose & Liaw, 1997). This seems to have been true even in cases with younger children that had not yet been introduced to a school curriculum (Geary, Bow-Thomas, Fan & Siegler, 1993).

Furthermore, education in China has been described as highly competitive (Kai, 2012), where parents and children are put under high pressure to assure good grades and performance. To the extent this is an accurate description of the educational environment in China, it indicates that a localized version of an educational software of this type might have to offer another level of mathematical challenge in order to stay viable. The competitive

tendencies in China have also been described to manifest themselves in the country's gaming culture (Yee, 2018).

2.4 China as a Target Market

China is currently the biggest game market in the world, with an estimated 619.5 million players and a 37.9-billion-dollar revenue in 2018 (Newzoo, 2018). Also when it comes to *functional games* or *serious games*, i.e. games with an additional, useful purpose apart from mere entertainment (Backlund, Johannesson & Susi, 2007), such as educational games, China currently has the highest revenue (Adkins, 2018). According to Metaari's 2018-2023 Global Game-based Learning Market report summary (Adkins, 2018), the top buyers of educational games for young children in China are large for-profit preschool chains. These factors make China an attractive market from a commercial perspective. It also indicates that there is an existing consumer culture around educational games and a big and vivid market environment in China for this kind of products.

Dong and Mangiron (2018) discuss what they claim to be the main cultural aspects usually taken into account when localizing video games for China:

- *Number Format:* Conventions used for writing numbers, such as punctuation types, varies between countries. In addition, some Chinese characters do not always have a counterpart in most western languages such as English.

- *Food-Related Terminology:* Certain dishes and food products might be familiar to one culture, but foreign or unrecognizable in another part of the world. Dong and Mangiron point to cases when developers have replaced names of certain dishes with the name of similar dishes in China.

- *Myths and Legends:* Myths and legends are a popular theme in Chinese video games. Though changing the references to the myths and legends of one culture to those of another might require extensive rewriting in the plot and storyline (which could be a laborious and expensive), it might also be profitable in the end.

- *Songs:* To provide a translated version of the songs occurring in the game, either in the shape of adding translated lyrics as text, or more ambitiously, record translated versions of them.

- *Use of Colors:* The symbolic meaning of certain colors also varies between cultures. For example, the color red is often used in the west in the context of warning or prohibition, while being seen as a color of celebration and happiness in China.

- *Character Design:* Among the characters in the localized version of the games can benefit from incorporating characters familiar to Chinese audience in the game (similar to the case with myths and legends) or adjusting the characters to the prevailing standards of beauty in China to make the game content more attractive in the eyes of Chinese consumers.

- *Game Mechanics:* Mechanics, or the core gameplay of the game, such as the rules provided for the players to solve the tasks in the game, what sort of tasks the player is presented with and the type of rewards given, could be redesigned to provide a more suited experience for the target consumers in China.

- *Gaming Habits:* In China, multiplayer games are the most popular type of games. Monetization system based on a pay-to-win model, while frowned upon in the west, is viable in China.

- *Censorship*: This aspect is of high relevance in the case of China, as it might determine whether the game can be released at all, or have to undergo extensive adjustments before it can be released on the Chinese market. Video games are subject to stricter censorship than other types of media in China, and must not be in conflict with the guidelines provided by the Ministry of Culture of the People's Republic of China, that put emphasis on prohibiting for example violent, pornographic or discriminating content (Zhang, 2008). This aspect might be the most visible factor to game industry professionals outside of China (Webb, 2019; Valentine, 2018)

2.5 Summary

In this chapter, central concepts necessary to be understood in order to gain a proper grasp on the meaning of the study's research questions were presented. These areas were game localization, as the general practice of adjusting a video game product to be viable in a certain locale; culturalization, as the type of content adjustments done in regard to the culture of the target locale; localization of children's educational games, as localization of a specific type of game product with additional characteristics and intended uses which in turn creates further considerations in the localization practice; China as a target market, as a locale shaped by multiple defining cultural characteristics, censorship and unique market status.

3 Problem

The goal of this study has been to discern which aspects of educational games should be considered for culturalization. In order to define a focus for the research work, as well as allowing the data to be formulated in reference to a clearly defined and comprehensible theme, a specific subgenre was chosen, which was mathematics games for children. For the same reason, so was a specific target locale, namely China. For determining appropriate direction for the research to achieve this, a research question was formulated: “which aspects of a children's educational game could benefit from culturalization in order to favor its viability for the Chinese market?”

This study focused on exploring this with the help of a selection of products from the subgenre at hand, and had thus its data formulated in reference to an actual case. The specific angle used to approach the topic of this research has thus been to explore how culturalization for the Chinese market should be considered in the case of these products. Since every product of this genre has a unique shape and set of content, and every target locale its own cultural characteristics and requirements, the specific findings of this research are case-dependent. However, through proper analysis, this research has aimed to discern what implications these findings might have on a broader level. In other words, through discussion and evaluation, the findings have been analyzed with an effort to discern their transferability to other products, subgenres and even locales.

Culturalization is one of the two most central terms in this study, alongside educational games. For game industry professionals, the combination of these two terms might become relevant in the context of attempting to localize a product of the type referred to by the latter of these terms. But whether culturalization should be viewed as something contained by the more encompassing practice of localization, or as something that can be practiced prior to and independently of localization efforts as Edwards defines it (2012), is not important for this study, as the relation of these two terms are not necessary to establish in order to answer the research question. What has been necessary for answering it has been a clear definition of the term culturalization. While clear, it also had to be a broad one, so that no interesting data would get filtered out as e result of a too narrow viewpoint. Any in-game adjustments made appropriate as a result of the characteristics of the target locale, whether they are based on local living habits, social norms, consumer trends, conventions, societal conditions, etc. has been regarded relevant and within the borders of the definition. With that said, it is not always obvious what sort of adjustment a need for culturalization calls for. Relevant factors pointed out by a participant does thus not always have to be coupled with a suggested adjustment.

In order to discuss the viability of an educational game, its ability to successfully provide pedagogic value to the user has to be taken into account. A game's ability to do so might vary between different target environments, as the skills of one age group might differ significantly from that of their peers in other cultures (Ching, Huntsinger, Jose & Liaw, 1997). As pointed out by Nikolopoulou (2009), when adjusting an educational game for a new target environment, relevant differences in curricula need to be taken into account.

From the genre of educational games, the subgenre looked at is the type of games that teach mathematics. Even if the structure of the school curricula might look different, mathematics will still be a central part of children's education whether you are in Europe or in China, which make it a legible choice. To the favor of the research, mathematics is sort of a universal language as it's logic applies everywhere. In comparison, the logic in linguistics, such as in grammatical rules, is less consistent across different languages. An educational product for teaching language that was designed for another market might have educational content that does not translate to the language of another, making viability estimation difficult.

The specific target locale looked at, China, is both culturally pluralistic and culturally unique. Furthermore, it has a distinguished position as the biggest game market in the world (Newzoo, 2018), in spite of strong regulations and censorship (Webb, 2019; Dong and Mangiron, 2018). These characteristics make China a distinctly diverging case that clearly contrasts western markets. When approaching this case from an outside perspective, openness and minimal preconceived notions have been required. Whether aspects such as those suggested by Dong and Mangiron (2018) would have the same importance in the case of children's educational games was the sort of insight that was aimed to be explored by this study.

3.1 Case Study Details - Games

The products used as a basis for discussion in the study's data collection are three educational games developed by the Swedish game development studio Zcooly, a branch of IUS Innovation. In this section, the games will be briefly described to provide an overview of the products presented to the study's participants. This is important in order to establish an understanding for what the data of this research is formulated in reference to. The following descriptions of the game content, as well as statements about underlying intents and other factors that influenced their design, are derived from an interview held with a designer at the studio for the sake of this study. These games all belong to one subscription service that let

the user gain access to the games of Zcooly's library. While the service was originally intended for classroom use, the main consumers today are parents.

The themes of the games revolve around child friendly things such as talking animals and funny, cartoonish characters. The tasks are often framed as helping the inhabitants of the game world by solving mathematical tasks for them. The tasks themselves start of very basic in all games and increase in challenge as the player progress. It is also possible to choose to practice the tasks at any difficulty level without affecting the environments, narrative and progression in the game worlds which serves as settings for the main game.

The first of these games, Time Ranch, is a game for children ages 7-9 about learning how to read time from both analogue and digital clocks (Figure 1). Time Ranch is set on a farm inhabited by a diverse range of animals. The choice of this setting was based on the idea that children like animals. As the player solve tasks they are rewarded with in-game currency that they can be used to buy new animals and upgrade their pen (Figure 2) to motivate continued play.

