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Master's Thesis  
Academic Year 2022

A Game Design for Increasing the Intention to  
Purchase Cultured Pearl for Young People



Keio University  
Graduate School of Media Design

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A Master's Thesis  
submitted to Keio University Graduate School of Media Design  
in partial fulfillment of the requirements for the degree of  
Master of Media Design

Huan Fang

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Abstract of Master's Thesis of Academic Year 2022

# A Game Design for Increasing the Intention to Purchase Cultured Pearl for Young People

Category: Design

## Summary

The cultured pearl industry is a traditional industry that has been associated with seawater conservation and local economies. Therefore, the promotion of education and consumption of pearl diversity contributes to the protection of the marine environment and the promotion of a circular economy society. The global pearl consumption regions can be mainly divided into China while the price competition for pearls is particularly fierce. However, the eco-environmental value of pearls is missing in consumer education. Not only because consumers can not have access to pearl knowledge and experience due to Covid-19, but the current market is far from enough pearl education and experience for consumers both online and offline towards consumers.

The thesis examined the changes of value proposition and purchase intention in potential consumer before and after work play game. Through the trail workshop, the changes in consumers' awareness of environmental ecological value were observed. After cultivating pearls, consumers were recommended to related pearl products after acquiring the knowledge and externalized knowledge. Consumers' purchase intentions and value ratings of pearls were observed. It was also indicated that the effect of education on the environmental value of pearls positively affects the the price consumers are willing to pay. And their motivation to purchase was improved in many cases.

Based on the SECI Model, a work play game is designed. In this thesis, a game-based recommended system is proposed, and its prototype examined through the workshop. At the service intent to provide "one product one consumer" service for

small and medium-sized pearl company, it is possible to design the pearl education related game to further promoting to potential users.

Trail participants evaluated the prototype positively as game is able to learn environmental ecological value of pearls. And they are prepared to pay more for pearl environmental ecological value through the experience of workshops.

**Keywords:**

gamification , cultured pearl , SECI model, millennial and generation Z , consumers , communication , design

Keio University Graduate School of Media Design

Huan Fang

# Contents

<b>Acknowledgements</b>	<b>vii</b>
<b>1 Introduction</b>	<b>1</b>
1.1. Introduction . . . . .	1
1.1.1 Sustainable Consumption and Production . . . . .	1
1.1.2 Cultured Pearl as Sustainable Jewelry from Ocean . . . . .	1
1.2. Small and Medium Pearl Company (SME) . . . . .	2
1.3. Millennial and Generation Z Consumer . . . . .	4
1.4. Proposal . . . . .	5
1.4.1 Research Goal . . . . .	6
1.4.2 Contribution . . . . .	6
1.4.3 Research Question . . . . .	6
1.5. Structure . . . . .	7
<b>2 Related Works</b>	<b>8</b>
2.1. Cultured Pearl Industry . . . . .	8
2.1.1 Service for Pearl-related Knowledge . . . . .	10
2.2. Consumer Experience . . . . .	12
2.2.1 Chinese Market . . . . .	12
2.3. SECI Model of Knowledge Creation . . . . .	13
2.4. Gamification . . . . .	14
2.4.1 Nintindo: Animal Crossing: New Horizons . . . . .	16
2.5. Consumer Engagement and Purchase Intention . . . . .	16
2.6. Summary . . . . .	18
2.6.1 Position of This Research . . . . .	18

<b>3</b>	<b>Design Progress</b>	<b>19</b>
3.1.	Preliminary Fieldwork . . . . .	19
3.1.1	HK Pearl Association x A Plastic Ocean Foundation . . . . .	19
3.1.2	Feedback Interview . . . . .	21
3.2.	Prototype I. Cultured pearl workshop . . . . .	22
3.2.1	Feedback and Insight . . . . .	24
<b>4</b>	<b>Design</b>	<b>27</b>
4.1.	Prototype . . . . .	27
4.1.1	Pearl Cultivation Work Play Game . . . . .	27
4.2.	Discussion Session of Self Construction . . . . .	34
4.3.	Story Session . . . . .	34
4.3.1	Pearl Information . . . . .	35
4.3.2	Consumer Information . . . . .	35
<b>5</b>	<b>Evaluation and Summary</b>	<b>38</b>
5.1.	Workshop II. Trial . . . . .	38
5.1.1	Participants . . . . .	39
5.1.2	Evaluation Method . . . . .	39
5.1.3	Data Collection . . . . .	40
5.2.	Effect of Workshop on Participants' Purchase Intention . . . . .	42
5.2.1	Feedback Survey of Pre-test . . . . .	42
5.2.2	Feedback Survey after Pearl Education Learning . . . . .	42
5.2.3	Feedback Survey after Discussion . . . . .	43
5.2.4	Feedback Survey after Story Session . . . . .	44
5.2.5	Interview . . . . .	44
5.3.	Result and Discussion . . . . .	46
5.4.	Limitations of Work Play Game . . . . .	48
<b>6</b>	<b>Conclusion</b>	<b>49</b>
6.1.	Conclusion . . . . .	49
6.2.	Research Limitation . . . . .	50
6.3.	Future work . . . . .	51
6.4.	Contribution . . . . .	52