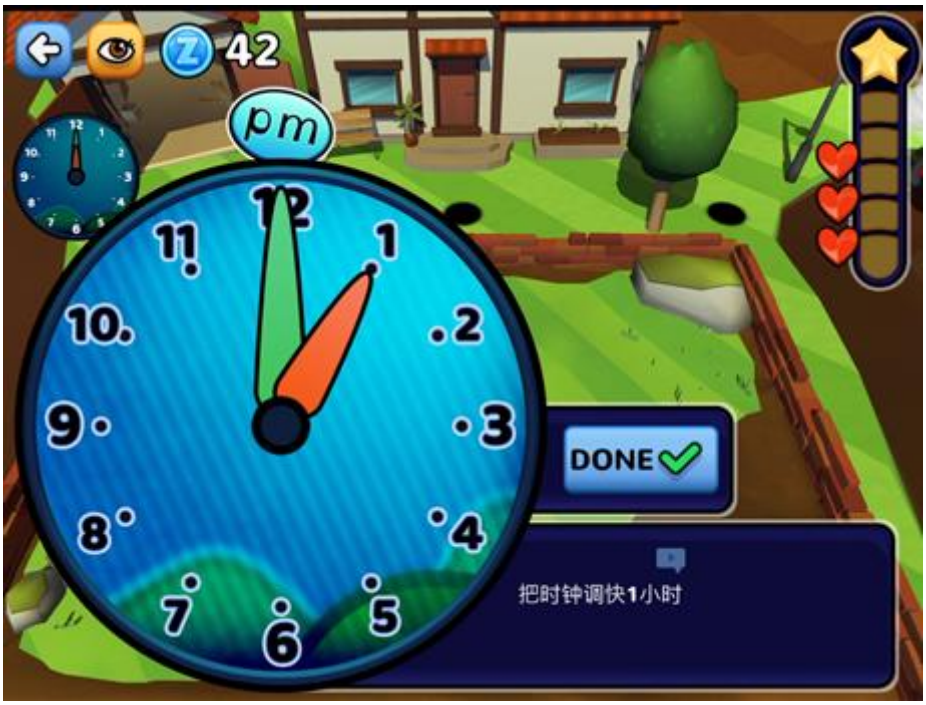

Figure 1 *Time Ranch* was translated into Chinese

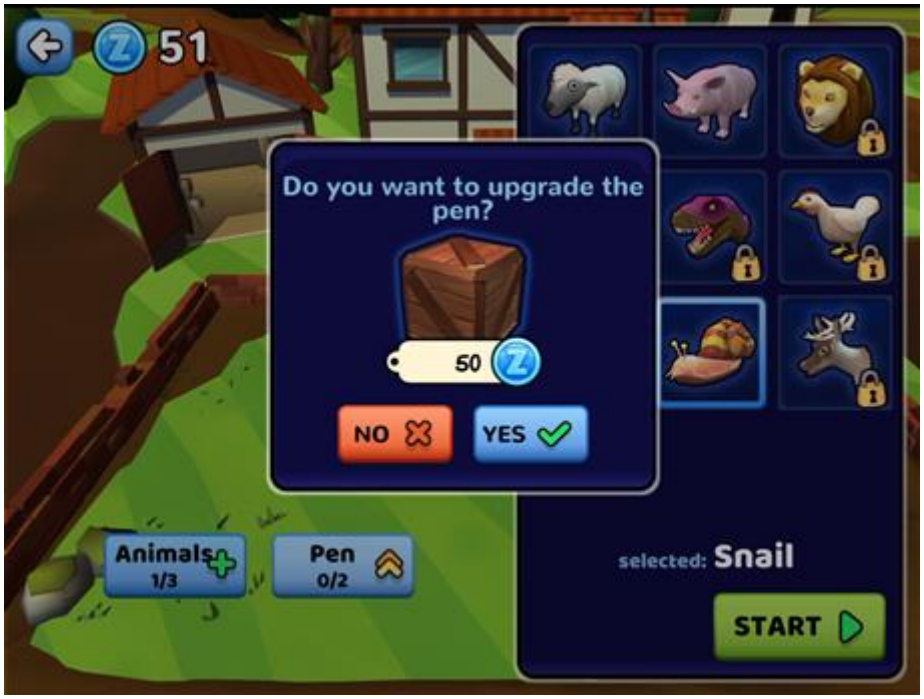

Figure 2 Buying an upgrade in *Time Ranch*

For the purpose of this study, a part of this specific game was translated into Chinese written language, so that its main concept could be experienced by participants that do not speak good English.

The second game, Store, is a game for ages 6 to 7 that lets the player practice subtraction, addition and numerical understanding. The setting is a store in which can have the player to simple mathematical tasks like manage the cash machine during transactions and selling items (Figure 3) or sorting numbers according to size (Figure 4). The range and type of tasks were selected by a pedagogue at the firm.

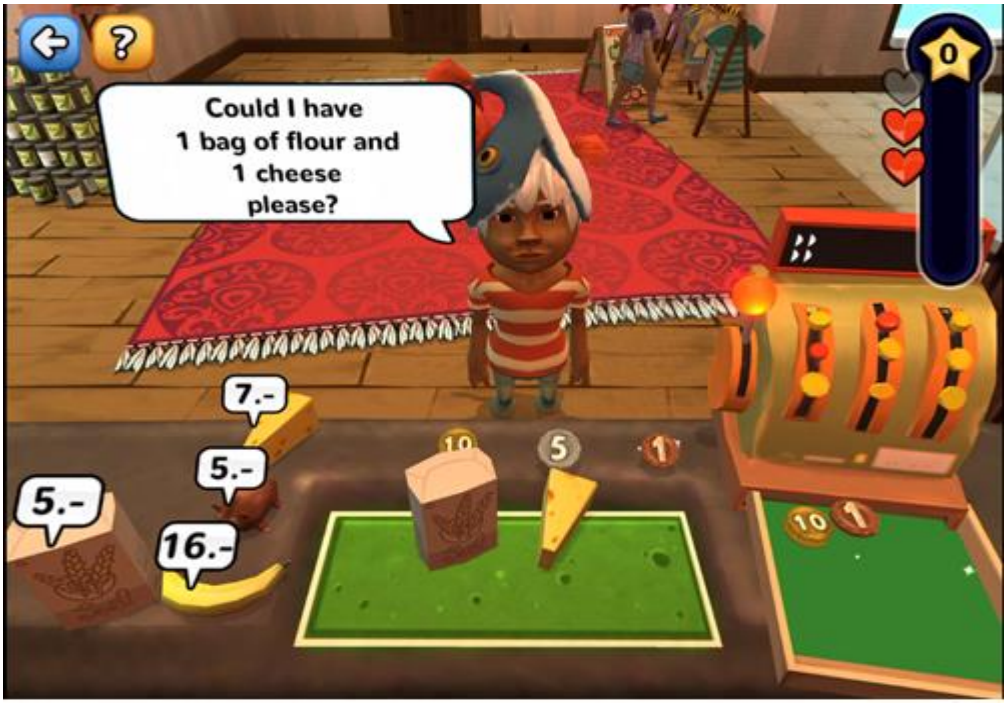

Figure 3 Selling items and counting money in *Store*.

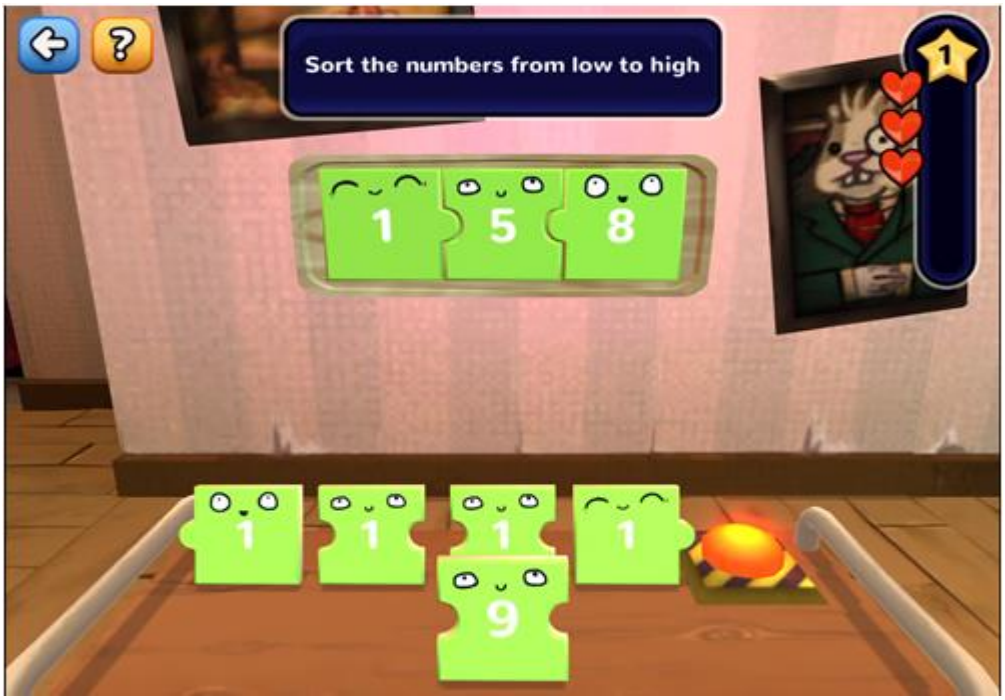

Figure 4 Task about sorting numbers in terms of size in *Store*.

Piece of Cake is a game that consist of gameplay meant to help the player acquire understanding the mathematical concept of fractions. The initiative for developing this game was rooted in NCM (National Centre for Mathematics Education) report that Sweden's

National Test in Mathematics showed that Swedish primary school students had problems understanding fractions. The game is developed for children ages 10 to 12.

The setting of the game is a cake bakery, where the player gets to manage the establishment and bake cakes through solving mathematical tasks about fractions (Figure 5). The choice of using a bakery as a setting was based on the fact that the activity of baking already involves measuring ingredients using fractions. Just like as the case with Time Ranch, you collect in-game currency by solving tasks. The currency lets the player expand the establishment by increasing it with new rooms or buy new kitchen machinery (Figure 6). While this do not affect the gameplay itself they are meant to show the players their progress and motivate them to continue playing.

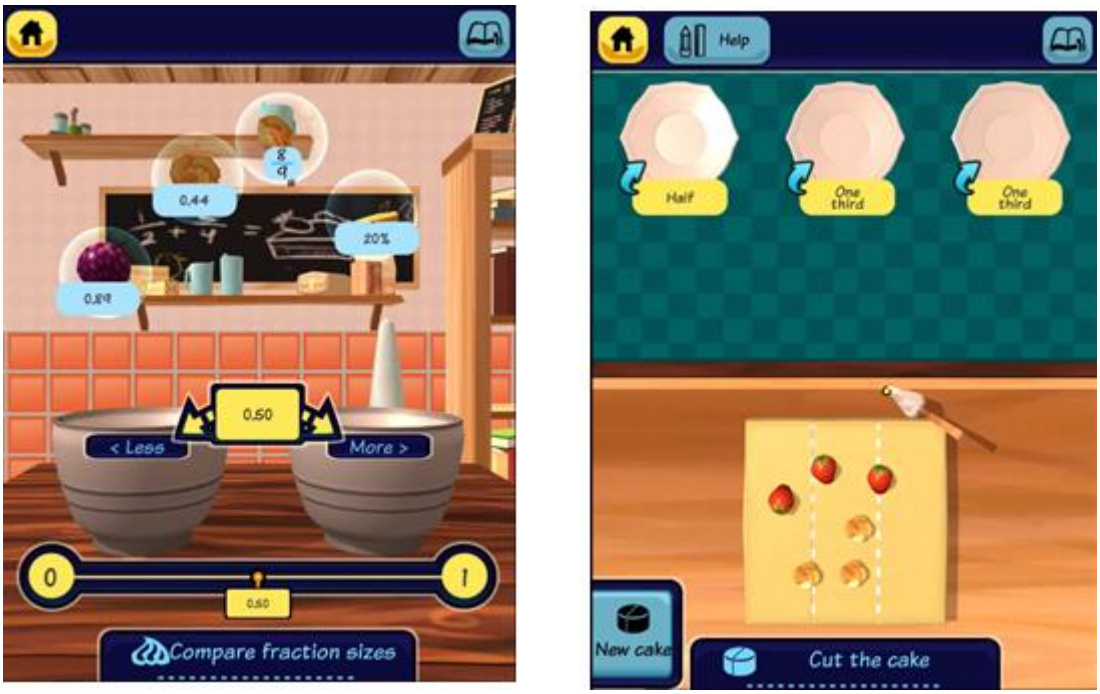

Figure 5 Tasks about reading and measuring fractions in *Piece of Cake*.

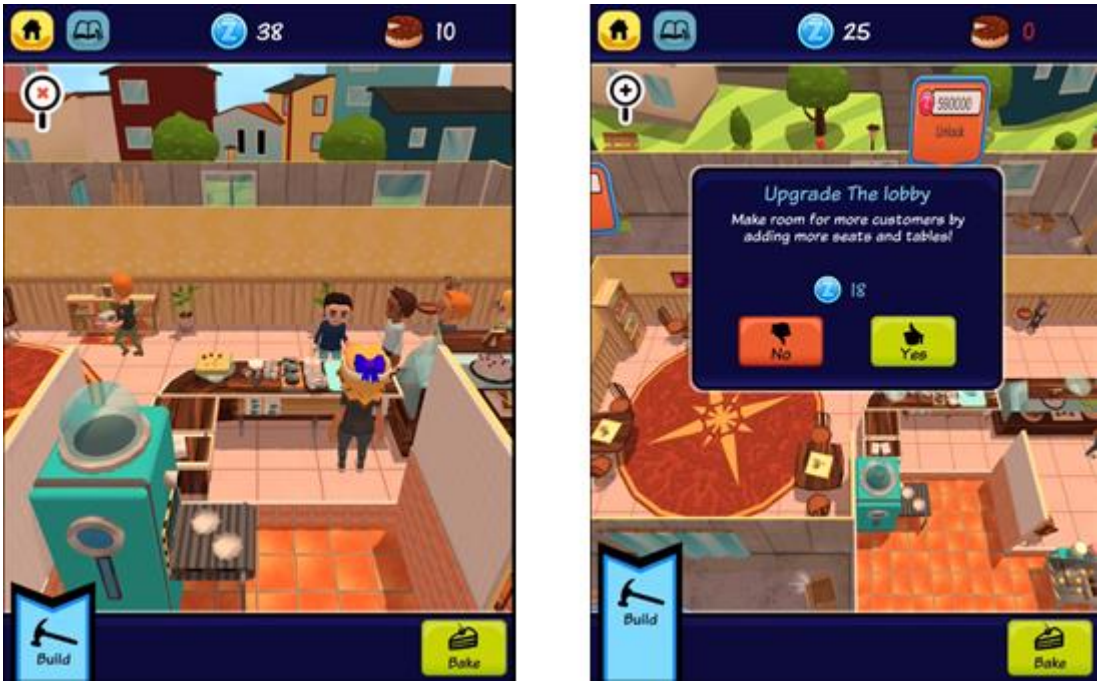

Figure 6 Using rewarded coins to upgrade your bakery in *Piece of Cake*.

The currency is also used to pay for playing tasks. The more challenging a task is, the more expensive it is to play. Failing to complete a task correctly means that the player won't receive any currency. The reason for this is to have the player take on the tasks they have the skill to solve first in order to afford advancing to more challenging tasks too early. As the player solve tasks they are also rewarded with new ingredients and recipes used when solving more difficult tasks.

3.2 Method

In this chapter, the method used to gain proper data will be explained. This involves explanations of the basis on which the participants were selected, how the interviews were carried out and a description of the pilot interview and how it affected the other interviews. The latter is thoroughly described to serve as an example in order to give proper insights into the interview format.

The type of insights necessary to answer the research question could be, on the basis of the concepts covered in the previous chapters, divided into two areas: general culturalization suitably applied when targeting the Chinese market, and specific ones that arise when the game is an educational product targeted at young children. These insights were sought by gathering data from people who already possess these insights. In this case that meant game industry professionals and pedagogues that are native to the locale focused on in this study, and thus subjects of the cultural environment forming it. The means of producing the data

was qualitative interviews with these individuals, structured as open-ended conversations. This approach was chosen in order to enable novel information and unheard perspectives to be expressed. In other words, the data sought was not of a kind that would benefit from predetermined questions or narrow subject limitations. The focus of the dialogues was however thoroughly presented by allowing the participants to either play, or observe video footage of, the educational games which content were to be used as a basis for the conversation. The area of expertise that made them suitable for participation in this study was also discussed, so that it would be clear in what capacity they were asked to participate. Throughout the interviews the participants could return to the content of the games in search of points of discussion, but whenever the participants instead chose to talk about something that not directly concerned something observed in the games this was still valued as relevant and recordable data.

As previously stated, the discussion held during the interviews did not evolve through asking a series of predetermined questions. However, for the purpose of transparency, the category of questions often asked will now briefly be explained. The most common one these categories were (apart from follow-up questions aimed to clarify or expand on answers), very broad questions encouraging the participant to share their thoughts and reaction to different aspects of the games. For example, after the participant had viewed or played the games, discussion was initiated with questions regarding whether the participant understood the game concept, or whether they had any initial reactions to the product. Many of these broad questions were often determined by the profession of the participant, so that questions about the educational utility of the games were asked to pedagogues, while fitness for the Chinese market was asked to localizers. It might be important to also explain that further questions were only asked to the extent it was needed to keep the conversation going, or have the participants focus on or consider certain aspects of the games. For example, if a localizer had not mentioned the culturally colored content of the games, this would eventually be brought into the discussion with a question.

The video footage used in the majority of the interviews had been selected and edited with the intention to give a comprehensive but summarized presentation of the games. The three videos, each showing one of the respective games, were a little over 5 minutes each. The reason for letting the participants watch video footage in the majority of the interviews instead of playing was due to technical and practical limitations. Because of this, however, the interactive aspects of the games were not available for exploration to most participants. While this is an important part of video games, the use of video recordings was still favored by two factors. The first of these was the possibility to show the recordings through a screen-sharing function during interviews held through video- or voice-calls. This was the only

option available during this type of interviews, as the researcher did not have the possibility to provide the participants with versions of the games to install on their own devices. The other factor that favored the use of video recordings was the fact that some of the participants (the pedagogues in particular), did not usually play games or read English, and only one of the games had been translated to Chinese. Initiating the interviews by having these people play a game in a foreign language was thus deemed too demanding and less ideal than letting them observe the game while the researcher added clarifying explanations. Had the intended target user (i.e. children) been included in the research, the UX (user experience) of the games could have been properly explored, and for this, video recordings would not have been a viable option of presentation.

The selection of participants was a purposeful sampling (Palinkas et al. 2013) meant to gather a good representation of certain expertise and in-depth knowledge regarding a range of relevant factors. The selection of participants both grew in number and were subject to changes in the expertise distribution after the data creation process had been initiated. This was done as a result of a growing insight into the subject gained through the research, and a need to assure that there was sufficient width to the collected expertise among the data sources emerged. Furthermore, there were reasons to secure alternative sources in case one or more of them proved to be inadequate. In this regard, the method also contained some opportunistic or emergent sampling (Patton, 1990).

For a research using expert interviews, discerning the educational value of an educational game also meant including people who understood the curricula and schooling habits of the targeted age group in that environment. In capacity of their profession, mathematics teachers can make judgements from a pedagogic point of view. Thus, the “usefulness” aspect of an educational game can competently be estimated. Apart from that, the selection of participants mainly consisted of people who are experts on the Chinese game market, and who also had enough insight into the global game market to be able to see it in a comparative light.

The overall approach to inquiry and data has been as open as possible for multiple reasons. One reason is that the research has aimed to identify a series of focus areas of unforeseeable number and kind. The research has been conducted with an outside perspective in regards to ethnicity, culture and expertise. Predetermined focus and limitations would thus be based on unqualified assumptions and guesses. Even if thoroughly rooted in previous research, such assumptions and guesses would have been limiting to the necessarily explorative approach to this subject. Furthermore, the subject is extremely complex, not just due to the cultural heterogeneity of the locale, but also because a lot of what can be said on the topic could be

treated as a perishable, as the shape of a consumer culture is as impermanent as the societal forces influencing it. The data collection has therefore been conducted with an understanding of the case and context dependency of provided answers. With this in mind, the research has had the approach of a naturalistic inquiry (Guba & Lincoln, 1981), with unconstrained types and quantities of possible outputs, open to the influence of the natural environment, the judgments, the experience and the views shaping the response of participants doing what is already natural to them in their capacity of area experts (i.e. analyzing game content or the applicability of educational tools).

In the same way as the data collection has been done with high level of openness, the goal of the data analysis has been to formulate a comprehensive overview as pluralistic as the data itself, and not an attempt to simplify or sort the data into predetermined categories. The dependency on context and fleeting nature of the subject, paired with an unavoidable outside perspective, makes the research's findings best suited to reflect the complexity of the subject rather than isolating definite truths. The final overview that constitutes as an answer to the research question has been made orderly and perspicuous through thematic analysis (Braun & Clarke, 2006), lifting the emphasis, philosophies and experience of the participants in a focused manner.