# List of Figures

1.1	Research Question . . . . .	7
2.1	Elements of Jewel Value of Pearls . . . . .	9
2.2	Pearls Certification . . . . .	10
2.3	Market Share of Pearl in China . . . . .	13
2.4	SECI Model . . . . .	14
2.5	Nintendo:Animal Crossing: New Horizons . . . . .	17
3.1	Fieldwork Insights . . . . .	21
3.2	Winner Reward a Cultured Pearl . . . . .	24
4.1	Service Dominate Logic . . . . .	28
4.2	Game Logic . . . . .	29
4.3	Random Pearl Matching . . . . .	30
4.4	Time for Growth . . . . .	31
4.5	Ocean Card . . . . .	32
4.6	Manual Card . . . . .	33
4.7	Special Information Card . . . . .	33
4.8	Pearl Story . . . . .	37
5.1	Flow of the Research . . . . .	38

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# Chapter 1

## Introduction

### 1.1. Introduction

#### 1.1.1 Sustainable Consumption and Production

Ensure that people everywhere have information and awareness about sustainable development and a way of living in harmony with nature, the Sustainable Development Goals(SDGs) call for deep transformations in every country that will require complementary actions by governments, civil society, science, and business.

In goal 12, sustainable consumption production is about promoting energy efficiency and providing access to basic services, green jobs, and a better quality of life.

Sustainable consumption and production require a diverse focus in developing and developed economies. Therefore, our economic model should not only maximize the value, but also consider how to make the best use of the limited resources, and even recycle them. Therefore, the value of environmental protection has an important part in sustainable consumption.

#### 1.1.2 Cultured Pearl as Sustainable Jewelry from Ocean

The desire for personal adornment is a natural place for the concept of jewelry to evolve from. Natural pearls are extremely rare, and largely limited to auction and collector's markets. In Egypt, China, India, Persia, and Rome, pearls have been highly valued since ancient times [1]. Pearls have been recognized for their functions and made into jewelry.

Pearls are treasures from ponds, rivers, lakes, and oceans. They are also an important part of marine conservation, because all bivalves are filter feeders, whether

seawater or freshwater pearl mussels. Each bivalve can filter an average of 150-200 liters of water per day. The growing process of pearls helps to purify the ocean. In 1893, Kokichi Mikimoto succeeded in culturing blister pearls in Japan and the pearl farming industry has grown into a global industry, the industrialization of pearls meets people's needs.

The reduction of resource waste and recycling based on circular economy theory allows for sustainable economic development. These concepts redefine the ideal ecological balance of the ocean. The production concept of a circular economy is to fully consider the carrying capacity of the ecosystem and continuously improve the effectiveness of using natural resources [2].

In the production process, the circular economy concept is to follow the 3R principles (by W.M.S. Russell and R.L. Burch): reduce the resources used (Reduce), extend the life cycle of products and use them on multiple occasions (Reuse); and recycle waste so that resources can be recycled (Recycle) to achieve economic and ecological harmony.

With the upgrading of farming technology, the superiority over the traditional model is that, firstly, the original pearl products have been added to medicine, beauty, decorative products, food, private chat additives, and other products. Secondly, the original waste shells, shell meat was processed for food, to achieve the principle of the resource. Thirdly, the fish, shrimp, and shellfish use the food chain relationship between organisms. Fourthly, to prevent the dead shells, open pearls after the shell meat is discarded offshore pollution, to achieve the principle of economic cycle development. The pearl industry was a positive link between environmental management and the long-term quality of pearls produced [3]. Also, water quality influences sizes, growth rates, and shell color and quality [4]. In a word, pearl oyster farming offers important economic opportunities in remote coastal communities.

From this concept, cultured pearls could be called sustainable jewelry.

## **1.2. Small and Medium Pearl Company (SME)**

Although pearls are high-value products, many pearl farmers fail in their attempt to make a living pearl farming. Even with the development of cultured technology,

cultured pearls were produced on pearl farms and were produced by injecting a small number of real pearl nuclei by humans, with the option of including a shell pearl in them. The process of continuous improvement of cultured pearl technology has produced many high-quality pearls, thus covering the market, and filling the gap between the supply of natural pearls in the market and the demand. Oyster shells were created by tiny family-run pearl farms and people on various levels. In Japan, for example, SME farmers were gradually decreasing in 2019 because of the Covid-19 and mysterious death of Akoya Pearl Oysters. The price of pearls has increased as a result. The fluctuation of the price of pearls is not only the effect of the market but also related to environmental protection. Only farmers who gain profit can better invest in sea protection.

There are three crucial things to keep in mind when thinking about pearl farming as a small business or as an investment opportunity:

- (1) The long-term investment of time, money, and labor is necessary for successful farming. The first ten months were the cultivation period, and then it took 3-4 months to process the pearls, and finally set the price. From investment to return, it took at least one and a half years.
- (2) Production of high-quality pearls. In produce high-quality pearls, there were high demands on the cultural environment. Mikimoto Pearl Company in Japan reported that they invested the money from their operations in marine conservation and management every year<sup>1</sup>.
- (3) Ability to market pearls. Marine cultured pearls company faces competition not only from other gemstones such as diamonds, but also from freshwater cultured pearls in terms of price competition. The pearl market was dominated by cultured pearls, which face problems such as overproduction, unstable prices, and global climate change.

Even the regional economy and pearl culture emerged because of pearl farming. The changes facing this entire industry require a redefinition of the value of pearls

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1 [https://www.mikimoto.com/jp\\_en/social-contributions/](https://www.mikimoto.com/jp_en/social-contributions/)

to consumers. Therefore, the current priority was to promote cultured pearls for SMEs and increase the willingness of young people to buy pearls.

Co-creation experience and exchange in knowledge that constitute value for customers. One of the challenges is little education of pearls in the consumer market. Because the education for consumers is not sufficient, the consumer's knowledge, understanding and willingness to buy pearls are not high. The youth in China always associated pearls with the image of parents or old style. There was also a lack of playful platform for overseas young customers to gain information about pearls.

### **1.3. Millennial and Generation Z Consumer**

Generally, Millennial were born between 1980, and 2000 and the people who are born during the mid-1990s are classified as i-Generation or Generation Z [5]. Millennial are hailed as “digital natives” [5]. These generations are willing to learn information and make purchases through computers. Research showed that consumer innovation, perceived advantages, perceived dangers, attitude, and intention are some of the characteristics of millennial customers' online purchase behavior [6].

According to a report by Daxue Consulting, in 2019, China's jewelry market accounted for 32.44% of the world's overall market, vacating a year-on-year increase of 7.7%. The Chinese jewelry market reached the \$100 billion threshold in 2020. Millennial will represent 40% of the global personal luxury goods market by 2025. This generation is willing to use social media to show their personality, and also willing to pay attention to environmental protection as green consumers. Customer online purchase intention determine the strength of a consumer's intention to experience a specified purchasing behavior via the Internet [7].

Moreover, consumption habits are also related to cultural background. Asian and Western customers do seem to be very different from one another [8]. 90% of marketers agree with consumers that companies are falling short of experience expectations. Consumers' value of the product is based on experience, due to they are growing a desire to be unique and different. Their characteristics tend to reflect their pragmatic approach to money and education. Also, the other key

influences are their affinity for technology, social belief, and a strong individualistic streak.

This group of consumers expects to be socially identified and self-identified but struggles to establish a valuable connection and social identity. Therefore, consumer experience is also considered by them as part of the value of the product.

The people, around 18 – 39, which is the target group of this research, who has awareness of green purchase behavior. The game is a good way to learn about the new industry and provide different suggestions.

## 1.4. Proposal

Pearl is a sustainable industry cultivated by the joint output of humans and the ocean. However, the jewelry market is changing at a rapid speed, this traditional jewelry industry is facing a lot of problems in customer education. One of the challenges is that pearls have an environmental ecological value as sustainable gemstones, there is a lack of customer education when purchasing jewelry, they did not take environmental and ecological value as an information point, thus missing the construction of value. In addition, there are few revolutions in this market. And it is hard for cultured pearls to expand its market to young consumers. On the other hand, the government and marketers are trying hard to regulate market order and set prices. However, there is vicious competition and price war between enterprises, which makes it difficult for new consumers to establish an understanding of how features of content. Therefore, during the act of product sales, knowledge between (potential)buyers and the new product team is exchanged, and value co-creation. It is the primary step to educate the customer and provide their desired information and service.

Moreover, the author hopes to provide a “one customer one product” service and education to fit the new generations’ demand, which means each customer receives an individual approach or exclusive product and service.

By developing a workshop through a game simulating the process of pearl cultivation, the author’s goal is to enhance consumers’ willingness to buy by providing the awareness of pearl itself environmental ecological value. Also breaking the geographical restrictions, the service aims to help the pearl farming industry to

open up overseas markets. Through this service, it can help customers experience how cultured pearl raises and efficiently make their pearl product stories.

### **1.4.1 Research Goal**

The goal of this research is

- To design an education pearl game for the consumer to help them better understand the environmental value of cultured pearl and increase their purchase intention.