In the case of this study, doing a thematic analysis meant identifying recurring patterns or other important pieces of information that in some way helped answering the research question. The method of analysis involved first getting familiar with each set of unstructured data that had been gathered during the interviews. This was achieved through repeatedly reading or listening to recorded data. Audio recording was only used in one of the interviews (for reasons that will be described in the next chapter). In the other cases, the researcher recorded the answers and information provided by the participants during the interviews by writing. After getting familiar with the data, the analysis proceeded by decoding the data, and structuring relevant pieces thematically in order to both get an overview and identify information vital to the research, as well as the relationships and patterns among it. This was done by color-coding the raw data and highlighting specifically important passages before structuring it in a more presentable manner with themes and categories.

Because of limited resources, the choices concerning the interview environment and conditions has been very limited. Thus, these conditions have been the product of convenience at each occasion. However, as this is a form of naturalistic inquiry, the environment has not been treated as a problem, as the conditions has put the set of the interviews in a context close to the everyday reality of the participant.

3.2.1 Ethical Considerations

The research has adhered to good research practice throughout the research, by for example assuring complete voluntariness among the participants and by protecting their integrity by for example not sharing revealing aspects of the data or information about their participation. But more than this, there are some specific ethical considerations resulting from the nature of elements of the case. One of these is the usage of a commercial product for research purposes. Another concerns the unavoidable outside perspective of the researcher in relation to the subject at hand. A third concern is the topic and the societal stigma around it. All these points will be discussed in this section.

The games used during the interviews are commercial products. The rights and possibility to use the products was provided by the company that produced it. Their participation has been rooted in their interest for deepened insights into the subject explored by this research. With that being said, the developers have been fully aware that the researcher and the focus of the study could not in any way adjust itself to their interests. In order to assure the researchers disinterestedness (Swedish Research Council, 2017) in the results, the affiliation has to be made clear in this paper. The researcher thus declare that he lacks personal and commercial interest himself and only aim to make an honest contribution of knowledge to the field. No funding in any way, shape or form has been received by the researcher from the company. The ethical considerations resulting from this has been to assure an indiscriminate presentation of the data, regardless of however it would be relevant to or positive for the developers of the used products. The affinity of the researcher and the solely academic purpose of the interviews was made clear to each and every participant as they were asked to participate.

In regards to the researcher's relationship to the relevant factors shaping the study, most specifically Chinese culture and society, it might be relevant to know that the researcher has an outside perspective, and are not himself a subject of it. While the validity of the results ought to be assessed in reference to scientific criteria and not the cultural affinity of the researcher, all according to the principle of universality (Swedish Research Council, 2017), understanding the outside perspective is still important. The reason why this is important is to make it clear that the researcher is not speaking on behalf of the culture or society looked at. The voice of these is represented through the study's participants only. The analysis of the data produced with the help of these people has an unavoidable outside perspective. It has been the responsibility of the researcher to minimize any expectations during the creation of data and generalization while analyzing it in order to avoid scientific negligence and arrogance in relation to cultural complexity. In the same way, since the researcher are not

himself a part of the culture, and could not see himself that way, there are no risks that he tries to speak on behalf of it, which in turn favor objectivity.

The topic of games is not an uncomplicated subject in China, as the entire medium is subject to regulatory guidelines (Dong & Mangiron, 2018) and the industry has been subject to temporary shutdowns (Valentine, 2018). The attitudes within the Chinese society that motivates these restricting measures puts professionals in this industry in a somewhat sensitive position. This was kept in mind in the approach to the participants, and there has been a reservation for the possibility that the participants might have felt hesitant to express certain ideas regarding relevant issues. This might have been especially true in regard to the societal conditions and government enforced regulations. This has affected the method of data collection in a number of ways. One is that the choice of setting has been left to the participants in order to give them the possibility to find an environment most comfortable to them. This often led to the interviews being held in the professional environment of the participants themselves, which went hand in hand with the naturalistic style of the inquiry (Guba & Lincoln, 1981) of letting the subjects do what they usually do (analyzing game content) in an environment they usually do it. Another practical result from this consideration has been the choice of people helping with the translation in two of the interviews, so that they in both cases has been personally but not professionally acquainted to the participant. Lastly, each of the summaries that are presented in the Analysis chapter of this study has been sent to each corresponding participant before they were included in the paper. The reason for this is because the summaries are the closest thing to citations that is used in this paper, and the most revealing information about participants (even if they are so to a very limited degree). Thus, if a participant felt misrepresented by their respective summary, or for any other reason did not want it to be included the way it was, they were given the chance to say this and provide corrections. Apart from making sure that the participants felt correctly represented, this also helped assure that the researcher's interpretations, on which the study's analysis and conclusions were drawn, were accurate.

As mentioned in the background chapter of this thesis, China is known to be both heavily censored when it comes to media such as video games (Zhang, 2008), and quite competitive when it comes to children's education (Kai, 2012). As a research committed to stay both transparent and objective with its findings, the reality of this has not been avoided when producing data or excluded when presenting results. While this research specifically explores where to apply culturalization for the sake of the local "viability" of a product, this might not be the only angle worth considering when approaching the subject of culturalization. As a developer, one could also reflect on what other values to consider when the target group is

children, or when one intends to conduct business in a developing country with societal conditions such as China's.

3.2.2 Pilot Interview

The pilot test of the interview that was conducted a month prior to the interviews served as the study's main data collection. The pilot test involved interviewing a participant deemed to be suitable due to professional and ethnic similarities with the other experts participating in this study. The interview was in many ways structured and carried out in a similar way as the study's main interviews conducted for producing research data. The goal was to let the participant get familiar with the games used in this study, and then identify aspects of the games that could benefit from culturalization, as well as describe how possible adjustments to these aspects might look like in order to increase the viability of the games for the Chinese market.

Like some of the interviews that were conducted to produce research data, this interview was conducted through a voice call over Skype, rather than at site, face-to-face with the participant. According to De Vaus (1991), in comparison to a face-to-face interview, that format might have affected the response rate negatively and the quality of the responses positively. As a Chinese game localization industry professional specialized on the Chinese market, the participant in the pilot study fitted the definition of the type of people this study derives its primary data from. However, unlike these, the participant did not live in China.

Without conducting any extensive thematic analysis of the kind that the study's primary data was subject to, the answers provided by the pilot test participant showed that this sort of interview, focused on an unlocalized version of a game, could be a viable way to discuss issues of culturalization. To judge from the specificity of the answers provided, the games themselves also contained enough culturally colored content to provide a basis for relevant observations to be made by a localization expert.

The participant was also allowed to share her experience of the interview, especially regarding the format's perceived ability to get the relevant information needed to provide data that could help answer the research topic. The participant thought that it would be easier to be sent the questions in advance, so that she would know what to focus on while evaluating the content of the games. The questions asked during the interview, however, were not prepared in advance, but rather asked occasionally by the researcher in order to inspire the participant to pay attention to something or elaborate on something she said. Thus, these questions could not have been provided beforehand. However, a more specific explanation of why each participant has been selected, that is, in what way their expertise

was hoped to provide relevant insights to the research, was provided to each respective participant in the later interviews as a result of this feedback.

The participant also thought that the games should have been sent to be played in advance, so that she could have gotten familiar with the games first and thus provide more qualified and thought out answers. She points out that it was hard to concentrate on answering the questions and simultaneously get to know the games. While later interviews (for the most part) did not provide the participants with the possibility to play the games themselves, there were less interference with questions during the presentation of the games in order to minimize distraction.

3.3 Summary

The method of data collection has been expert interviews. The interviews were held with a selection of participants with different areas of expertise. The selection was made to include the expertise necessary for mapping out the demands on game products for Chinese consumers as well as the educational needs and requirements of the locale. Because of the complexity of the subject, the interviews have been kept open-ended and explorative. A pilot study confirmed the methods capacity to generate data, but also gave insight into how it might be experienced by participants.

In line with good research practice, the researcher's relationship to both the commercial product used, as well as the cultural environment looked at in this case study, has been declared.

4 Results

In this chapter, the findings of this research will be presented. First, relevant details on how the data creation proceeded, as well as the approach behind the analysis of this data, will be explained. This is meant to give insight into the research work and make the processing of data transparent for reliability reasons. Next, the data will first be presented in a comprehensive manner. This is done in order to provide insight into the findings in a way that describes the raw data unprocessed through purposeful analysis. Next, the analysis and a thematisation of these findings will be presented, and illuminate the reasoning behind the conclusions arrived at through this research.

4.1 Treatment of Data

The research question for this study is: "which aspects of a children's educational game could benefit from culturalization in order to favor its viability for the Chinese market?" The term culturalization is thus mentioned in the research question itself. But in spite of its central status in this research, the term was used cautiously during the data collection in order to avoid raising potentially limiting perceptions of the subject at hand. Instead of attempting to define what can be seen as a culturalization measure and then ask the study's participants to abide to that definition, the participants of this study were asked to consider "in-game adjustments apart from translation" with the Chinese culture and market in mind. Whether the participants would have recognized or ever used the term culturalization themselves or not, was thus not important. Instead, it has been the researcher's task to determine whether produced data actually concerned culturalization of the games' content rather than other things also concerning optimization of the products for the Chinese market, such as translation, appropriate means of distribution or pricing.

Comparing the findings in this study with those found in previous studies that also treat game localization in China was done with moderation, as it has been important not focus too much on what other sources previously have concluded regarding this. This approach was chosen to allow this research to both create and treat data, at least initially, in a non-comparative way and avoid filtering any of it through acquired preconceptions.

As mentioned in the method chapter, the data was processed through thematic analysis by decoding the recordings, highlighting important aspects, and categorizing it based on the discerned relationships and patterns. This process both resulted in the interview summaries and the analysis presented in this chapter.

4.2 Interview Summaries

This section is meant to provide a summarized version of each interview and insight into the viewpoints of each participant. The purpose is to increase transparency on the findings before presenting the analysis of these. Each summary, as formulated in this paper, has been approved by the respective participant in order to guarantee both a correct representation of the participants' viewpoints and that the sharing of these summaries would not be in conflict with the wishes of the individuals.

Apart from providing perspicuous and accurate presentations of the data, these participant reviewed summaries are also meant to make up for the lack of verbatim quotes throughout the analysis. The lack of such quotes is due to the method of recording. Audio recordings were replaced by written recordings after the first interview, as the researcher perceived that participant as less relaxed and talkative from the moment the audio recording started, and were unwilling to experiment further with this method due to the limited amount of participants. As the interviews were held as open and extensive dialogues, the sentences were not always written down verbatim, but often fragmentarily. The resulting transcripts did not clearly differentiate word-by-word statements and summarized information. This was a negative consequence of combining this interview format with this method of recording. However, as described, it was deemed the best choice all things considered.

Table 1 This chart is meant to visualize the conditions of the interviews and participants.

Participant	Sex	Profession	Interview setting	Game presentation	Approximate Interview Duration
1	M	Game Localizer	At location (workplace) Was recorded with audio.	Participant interaction	Around 60 min
2	M	Game localizer and Developer of Educational Games	Through voice call	Prerecorded video footage of gameplay	Around 30 min
3	F	Game Researcher	At location (workplace)	Prerecorded video footage of gameplay	Around 40 min

4	M	Game Developer and Game Localizer	Through voice call	Prerecorded video footage of gameplay	Around 70 min
5	F	Mathematics Teacher	Through video call	Prerecorded video footage of gameplay	Around 80 min
6	F	Mathematics Teacher	At location (workplace)	Prerecorded video footage of gameplay	Around 60 min
7	F	Game Localizer	Meeting In public area	Prerecorded video footage of gameplay	Around 60 min
Pilot	F	Game Localizer	Through voice call	Prerecorded video footage of gameplay	Around 60 min

4.2.1 P1 - Game Localizer

P1 do translation and implementation at a localization studio, both English to Chinese and the other way around. The interview took place at the participant's workplace office with no other people present than the researcher and the participant himself. Unlike later interviews, P1 got the opportunity to interact with the games himself. The play session and interview combined took about an hour to complete.

P1 comments on the games' graphics, especially in regards to the UI, expressing concerns that it is too simple for the Chinese market. He thinks it either should be more stylish, or made cuter, in order to appear attractive to the consumers in China, simply because that is how games usually are made in China. He suggests remaking the UI in 3D, and also stresses the importance of having better graphics overall, especially in China.

P1 does not think that the culturally colored content of the games needs to be changed, as a lot of western imagery is already understood. This is true even for classic western traditions like Christmas, which he thinks is understood even by younger children in China. Maybe one could add some Chinese elements for increased attractiveness, he adds, like Chinese characters in the environment of the games.

P1 believes that the parents will perceive the math to be too simple to be useful for their children, claiming that Chinese people are known to be good at making calculations in their heads. At the same time, the information is too hard to be easily understood. According to P1, it contains too much text and the interface is too hard. Since the amount and complexity of the information communicated by the games makes it hard to grasp, and the level of the math is quite simple, P1 believe that the parents need to actively participate in playing the games, but points out that the games does not seem to be designed for that.

4.2.2 P2 - Game localizer and Developer of Educational Games

P2 has many years of experience in both game localization and development of games, including educational games. He was interviewed through voice call and was presented the games by being shown the prerecorded video footage of gameplay. The interview lasted for about half an hour.

P2 expressed his perception of Time Ranch as an unnecessary educational product. The goal of Time Ranch is to teach children how to read the clock, but for P2, such knowledge is commonly taught by parents to their young children without pedagogical tools, and normally without any difficulty. To develop a game for this purpose, with additional information to learn and a game interface to master in order to solve these tasks, this game made “simple things difficult”.

P2, like many others, did not think that the setting of Time Ranch would matter in order to make it comprehensible to the intended audience, pointing out that it was instead rather suitable for children, as they commonly like animals. Thus he could not see a need for any adjustments other than translating the language for this particular game.

Even regarding Store, P2 did not see a need for any bigger adjustments to the content in order to match the Chinese culture, with the exception of minor changes like swapping a food product such as a block cheese for fruits or something that Chinese children, presumably unfamiliar to the western food culture, could identify. The same issue was somehow more important for Piece of Cake, as he believed that young children outside the bigger cities might not know what a cake is. To adjust this would mean changing the central theme of the game itself.

P2 was, similarly to P1, concerned with the level of textual information in the game interface in relation to the age he presumed the intended audience would be in. In case the games were intended to be played without the support of an adult, he did not think they would be suitable unless the text was read out loud by a voice.

P2 reacted to the fact that the games seemed focused on letting the player practice solving certain mathematical concepts, rather than introducing them. P2 perceived this as an unfavorable aspect of a game aimed to teach.

P2 lifted a concern about Chinese parents' attitude towards video games, especially regarding the time spent by their children playing games. According to P2, this problem increases as the child gets older, since young children as those in kindergarten are expected to spend time playing, while school children at expected to spend more time studying.

Concerning the content designed to represent Chinese culture, P2 encouraged reservation for potential future policies to include more Chinese content in games as a promotion of Chinese culture, as such trends are already notably present in the Chinese market.

4.2.3 P3 - Game Researcher

P3 is a game researcher working for a company that in part develops educational games for children. The interview was done face to face, at location at the participant's workplace, in a secluded area. The games were presented through video footage and the interview lasted for about 40 minutes.

P3 was concerned with the fact that the games did not emphasize the teaching aspect of the games by introducing new concepts. She thought that doing a good job at introducing new concepts to the players would be to advantage to the viability of the product, as that would provide an opportunity for the children to get "a step ahead" by playing the games. This would perhaps make the games useful in the highly competitive environment of children's education in China, and at the same time help make the games attractive to the intended consumers, i.e. the parents. A game that only contains game elements that let the player practice by solving different degrees and versions of tasks might make the parents perceive the game as more playful than useful, even though the means of solving these tasks are applying mathematical equation.

P3 emphasize that in China today, policymakers, teachers and parents do not talk about educational games. In other words, such a product is not something encouraged or sought after, unless it has been proven to be very meaningful in some way.

P3 recommend getting aware of the Chinese school curriculum, and adjust the game content from that. To be aware of all the phases of the school curriculum, the games could thus be designed so that the content derives its meaning in relation to something that is already relevant and highly important for the intended audience.

P3 compares this to language learning, which she describes as more straight forward. More is better when learning a language, she says. The goal of expanding your spoken and written vocabulary is to know as much as possible, and thus a continuous source of tasks that tests the vocabulary and teaches new words would be more viable, she explains.

The culturally colored content of the games, such as environment and intractable objects, is not a problem for older kids, she believes, but might be a bit confusing to younger audiences, who have not yet been as exposed to western culture through media as older children has.

She believes however that a higher representation of Chinese elements would perhaps get the games recommended by government, teachers and media. This matter, as video games is a sensitive topic, not necessarily seen positively by many Chinese citizens – an attitude that might be susceptible to the opinion of policymakers.

The guidelines of the Chinese policymakers are at the moment restrictive in their attitudes towards children's playing habits, recommending parents to not let their children look at screens more than 15 minutes at a time, and not more than one hour a day. The whole industry is affected by this, P3 explains, particularly if you are making digital apps for kids. In order to design the game in line with the recommendations of the policymakers, and thus be held in higher regard by teachers and parents, incorporating reminders every quarter of an hour of gameplay could useful, P3, suggest. This indicates that not only the school curriculum, but also the guidelines set by certain authorities will be relevant in order to increase the viability of an educational game for the Chinese market.

4.2.4 P4 - Game Developer and Game Localizer

P4 is a Game Localizer who has also worked as a Game Developer previously. The interview was held through voice call and lasted for about 70 minutes. The games were presented through video footage.

Concerning the genre itself, P4's comment that the government are more positive about seeing educational games on the market, as they think that conventional video games tend to be too violent. They refer to educational games with the term functional games. To further favor the games viability for the Chinese market, an inbuilt reminder about not playing too long would be in accordance with government policy.

P4 stresses the educational culture of China, explaining that it is very competitive and highly performance focused. He says that this is due to a fairly recent development in the education system, which took form at around 1988. Now there's a lot of emphasis on homework.

P4 does contrast two parallel types of child education, what he calls “domestic” and “international”. While domestic schools refer to the more common and traditional schools that mostly teach in Chinese, international schools refer to a more modern format in schools more influenced by the west, which conducts a huge part of their education in English. From these, the international type of schools would be more accepting of gamification of education he says. He also believes that parents in what he’s referring to as the “tier 1 cities” (to which he counts Beijing, Shanghai, Guangzhou and Shenzhen) would share this openness to gamified education. But in any case, the parents would want to see proof that the games are useful, i.e. educationally viable. This would perhaps mean that the games need to contain something that shows that they help the children pass examinations. In that regard, having a mathematics game for an iPad could be positive, as many parents themselves have little time to engage in the child's learning.

In regards to the games he thinks that the target audience should be younger than primary school. He believes the tasks are easy for normal school children, and maybe too simple for some. The exception is Piece of Cake, as fractions are also considered difficult for Chinese students, and suggest it could be used to prepare kindergarten kids to get into primary school. In addition, he believed that pre-primary education is less traditional, and might have more resources, for using this kind of educational tools. As soon as you enter primary school, there’s a strict adherence to the curriculum. This curriculum is standard throughout China. If one wishes to increase the games viability for the Chinese market, fitting its content to this curriculum is relevant.

P4 suspects that perhaps some of the western content would be foreign to some of the children, as to many foreign elements might create a barrier. Perhaps the environment should be adjusted for localized versions of the games, as well as doing some changes to interactive content, which he exemplifies with suggesting changing a block of cheese from Store with something more Chinese like dumplings. He also suggests incorporating Chinese characters in the environment, mentioning a regulation about exclusively using English in a game. At the same time, he thinks that the exoticism of having the games take place in another country might be interesting to the students.

4.2.5 P5 - Mathematics Teacher

P5 is a teacher in mathematics for primary school students in the ages that the games used in this research are targeted to. The interview with P5 was held through a video call, and the games were presented through video footage. Two more people, acquainted to the participant, were present during the interview to help with translation, which made this

interview one of two that had more than two people (participant and researcher) present. The interview lasted for 80 minutes.