### **1.4.2 Contribution**

This research mainly studies whether the business model of education through games can effectively stimulate the ecological value of pearls in potential consumers, and stimulate their willingness or behavior to purchase. This paper aims to determine the impact of usage of work play gamified experience on purchase intention while assessing how value propositions have affected this relationship.

### **1.4.3 Research Question**

The study is attempting to provide answers to the following questions to achieve this goal:

- Does the use of gamified mechanics in the pearls work-play experience affect users' plans to make purchases?
- What effect does the use of the pearls work-play game have on their involvement in terms of the positive value proposition?
- Does the increased consumer engagement brought about by gamified interactions have an impact on the value proposition that is generated?

The study's conclusions show how important gamified interactions are in determining consumers' views and behaviors.



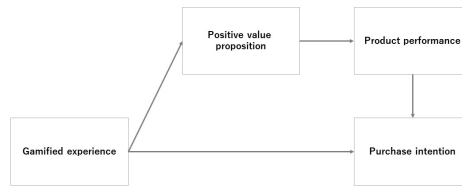


Figure 1.1 Research Question

## 1.5. Structure

This thesis will be divided into six chapters.

Chapter 1 is the introduction of the whole research where it discusses the background of the pearl, the challenge of small and medium enterprise, the current consumer behavior. Also, the aim of this study is to understand whether the pearl game design can help to increase cultured pearl purchase intention.

Chapter 2 Related Works mainly focuses on the background review of the study. There are mainly two parts: pearl's consumer education, the SECI Model of knowledge creation, purchase intention, gamification and consumer engagement.

Chapter 3 Design concept Reviews pre-study in the research. Learned from the real business model and conducting the first prototype of the workshop.

Chapter 4 This chapter concentrated on the design methodologies of the final prototype service design which include the application of pearl game and discussion session and story session.

Chapter 5 Evaluation This chapter will explain the experiment scenarios, where in total 22 participants were involved in the research. Analysis of the results of the questionnaire and interviews will be demonstrated in the chapter.

Chapter 6 Conclusion and future work This chapter concludes the result of the experiments, discussing the findings as well as limitations and possible improvements and the future development of the research.

# Chapter 2

## Related Works

To better promote consumers' awareness of pearls, it is important to start from the current pearl industry. This chapter discusses related works, both theoretical and commercial. In addition, it analyzes the SECI model of knowledge creation.

### 2.1. Cultured Pearl Industry

Since jewelry products are a traditional industry, there are multiple ways to sell them. Taking Japan as an example, pearls are cultivated by local small and medium-sized enterprises and then sold to merchants for the second sale. Pearls are further processed and designed. Part of the profits from selling pearls is used for seawater purification and protection. Because pearl cultivation takes time, the pricing of pearls is mainly determined by the local pearl association after the production is counted. The pearl industry promotes pearl products by organizing associations, participating in pearl exhibitions, etc. In recent years, the market has become increasingly demanding in terms of where pearls are sourced. Jewelers were concerned about the origin of their pearls in order to appeal to the public, and provide a brand image. In the market, sellers conduct word-of-mouth publicity in order to obtain higher profits. This has created a series of problems and challenges for pearl farmers, as the higher prices of fair trade pearl brands would create a perception among consumers that pearls are more expensive. Therefore, there is a lack of formal pearl education courses for consumers in the market. The value positioning of pearls in the market is as follows:

- i) beauty value;
- ii) durability value,

iii) rarity value. (Figure 2.1.)

	<b>Beauty</b>	<b>Durability</b>	<b>Rarity</b>
<b>Characteristics</b>	Shape, nacre thickness flaws, color, luster	Nacre thickness, structural soundness of organic matrix (conchiolin)	Overall ratio of high to low quality pearls produced
<b>Improvement measures</b>	Production to enhance quality, orientation towards nacre thickness	Treatments, stability	Maintaining a sustainable production rate

Figure 2.1 Elements of Jewel Value of Pearls

The traditional model for selling pearls is from farmers to association cultured pearls organization and report the number of pearls produced to the pearl association, where they are priced and sold at wholesale. It is because of centralized management that countries have formed counterpart organizations to assess the quality and characteristics of pearls and have developed pearl rating standards. In the jewelry industry, the most commonly used jewelry appraisal organization is the GIA. While, the most common sustainability rating system in Japan is Pearl science labor. The quality standards are based on

- (1) maintaining the durability of the nacreous layer
- (2) preventing deviation from the definition of pearls. And the evaluation levels are represented as a percentage of the total available points: 45%—accessory quality, 55%—gem quality, 70%—top gem quality, and 85%—best gem quality. (Figure 2.1.)