Regarding the Time Ranch, P5 comments that she has trouble to see the utility of the game. She explains that how the clock is read is usually learned before the age of 5 in China. She explains that in school, which has math classes every day, teaching related to reading the clock only take two days. With that in mind, the repetitive tasks of the game are too narrow and simplistic to justify the game's utility. She does think that the game concept would be engaging however, as she believes that the children would like to participate in the process of "growing" the farm.

Regarding Piece of Cake, P5's initial response that fractions are something that takes a lot of time to learn for students to learn in China, and that it receives a "heavy" focus in school. This might make a game like this more useful than Time Ranch. She says the game seem "interesting and useful". She believes that from a gameplay perspective, boys would be motivated by increased challenge of the tasks and girls by building the bakery, which is the simulation-like reward system that derives its aesthetic framing from the game's concretization of the tasks (i.e. measuring ingredients and dividing cakes). She says she would consider the game quite useful if it provided the opportunity to make an input of tasks to customize the challenge for educational purposes. P5 estimate the game to be for 9-year-old players.

For Store, P5 estimate it to be too simple to be able to provide educational meaning. She also sees a problem with the framing of the tasks, as they are partly concretized with coins. She explains that in accordance to their educational material, they only spend one class looking at the value of physical money. As people tend to use digital services like WeChat and Alipay in order to pay, children do not usually relate well to the concept of physical money.

P5 also have general thoughts on what would make an educational game useful. She says that the game's needs to be designed in relation to the other teaching material used. If so, she believes that the games can be useful, as they are "more fun" than books.

While she is not sure that the games can be a formal part of the education (she explains her school never use educational games), she thinks that young parents, born after 1980, might be positive to get these games for their kids.

In order to be accessible to children, she thinks that games like these need to be used for mobile platforms with touch screens like iPads, as a PC is navigated with a too complex interface for children.

4.2.6 P6 - Mathematics Teacher

P6 is a mathematics teacher at a primary school. The interview was held face to face at location at the participant's workplace office. Two people acquainted to the participant where present during the interview to help with translation. The interview lasted for nearly an hour.

P6 says she has never seen anything like the educational games used for the interviews. She thinks it might be good for concretization of tasks. Her impression is that media like this could be useful for introducing game concepts, at least for schools, and that perhaps parents could use them to have their children practice these concepts. As a teacher, she could perhaps have used them as an intro to new concepts she believes.

In regards to Time Ranch, P6 says the clock is taught in 3rd grade when children are 9 years old, but has no formal place in the curriculum, simply because it is too easy to learn. The school encourages parents to buy their children a wristwatch at that time, in order to teach them to read it naturally.

For Store, P6 thinks it might be relevant for 1st graders, who are normally 7 years old. She deems it to be too easy for higher ages.

In regard to Piece of Cake, P6 says that fractions are a challenge to learn for students in China. She thinks this game would be suitable for higher ages, like 6 graders. Unlike reading clock, fractions have a prominent part in the curriculum.

Regarding the culturally colored content of the game, P6 do not see reason for adjustments. She thinks such things as the ethnicity of the characters, or the style of the farm in Time Ranch, would not be a problem. Even in the case of a bakery, she thinks that children in the bigger cities understands.

4.2.7 P7 - Project Manager at a Game Localization Studio

P7 is a Chinese Project Manager working for a multinational game localization studio. The interview with P7 took place in a public area and lasted roughly one hour. The games were presented to her through video recordings.

In general, she did not see a problem with the European style of the environments in the games. Adding some Chinese elements could be fine, like changing the cheese in Store for something more local type of food. She points out that some other details like the cash machine looks weird to her, that is not something that could be easily understood by Chinese players. The same goes for the measurements in Piece of Cake, as she says that Chinese people are not familiar with such equipment, as people do not normally bake at home. She

compares this with Time Ranch, which is set at a farm, pointing out that animals are "more universal". She believes, however, that it would be more attractive if cuter animals to collect were added, like rabbits. For such a heavily culturally colored game as Piece of Cake, she suggests to embrace the unavoidable exoticism and maybe rename it to "Swedish Cake".

She clearly differentiates between consumers in smaller and bigger cities. She believes that foreign elements could be more easily recognized by the more educated and goal focused people in the bigger cities than those in smaller cities. In that regard, she suggests viewing China not as one market, but multiple ones.

4.3 Analysis

In this section, the analysis of the data will be presented. The analyzed data has been divided into two different categories in order to provide a comprehensible overview: "cultural references and societal attitudes" and "utility". These categories were formed by discerned themes in the data defined during the decoding process, and are not predetermined categories based on previous research. Though structurally divided, the content of these categories overlap as they touch on the same issues or have some causal relationship to each other. Note that the categories are not selected to cover a specific culturalization measure. Instead, each category deals with a category of *factors* that create a need for culturalization.

The themes that these categories contain are the following: *cultural references*, *educational utility*, *branding* and *gamification design*. What these in turn consist of will be explained in this chapter.

The following presentation has been formulated so that the research question (which aspects of a children's educational game could benefit from culturalization in order to make it more viable) could be answered by looking at these. In the next chapter, the analysis continues with a wider perspective, by discussing the findings' broader subject implications.

Note that the term "West" or "Western" are used in this section. This is a term that was regularly used by most participants during the interviews when referring to the games' content displaying European culture. This might seem like a display of occidentalism (Xiaomei, 1995), but a lot of the traditions and imagery in these games are common across most countries and cultures in Europe, America and Oceania, but definitely foreign in China.

Often, when a claim is made about what a participant has said, their alias is put in parenthesis after (e.g. PX). Since there is no Appendix with word-by-word transcripts in this paper, these markings are put there to help readers find the context of these claims by looking at the data summaries presented previously in this chapter.

4.3.1 Cultural References and Societal Attitudes

Greatly emphasized by other sources talking about culturalization are the culturally colored content of games. In the games discussed, environmental details, activities, the ethnicity of characters and intractable objects are all stylistically Western. While a some of these were noted by the participants, they were generally of the opinion that there would not be a problem to the games' fitness for the Chinese market. The reason for this was stated to be that Western traditions and imagery is already very familiar to the Chinese population, due to a lot of the cultural import from the West. At multiple occasions the participants claimed they saw no reason to switch any content in order to make it more culturally relatable, with the exceptions of things like cake topping and cheese blocks that might be unrecognizable for young children (*food references* was pointed out as a possible subject for culturalization by Dong and Mangrion (2018)). Some participants (P4 and P7) even state that cultural exoticism could be regarded as a benefit and worth embracing. Leaving such aspects purposefully unadjusted for educational reasons, would, in the case of an educational game, put it in the category of LO (Learning Objects) as defined by Amiel, Squires and Orey (2009).

The reason for the unproblematic view of the cultural references might very well be due to the characteristics of the subgenre itself. As is the case with the games discussed in these interviews, products from this subgenre rarely revolve around very sensitive issues (Nikolopoulou, 2009), such as historical matters, religion and beliefs, ethnicity and cultural frictions or geopolitical imaginations, which Edwards (2012) emphasized as "top variables" for culturalization. Instead, these games revolve around settings and activities that are relatable and exciting for young children, such as taking care of animals or baking cakes, making efforts to locate and remove offensive and sensitive content unnecessary.

While the culturally colored content was not problematized by the participants, several pointed out that there might be a relevant difference between children living in bigger, modernized cities such as Shanghai and Beijing, in comparison with the children growing up in other parts of the country and in smaller cities. These individuals might never have seen a bakery or a cake at all, and would thus have problems relating to the theme of the games. Note that a smaller city in China might still be considered a relatively big city when compared to a European city, due to the notable differences in population quantity, meaning that excluding the population from "small cities" from culturalization considerations could have a notable effect on the games viability. This in turn suggests that if the games are to be considered for culturalization for the Chinese market, more than just age group need to be taken into account, as the domestic variations in lifestyles between geographic areas and different cultural environments calls for a more careful consideration of how to apply culturalization.

To change the setting of an entire game is perhaps not something a developer would consider to do when looking into localizing their game to a new market. Trying to target a vast number of different cultures with one and the same product might also be a challenge depending on the format of the game. Thus, in order to avoid excluding potential users in a certain market, reactive culturalization could be incorporated as a part of the development of the game (Edwards, 2012), making sure that the setting of the game is of a very universal theme that most children can relate to, regardless of their cultural environment.

While keeping the theme universal, some participants has also suggested including Chinese references, such as using Chinese characters. On one hand, this could make it more attractive, but another notable reason stated was that this would be in favor of the games' approval in the eyes of the government. One participant (P2) also mentions that there might be upcoming policies on including Chinese elements in new games being published in the country. The importance of having the approval of the government in China both has to do with getting your game legible for release (Webb, 2019; Dong & Mangrion, 2018), but also attractive to the targeted consumer group (parents), as one of the participants (P4) pointed out, since that could work as a proof of quality in the eyes of these.

The government of China does not seem to have an entirely positive attitude towards the video games as a medium in general, resulting in many restrictions, especially in regard to minors (Webb, 2019). One such regulation is built-in limits on playtime, as recommended by policymakers (P3). The participants' claims (P3, P4) are not coherent on whether this attitude applies equally much in the case of educational games. This skepticism is shared with parents, especially those that fall outside of what seem to be perceived as the most suitable target consumer group, i.e. young, educated, modern, top-tier city citizens (P2, P3, P4, P5). In order to get attractive to this consumer group, participants stress the importance for the games to prove their own educational viability.

4.3.2 Utility

As educational games, more than being sufficiently engaging (the game aspect), they also need to fulfill their utilitarian purpose, i.e. ability to deliver educational value (educational aspect). In case a product of this type would fail to do this, its viability would suffer both in regard to usefulness to the intended end-users and attractiveness to its consumers. A clear example from the interviews (P2, P5, P6) that shows when a product is perceived to fail with this is the participants' comments on the game titled Time Ranch, disregarding it as educationally useless due to its narrow focus on teaching how to read the clock.

Another common comment is that the games are simply too easy to fulfill their purpose (P1, P4, P5, P6). Whether this is a trait of the games regardless of educational traditions of the

target locale looked at, or a result of an apparent difference in mathematical proficiency between Chinese children and their Western peers (Geary et al., 1993; Ching et al., 1997; Mu & Siegler, 2008; Chen et al., 1990) is not something that could been explored by the research method of this study. However, adjusting the games' content to be viable in this cultural environment, is a matter of applying culturalization.