Due to the different types and regions of pearls, there is no widely recognized evaluation system in the pearl industry. Besides, Chinese and Vietnamese seas can produce Japanese pearls. The Middle Eastern pearls of the UAE are similar to the Japanese Akoya pearls. Burma and Indonesia also produce South Seas white pearls like those of Australia. Even if the pearls are of the same quality and size, countries with a low per capital income produce pearls of lower value,



Figure 2.2 Pearls Certification

while countries with a draft per capital income produce pearls of higher value and image. Because of the above reasons, the competition for pearls is fierce and there are a large number of incidents of unfair competition. It is important for pearl farmers to differentiate their pearls and to ensure that retailers provide the right brand and product information to their customers.

### 2.1.1 Service for Pearl-related Knowledge

In the study of cultured pearls, although there are many studies on pearls, there are few studies related to the education of consumers and young people Education on the sea and pearls is mainly carried out in the following way:

#### Offline Experience Workshop

Pearl farming is closely related to the marine ecology of the earth. Through farming activities, participants can learn about marine ecology and climate from different perspectives and understand the operation of the earth. The Hong Kong Pearl Culture Association organizes science education for pearl culture. The workshop is conducted in four main steps.

The first step, the pearl learning course; the second step, culturing teaching; the third step, opening a mussel and finding pearls; and the fourth step is pearl jewelry making. Through the workshop, they explain the life cycle of pearl shells

from a scientific perspective and their function in living nature. During the fun cultured pearls and participation in opening the mussels, consumers deepened their knowledge about pearls by participating in a part of the ecological balance of the ocean. The purpose of this project is to develop participants' awareness of the environmental ecological value of pearls. At the same time, the intention to buy cultured pearls is enhanced. Unfortunately, for a metropolis where economics and profit are paramount, pearl farming or even fish farming does not meet modern economic efficiency. There are limited sea areas where seawater pearls can be raised, and this type of workshop has geographical limitations and need a creative way to be promoted effectively.

### **Online Live Streaming**

The COVID-19 pandemic has caused a rapid shift from traditional shopping styles to online learning and purchase style across many nations and regions. The pearl company also entered the live industry as consumers could not go to the site to experience pearl farming. In order to survive better, cultured farmers also started to take the initiative in the online business. Instead of distributors, farmers create their brands to promote the price, quality, and one-to-one contact with overseas consumers of cultured pearls. Pearls company improved user engagement by repurposing various entertainment components to give online instruction.

Pearl-related knowledge is dominated by product quality description and value transfer. The education method is mainly carried out in the following three steps. First, the anchor tells the brand story of pearls, then the farmers introduce the quality and price of pearls, and finally, they conduct one-to-one direct product sales with consumers. Design through live broadcast, interact with consumers in real-time, and open the pearl oysters to give as a package design sell. Pearl merchants from different regions conduct price wars online. Not only that, because the marketing model is designed with a single product, the prejudice of pearl knowledge is transmitted through the network.

### **Pearl Museum - Mikimoto Pearl Island**

The Mikimoto Pearl Island is a museum about pearls, the pearl cultivation and Mikimoto Kokichi, the pioneer who first succeeded in cultivating pearls. The

island is located in the Bay of Toba. It offers hourly performances by female divers, known as ama (lit. "sea women"), who have traditionally been planting and harvesting the oysters (and other seafood). However, due to geographical restrictions, non-Japanese consumers are unable to experience and learn about pearl farming information online.

## 2.2. Consumer Experience

### 2.2.1 Chinese Market

Research describes a framework for sustainable luxury that combines financial value, functional value, individual value, and social value to attain excellence in social and environmental values [9]. The nature of people's pursuit of beauty has been recognized by the society, and the jewelry market has greatly improved. One of the main factors that effectively promote the growth of consumer demand is the improvement of consumption capacity and consumption structure [10]. In the research on jewelry culture, it is found that jewelry is the carrier of Chinese culture, and consumers pay attention to the cultural value of jewelry when purchasing. It should be pointed out that after the global financial crisis, due to the depreciation of the US dollar, some Chinese investors regard jewelry as an important investment to avoid financial risks. Besides, one of the reasons why Chinese consumers buy jewelry is because it is a must-have item in traditional marriage customs. In Chinese traditions, people give longevity locks, gold, and silver to children as lucky charms as well as a way of wishing them a healthy and happy life.

Due to its recent rapid industrialization and urbanization, China's growth stage and process may have a considerable impact on the attitudes and behavior of Chinese consumers. Green consumers pay attention to the environmental ecological value of products has also begun to be widely discussed. The primary driver of green consumer behavior has generally been considered to be environmental awareness [11].

The data analysis agency associated with the China business network and Alibaba group published a report on Chinese customers' online shopping behavior percent in each category. (Figure2.1) With this report, the highest jewelry pur-

chase is gold, followed by emerald, with pearls holding only 9.5%. 55% of jewelry consumers in Mainland China are in the 25 to 34 age group.