Which issues these culturalization measures should address could be determined, according to participants (P3, P4, P6), by a deepened awareness of the Chinese school curriculum. One reason for this (P3) is the desire by parents to see their children "get ahead" in the highly competitive environment that is a part of China's school system (Kai, 2012). This is an extensive task, and an issue predicted by Nikolopoulou (2009). Simply changing the proposed user age group would not be sufficient, as the gamification, that is, the delivery and format of the gameplay, consisting of gamified mathematical tasks, need to be designed for the intended audience. This balance of challenge/educational utility and deliverance (through for example textual information and UI) was problematized by participants (P1, P2). This might potentially imply that, in the case of this locale, these game products do not deliver an educational challenge at the level necessary for the audience age group its designed for.

Another aspect of the games that participants (P2, P3, P6) perceived to be a lack of educational utility was the fact that these games first and foremost seemed to be a tool for practicing math tasks of different kinds, rather focusing on introducing new mathematical concepts.

4.3.3 Summary

In order to wrap this section up, the following paragraphs will give a summary of the analysis of the data. This is done by highlighting and repeating the main points of the analysis in a concise manner. The next four paragraphs will focus on one aspect of the games each, and the fifth and last paragraph will focus on a factor that seem to call for a revised approach to the subject.

One aspect of these games that could require various degrees of culturalization are the *cultural references* found within them. Such culturalization could consist of adjusting culturally colored details, or in some cases entire settings, in order to avoid being unrecognizable for young children, or children outside bigger cities (a substantial part of the population), who do not have any experience of these cultural phenomena. In this regard, basing the themes of the games on themes that both excite and feel familiar to children regardless of the cultural environment they live in could be an advisable action of reactive culturalization. Replacing some things with Chinese cultural elements is also an option. In

that case, addition to becoming more accessible, culturalization that incorporate Chinese, cultural elements could also have a positive impact on how the games would be perceived by local policymakers.

Another aspect of the games that could be subject to culturalization, concerns the *branding*. By this, how the games portray themselves, is what is referred to. The reason for this is due to unfavorable attitudes from both policymakers and parents towards the idea of children spending times playing games, along the absence of gamified pedagogic tools in school. By emphasizing the product's usefulness while deemphasizing the "game" aspect, adhering to the guidelines of the policymakers and including appropriate cultural elements, the product might be able to raise its attractiveness in relation to this market.

For these games, the aspect of *educational utility* becomes highly important. The sort of mathematical concepts addressed by these games, as well as the difficulty level of the tasks provided, somehow fell short in the eyes of participants. This hurts the games' utility, and attractiveness, as their usefulness is paramount for their viability in the eyes of the consumers. With awareness of the curriculum and educational environment of China, these games could undergo adjustments so that they fit to the needs and wants of the intended consumer group in this locale.

Another aspect is the *gamification design*, which in this case of these games was pointed out as a problem mainly because of the degree of textual information the player had to process in order to play properly. This is an important consideration in relation to the mathematical tasks the games provide, remembering that the difference between language and mathematical proficiency may vary from country to country, which in turn make a decision to culturalize reactively by gamifying and communicating in a highly intelligible way a good choice.

Finally, worth mentioning is an issue that, though highly relevant to the topic, falls somehow outside the purpose of the research. This is the fact pointed out by various participants that the Chinese market has, due to different cultural environments, a high level of diversity within itself. This regards the age and lifestyle of the consumers as well as the cultural environment and educational system that the end-users live with. This might be important to be aware of when determining the level of detail one choose when culturalizing an educational game for this market. It also has profound implications on the way one should interpret the research question of this study, as "the Chinese market" in the light of this contains a multitude of cultural environments, each with its own requirements.

5 Conclusions

In this concluding chapter, the findings of this paper will be looked at in terms of their relevance and implications for the overarching subjects of *game localization* and *serious games*. The findings of this paper will also be compared with how this topic has been explored in texts in which this study has been theoretically rooted. Finally, the chapter ends with suggestions on how to further explore this subject, partly on the basis of the evaluation of this study and its results.

5.1 Summary

The goal of this research has been to explore which aspects of a children's educational game would benefit from culturalization in order to favour the product's viability for the Chinese market. Culturalization is the process of adapting a product in order to cater to the needs and wants of one or several cultural environments, and it may be applied both as a part of the development and localization of games. Children's educational games differ from many other video games because they are designed to have an educational purpose. Furthermore, they are often thematically uncontroversial. In this study, suitable application of culturalization in the case of these products has been explored, specifically in relation to the Chinese market.

The method for exploring this has been interviews with pedagogues, game localizers and game researchers native to the cultural environment in question, i.e. China. To help focus the interviews, three commercial mathematics games for children that was used. These games had been developed for the Swedish market, and thus not been culturalized for China. The participants were introduced to the games and the interview regarding to its content and utility were held.

Through the inquiry conducted and the analysis of the results, this research identified four main aspects of children's educational games to consider for culturalization: the usage of *cultural references* in the game; the *educational utility* in relation to the target locale; *branding* of the product; and the *gamification design* delivering the educational content. In addition to this, a factor concerning the diverse cultural environments in the target locale was discovered.

5.2 Discussion

The aim of this study has been to make a contribution to the area of game localization and educational game development. By focusing on this specific, functional genre of interactive

media, the study has been aimed to break new ground in the field of game localization, and by addressing the issue of cultural influences on a modern market, it aims to awaken new angles for the development of educational games. Exploring which factors to consider in relation to a certain locale could help developers in many ways. For example, to determine appropriate culturalization to apply during the development of the product, assess whether their product is fit for a certain market, or estimate to what extent a localized version of their product might have to diverge from the original product to become so.

Discussing educational products designed for one cultural environment from the perspective of members of another also gives an understanding for how culturally dependent the utility of an educational game can be, depending on the focus and delivery of its content. This is not only useful from a commercial perspective, but also from an academic one. Making the factor of cultural dependency visible in the teaching of game design could be important if the purpose is to prepare students for the highly globalized market of educational games.

These things just mentioned indicates the usefulness of a study of this kind in general terms, but what, more specifically, could these findings imply and how do they transfer when looked at the through a broader lens?

Cultural references were one of the factors emphasised for different reasons throughout the data. Cultural references are not only important in the case of children's educational games, but emphasised by Edwards (2012; 2018) as vital for consideration when culturalizing games in general. As mentioned earlier, the range of cultural references found in children's educational games are often different from those found in many other genres of video games, that often include violence, war, portrayal of historical events and people, sexualized characters or religious imagery. Many of the factors pointed out by Dong and Mangrion (2018), like changing or implementing character designs and storyline elements based on Chinese myths, epos and history, also becomes less central when the themes are based on simple, everyday activities. This is, as Nikolopoulou (2009) points out, favourable in terms of localization for educational software (such as games). On the other hand, as pointed out by participants in this study, foreign cultural references that adults in a country might very well be aware of might be unrecognizable by a young child. When targeting China as a market, being aware of the multitude of different cultural environments becomes important, knowing that though western elements are very common in modern China, it remains foreign to children living there. Foreign cultural elements can be exotic, but also excluding to some, making the product less accessible and therefore less viable. In addition to being exotic, as Amiel, Squires and Orey (2009) point out, cultural elements can be to the benefit of educational products, as it might create an understanding of other cultures, which is also a

sort of learning. Thus, some types of culturalization might not necessarily be desirable in the case of educational games.

To the favour of children's educational game in comparison to an entertainment video games is the genres function as an educational tool, which allows the brand to emphasise the utility of the game, rather than the game aspect. This becomes favourable when the targeted market is characterized by negative attitudes to games in general, and children playing in particular, such as China's (Webb, 2019). In order to successfully be able to brand one's product in this manner, it also has to live up to its supposed usability. Because of the educational culture in China (Kai, 2012), adheres to the local and nationwide curriculum becomes important in order to cater to the needs of the users and attract consumers. Differences in curriculum was pointed out by Nikolopoulou (2009) as a potential issue for localizing educational games, and through this study confirmed to be a significant issue for culturalization in the case of China.

In order to guarantee that an educational game has both has recognizable themes and educational value to the intended users in China, the culturalization might have to be incorporated in the initial development of the product itself. In regards to recognizable theme, that incorporating culturalization at the stage of development would implicate reactive culturalization, as that term is defined by Edwards (2018), so that too unfamiliar themes could be avoided and thus not disrupt the players' experience. If one chooses, as suggested by participants in this study, to keep the foreign elements unchanged for educational purposes, either the LOMA or the n-Culture models (Amiel, Squires & Orey 2009) could be viable choices for development process. Either of those could possibly help face the issue of the multiple cultural environment contained within one market, as the case is with China. For the educational utility of the game, the curriculum needs to be taken into account, which would make n-Culture a good option, as pedagogues from the Chinese educational system would be able to provide a better insight to the needs and conditions to take into account than their foreign peers. Note that this issue is not relevant only in the case of China, as the school curriculum of each country varies, and so does the level of educational performance (OECD, 2018).

As a case study, the findings of this research remains contextual and case dependent. Thus, an unpredictable amount and diversity of findings might come out of a similar research focusing on a different case, as for example another subgenre of educational games or another target locale. Nonetheless, the study shows that expert interviews of the kind used in this study proves to be a solid method of exploring the characteristics and conditions of a specific market. This method is not very unlike those already applied within the industry,

where the expert knowledge of in-house specialists or professionals native to the target locale often guides the localization (O'Hagan & Magrion, 2013). For a learning object such as educational games, this would fall under Amiel, Squires and Orey's definition of LOCA (2009). Applying this method in another case would presumably yield equally illuminating, although different, results.

The case in this study regards mathematics games, but there are other types of educational games as well. An educational children's game dealing with another subject would still be a game targeted at children however, and thus many of the things explored in this study applies such a case as well. Moreover, the game would probably be similar in many ways too, such as in terms of adhering to a child friendly theme and playstyle. But while the conditions that apply for aspects such as cultural references and branding might stay the same even if the educational subject of the game would be another, the conditions that apply in regards of the educational utility might not. One of the study's participants suggest that the importance of adhering to the national curriculum would be lesser in case it was a language learning game. Her argument, that expanding one's vocabulary can be done indefinitely without following a logical order as the case is with learning new concepts in mathematics. Regardless of the subject chosen, exploring whether the subject the product is designed to teach requires considerable customization for a specific target locale might be necessary.