Even though, many types of researches show that services offered by online environmental platforms significantly improve customers' green consumption habits. Consumers need to see the real thing to determine whether it matches their needs, and because the unit value of jewelry is high and easy to fake, consumers' trust in online channels is naturally low, so the jewelry industry has been able to maintain a long-term business model based on online - offline channels.

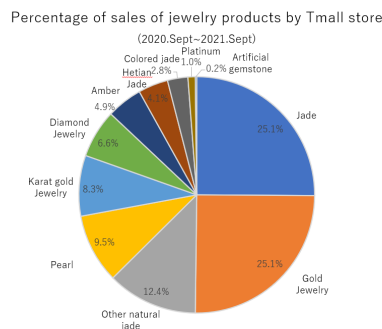


Figure 2.3 Market Share of Pearl in China

## 2.3. SECI Model of Knowledge Creation

From a business perspective, knowledge management attempts to improve the caliber of business activities by managing and supporting varied formal information that is present both inside and outside an organisation. Knowledge creation has been explained in various places, especially by the SECI model.

The SECI (Socialization, Externalization, Combination, Internalization) model of organizational knowledge generation was created by Ikujiro Nonaka and his colleagues and has gained paradigmatic stature since its publication in 1991. The SECI model is about how users practice, interact, and learn while continuously transferring, combining, and converting various sorts of knowledge. Understanding this aspect of knowledge management and how knowledge generation happens

as a flow from tacit to explicit information and a combination of knowledge push and pull can be helped by looking at the Figure 2.4.

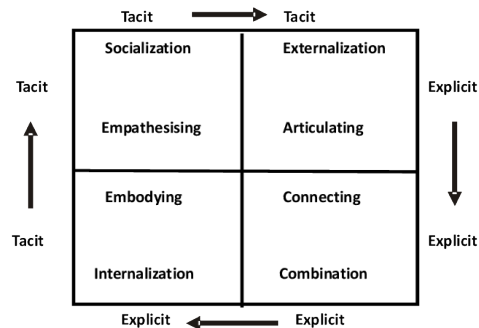


Figure 2.4 SECI Model

In order to turn tacit knowledge, which is ingrained in employees but difficult to monitor, into explicit knowledge that can be shared and learned among organizational members, socialization and externalization processes are encouraged. The externalization of tacit knowledge, or the act of making other organization members aware of and capable of learning tacit information, is the key to knowledge innovation (experience, skills, perception). Among the existing-related studies, exploratory learning and exploitative learning both significantly improve the management of the e-business ecosystem.

## 2.4. Gamification

Due to the impending explosion of the “wearable technology” business, mobile phones are getting more intimate and personal (Stern 2015)<sup>1</sup>. The simplicity of recording personal data in areas like fitness, lifestyle, and the “quantified self” is what draws consumers to wearable. The concept of incorporating technology into aspects of daily life incentivizes the app developer to use mobile platforms to design services for consumers and ability the potential to leverage these data. The

<sup>1</sup> <https://www.businessinsider.com/wearable-tech-could-soon-reach-385m-people-2015-7>



marketer should consider two possible strategies, the one for the online platform services, one for combining online and offline services. Given that games have a greater degree of media richness than other genres, narrative transportation has lately been applied to the study of games [12].

Gamification enhances mobile marketing [13]. It has seen an increase in the importance of information advertising as a source of product knowledge for information searchers [14]. The game as a new consumer education tool. Education affects spending patterns [15]. The strength of the game is that it can simulate reality in a way that allows users to be educated and develop problem-solving skills during the game through 4 main elements: story, mechanics, aesthetics, and technology. Especially, in the mechanic's elements, consumer competence and the potency of practice effects determine consumption, satisfaction, and loyalty [16]. In the fields of business, health, environment, politics, education, etc., gamification is used to increase people's participation or encourage certain behaviors.

The researchers reported that conceptualizing "educational gamification" can analyze the power structure of educational gamification in the framework of the elemental structure. It shows that there are five basic principles in the design strategy of educational gamification [17]: clarification of goal rules, emotional of participating subjects, socialization of learning relationships, visualization of learning progression, and narrative of educational process, which plan the possibility of existence for educational gamification. The following items are parts of the game design process:

- Evoke passion: Narrative is important for the development of educational games from both educational and play perspectives, and the emphasis on narrative in relevant academic and practical contexts helps to increase the enthusiasm and participation of participants;
- Provide a safe learning environment: New ideas to promote user engagement;
- Emphasis on important learning items: The user's narrative logic can be an effective way to develop the user's narrative thinking;
- Reward and punishment mechanisms that allow for an environment of learning through failure: In real life, it is common to give up because of the

impact of failure, and in order to enhance the effectiveness of use, the way of learning from failure should be increased.

### **2.4.1 Nintendo: Animal Crossing: New Horizons**

The game is a new form of educational interaction, for example, Animal Crossing is a life simulation game launched by Nintendo in 2020. The player takes on the role of a character participating in Nook Inc.'s "Land Relocation Program" and intends to start a new life. Players can use props to catch all kinds of fish, sea creatures, and insects and collect fossils, and the captured items can be sold, made into furniture/cuisine, used for decoration or donated to the museum. The museum is designed to help players learn about different fish and creatures. The game is designed to give players a better understanding of realistic marine life knowledge, and an exhibition hall is set up to satisfy the player's sense of achievement during Covid-19. The increasing number of people socializing through the game, and the home quarantine policy that prevents players from traveling, this game excels not only in business but also in word of mouth. The advantages are the freedom it has, the rich customization content, and visual performance.

It can be seen that the game is a social tool of the platform, but also to pass knowledge and change the cognition of the platform.

## **2.5. Consumer Engagement and Purchase Intention**

Consumers who intend to make purchases online have noted the significance of characteristics like Internet experience (in the sense of frequency) and the connection to environmental trust [18]. A variety of online services are delivered via the Internet, and these have been the topic of research. Consumer experience is the process of perceived value. The expectation of purchase is the probability that consumers are willing to buy certain goods. The willingness to consume is determined by the user's perception that the item has value. Value is considered "the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given" [19]. Value is also defined as a belief about



Figure 2.5 Nintendo:Animal Crossing: New Horizons

desirable end states [20], which focuses on a psychological aspect.

The literature suggests the link between product attributes and price. The intention to purchase is influenced by several intervening constructs, including perceived price, perceived quality, and perceived value [21]. Research proves that purchase intention is determined by product value. If a product is judged low in value due to either low quality or high price, purchase intention is expected to be low. Perceived value has been proposed [22] as an intervening construct in the relationship of price and non-price information with purchase intention. Therefore, the researchers suggested the managerial implications of how various factors influence the formation of quality and value perceptions and under what conditions price and perceived quality combine to yield favorable purchase intentions.

To promote products, it makes full use of the Internet and traditional media to create a new and creative atmosphere for mass participation.

## **2.6. Summary**

Influenced by the sustainable and genderless trends, new pearl consumers are on the rise. Mariko Kawaguchi, a professor in the Social Design Research Institute, said that “Pearls not only look good but the story behind them is also considered an added value by consumers. In addition, they are more likely to be worn if they resonate with others”. In today’s competitive business marketplace, suppliers are constantly challenged to anticipate, rather than follow, changes in customer value. Customers are often looking for innovative suppliers that offer new value concepts or total solution packages.

### **2.6.1 Position of This Research**

Due to the lack of education on the environmental ecological value of pearls in the education of consumers, this paper develops a thorough service design model of the knowledge production process in consumer education to raise purchase intention, which helps our understanding of knowledge formation. Through SECI Model, there are few papers on the application of this theory in a commercial promotion. This is also an attempt to explore the possibility of using this theory in commercial applications.

# Chapter 3

## Design Progress

### 3.1. Preliminary Fieldwork

#### 3.1.1 HK Pearl Association x A Plastic Ocean Foundation

David Wang is a pearl farmer from Hong Kong who is dedicated to promoting the culture and knowledge of pearl cultivation. He found that the water quality in Hong Kong was suitable for pearl farming, but there was a lack of education in the market about pearl farming, so he took education as a prerequisite for pearl farming and wrote a book to introduce how he did it. The main points in the books were as follow,

Raising pearls is a great learning process, and when the pearls are raised it is another learning experience. A school-based pearl farming program can also be implemented in schools as a comprehensive educational activity. Since pearl farming involves a variety of industries, such as fisheries and agriculture, marine conservation groups, the jewelry industry, and Internet of Things technology, each with different insights and experiences. Depending on local resources, participants can learn about the cultured pearl industry.

In the school, the small-scale experiment can be conducted by simulating marine ecology. Students took out fixed pearl shells from the tank for a 20-minute environmental stress interview every day; change the environment and test how much the water temperature of 18 degrees and 22 degrees affects the growth of pearl shells; what is the effect of different feeds on the color of pearls raised later; how does the presence of waves affect the growth of pearl shells, etc.

In summary, there are three aspects: feeding, observing and reporting, innovating and altering the pearl farming industry in conjunction with STEM education in order to promote participants' understanding and recognition of the cultured

pearl industry in Hong Kong and enhance willingness and behavior to purchase pearls.

The 4Ps principle is used to analyze this business structure.