Beyond the cultural environment of China, what implications would these findings have for other locales? To answer this with precision, the question needs to be more specific. Not only would the target locale have to be defined, but also the place of origin for the product, as that would determine the cultural origin of the game and make up half of the cultural contrast between the product and the target locale. For example, had the case been flipped around, so that the product used was developed in China and the need for culturalization would be considered in regards to the Swedish market, the attitude of the policymakers would be a lesser issue, as censorship of games is not a widespread phenomenon in Sweden. These two cultural environments contrast each other considerably, and thus the contrasts and importance of cultural adjustments becomes clear. A product localized from one Western country to another have to be considered for culturalization under vastly different premises. As mentioned earlier, the current, relevant factors shaping the needs of the target locale is explored by incorporating expert knowledge and research, and catered to by applying appropriate culturalization on the basis of resulting analysis.

5.3 Future Work

This study does not provide a complete guide to how to culturalize educational games in order to be successful in China, nor was it aimed to do so. Instead, its method was designed to explore the potential need for culturalization for games designed for the Swedish market by having them evaluated in relation to the Chinese market. If the goal would be to truly go in-depth with what makes a game of this type commercially and functionally viable for the Chinese market, including the consumers and the end users in the research would generate data directly from the source. In the case of consumers, attitude surveys would be able to explore such things brought into consideration through this study, such as attitudes and product viability. For the end-consumers, putting the products in the hand of the local targeted group could help assess the usability and fitness of the product when put to use, as playtesting with the target population is vital to integrate in the design of learning games (Denham, 2016). This is important since targeting users from a new cultural environment means expanding the range of intended users, which in turn makes the games partly untested (in relation to the Chinese market). New findings from exploring the consumers and end-users could possibly confirm, conflict with or expand on the findings reached through the expert interviews conducted in this study.

Another way to get close to such data is to take a look at the products of the educational games genre targeted at children already existing on the Chinese market, analyzing products based on their success. This would at least give an insight into what sort of educational children's games are commercially viable in China. By looking at the content of these, more common aspects favorable to the viability of an educational game in China, than those found through evaluating a specific product such as the ones used in this study, could be discerned.

To help discern which findings arrived at through this study are relevant only in case of mathematic games, as well as continuing to map out factors relevant in educational game culturalization, the genre of the games looked at can be switched out in future research. In the last section in this chapter, this was already touched upon, but primarily in a speculative manner. The research question of this study does not specify mathematics, still it clearly declare reservation for the fact that the educational subject of the games defines the scope of what it can explored in relation to the genre of educational games. For a more comprehensible overview, encompassing larger portions of the genre, educational games designed to teach other subjects should be explored as well.

References

Adkins, S. S. (2018). The 2018-2023 Global Game-based Learning Market: Worldwide Serious Game Industry in a Boom Phase. In *Serious Play Conference 2018*. George Mason University Science and Technology, Manassas, USA 10-12 July 2018.

Amiel, T., Squires, J. & Orey, M. (2009) Four Strategies for Designing Instruction for Diverse Cultures: Context and Localization of Learning Objects. *Educational Technology Magazine: The Magazine for Managers of Change in Education*, 49(6) pp. 28-34.

Backlund, P., Johannesson, M. & Susi, T. (2007). Serious Games – An Overview. School of Humanities and Informatics, University of Skövde.

Braun, V. & Clarke, V. (2006) Using Thematic Analysis in Psychology, Qualitative Research in Psychology, 3(2), pp. 77-101.

Cederskoog, K. (2012). When to Forgo the Culturalization of Video Games: Contextualizing Globalization within the Mobile Marketplace. *Gamasutra*. https://www.gamasutra.com/blogs/KarinESkoog/20120702/173371/When_to_Forgo_the_Culturalization_of_Video_Games_Contextualizing_Globalization_within_the_Mobile_Marketplace.php.

Chandler, H. M. (2005). The Game Localization Handbook. Massachusetts, USA: Charles River Media.

Chandler, H. M. & Deming O'Malley, S. (2012). *The Game Localization Handbook*. (2nd ed.). Sudbury, MA; Ontario and London: Jones & Bartlett Learning.

Chen, C., Fan, L., Ge F., Lummis, M., Shin-ying, L., Stevenson, H. W. & Stigler, L. (1990). Mathematics Achievement of Children in China and the United States. *Child Development*. 61 (4) pp. 1053-1066.

Ching, W., Huntsinger, C. S., Jose, P. E. & Liaw, F. (1997). Cultural Differences in Early Mathematics Learning: A Comparison of Euro-American, Chinese-American, and Taiwan-Chinese Families. *International Journal of Behavioural Development*, 21, pp. 371-388.

Denham, A. R. (2016). Improving the Design of a Learning Game Through Intrinsic Integration and Playtesting. *Technology, Knowledge and Learning*. Berlin, Germany: Springer. 21 (2) pp.175-194.

Dong, L. & Mangrion, C. (2018). Journey to the East: Cultural Adaptation of Video Games for the Chinese Market. *The Journal of Specialised Translation*, 29, pp. 149-168.

Edwards, K. (2018). Kate Edwards: Game Culturalization [Video]. https://www.youtube.com/watch?v=F0-t53Hmlpk

Edwards, K. (2012) Culturalization. In Honeywood, R. & Fung, J. (Ed.) *Best Practices for Game Localization*. IGDA. https://cdn.ymaws.com/www.igda.org/resource/collection/2DA60D94-0F74-46B1-A9E2-F2CE8B72EA4D/Best-Practices-for-Game-Localization-v22.pdf [Accessed 29 March 2019].

Esposito, N. (2005, June 16). A Short and Simple Definition of What a Videogame Is. DiGRA. Changing Views: Worlds in Play. In *Digital Games Research Conference 2005*. Vancouver, British Columbia, Canada: DiGRA.

Fry, D, & Lommel, A. (ed.) 2003. The Localization Industry Primer. 2nd edition Féchy, Switzerland: SMP Marketing and the LISA. ISSN: 14203693.

Geary, D. C., Bow-Thomas, C. C., Fan, L., & Siegler, R. S. (1993). Even Before Formal Instruction, Chinese Children Outperform American Children in Mental Addition. *Cognitive Development*, 8(4), 517-529. Retrieved from: http://dx.doi.org/10.1016/S0885-2014(05)80007-3

Guba, E. G. & Lincoln, Y. S. (1981) Effective Evaluation: Improving the Usefulness of Evaluation Results Through Responsive and Naturalistic Approaches. San Francisco, USA: Jossey-Bass.

Honeywood, R. & Fung, J. (Ed.) (2012) Best Practices for Game Localization. Retrieved from: https://cdn.ymaws.com/www.igda.org/resource/collection/2DA60D94-0F74-46B1-A9E2-F2CE8B72EA4D/Best-Practices-for-Game-Localization-v22.pdf [Accessed 29 March 2019].

Kai, J. (2012). The Origin and Consequences of Excess Competition in Education: A Mainland Chinese Perspective. *Chinese Education & Society*, vol. 45, No. 2, pp. 8–20.

Mu, Y. & Siegler, R. S. (2008). Chinese children excel on novel mathematics problems even before elementary school. *Psychological Scienc*e, 19, 759–763.

Newzoo. (2018). *China Games Market 2018*. Newzoo. [online] https://newzoo.com/insights/infographics/china-games-market-2018/ [Accessed 2 April 2019].

Nikolopoulou, K. (2007). Early Childhood Educational Software: Specific Features and Issues of Localization. *Early Childhood Education Journal* 35 (2):173-179

OECD (2018). PISA - Data. OECD. Retrieved from: https://www.oecd.org/pisa/data/

O'Hagan, M. & Magrion, C. (2013). Game Localization: Translating for the Global Digital Entertainment Industry. Amsterdam: John Benjamins Publishing Company.

Palinkas LA, Horwitz SM, Green CA, Wisdom JP, Duan N, Hoagwood K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Adm Policy Ment Health*. Sep; 42(5): 533–544. Doi: 10.1007/s10488-013-0528-y

Patton, M. (1990). *Qualitative Evaluation and Research Methods* (pp. 169-186). Beverly Hills, USA: Sage.

Swedish Research Council (2017). *Good research practice*. Stockholm: Vetenskapsrådet.

Thayer, A., & Kolko, B. E. (2004). Localization of digital games: The process of blending for the global games market. *Technical Communication*, 51(4), 477-488.

Toftedahl, M., Backlund, P., Engström, H. (2018). Localization from an Indie Game Production Perspective: Why, When and How? In: *DiGRA '18 - Proceedings of the 2018 DiGRA International Conference: The Game is the Message*.

Valentine, R. (2018). Chinese hold on new video game licenses may last another 4-6 months. *Gamesindustry.biz*. [online] https://www.gamesindustry.biz/articles/2018-09-10-chinese-hold-on-new-video-game-licenses-may-take-another-4-6-months [Accessed 2019-07-22].

Webb, K. (2019). China has released its guidelines for approving new video games, one year after putting a freeze on new releases in the country. *Business Insider*. [online] https://www.businessinsider.com/chinese-video-game-regulations-censorship-2019-5?r=US&IR=T [Accessed 2019-07-24].

de Vaus, D.A. (1991). *Surveys in Social Research*. 2rd ed. London: University College London Press.

Xiaomei, C. (1995) *Occidentalism: A Theory of Counter-Discourse in Post-Mao China*. New York: Oxford University Press.

Yee, N. (2018). Chinese Gamers are More Competitive and Completionist, More Homogeneous in Gaming Motivations Than US Gamers. *Quantic Foundry*. [online] https://quanticfoundry.com/2018/11/27/gamers-china-us/ [Accessed 2 April 2018].

Zhang, X. (2008). 'Harmonious' Games Localization for China. *Multilingual* 19 (7): 47–50.