- **Product:** In order to let the consumers experience go through a simple process and learn about the local pearl industry. The product is using locally cultured mussels. Recognizing that the participants were not practitioners of the jewelry industry or the pearl culture industry, their knowledge of the pearl was limited to the name. To maximize the presentation of how the different pearl products meet the market demand and processing techniques, the pearl farm prepares different experiential courses such as shell cleaning experience, mussel opening experience and pearl jewelry making experience. In each of these courses, the participants were guided by staff. Participants do not need to prepare any materials in advance.
- **Promotion:** The promotion is through the Hong Kong Cultured Pearl Association and the online SNS platform. Not only that, the jewelry fairs held in Hong Kong 2 times a year are also a way to promote, and gain customers offline. As for a promotion strategy, the promotion messages are frequently posted on weekends.
- **Place:** Since some of the participants were unable to come to the site, the Pearl Farming Association with a Plastic Ocean Foundation has introduced a pearl farming assistance service for the participants. They were committed to providing a personalized and customized service. The limitation of this business model is that the consumer population is limited to the Hong Kong area due to lacking promotion way.
- **Price:** There were different prices for the above 3 types of pearl experiences. The clear mussel experience only requires paying for a round-trip boat ticket. The open mussel experience will depend on the market price of the pearls.

Consumers' awareness of the value of pearl was expected to be improved in four major ways: first, knowing what the product is and improving the attachment; second, experiencing care and achievement from the playful games; third, more

interactive communication through a personal story; fourth, willingness to share their pearl raising experience and understanding the relationship with pearl.

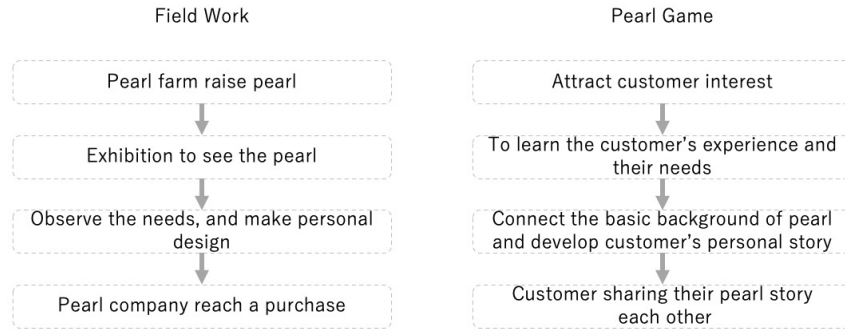


Figure 3.1 Fieldwork Insights

### 3.1.2 Feedback Interview

The author conducted an interview with Miss J, 26 years old who lived in China and has attended the workshop. She said Pearl's education is very meaningful before purchase. In particular, the following two points deserve attention. The first point is that it was important for users to know what kind of promotional information is provided. Pearls as sustainable gemstones and the process of growing them requires human participation, which was what she did not know before she attended the event. The cultured pearl experience process was also a platform where she can socialize with a group of people who share the same marine conservation philosophy.

The second point is a personalized and customized experience. Since pearls have the attributes of jewelry, in the process of opening the mussel and making pearl jewelry, she believes that the process of making pearl jewelry was also the process of commitment. It was a great way to express romance and witness friendship,

affection and love. Because of the Covid-19, a long time has been home isolation, there was SNS platform to know each other, but also to see their concerns about the pearl farming log. Because of such a story linkage, she had not thought about making or buying her own pearl products before, but through activities like this, she learned the meaning of cultured pearls.

While the main target group of the Hong Kong program is mainly students and promotes local cultured pearls and environmental conservation. The author want to strengthen the connection between the consumer and Pearl's story through a playful game. In view of the above program, is it possible to break the geographical limitation in the future, to go to the remote way can also participate in the cultivation and design of pearl?

Pearl game design focuses on helping consumers form a personalized pearl story and understand the different elements of the pearl culture process that affect the price of pearls in order to increase the willingness to buy cultured pearls. Young people will seek novelty and recreation. Experimenting with pearl education, experience and purchase as a linked consumption model is feasible. However, since pearl conservation education is under-developed in Hong Kong, China, Japan and even around the world, there is potential to provide a game that allows consumers to enter the world of pearl farming and thus open up access to pearl products.

### **3.2. Prototype I. Cultured pearl workshop**

Inspired by the offline workshop, the author wanted to test whether providing understanding and options for pearl education through a game approach could enhance participants' knowledge of pearls and increase their intention to purchase pearls.

Before the game starts participants were introduced to the formation of pearls and the range of prices of different pearls and the common ones used. The main focus is on the environment and the humanities, by introducing the significance of the existence of the pearl industry and the significance of why pearls are chosen. Then an interactive game is played with the participants.

The game was designed to play in the form of a roll play, where the author chose 4 topics related to pearls for the participants to interact and discuss. 4 aspects



were the 4 elements that determine the value of a pearl.

- (Environment) The significance of the culture of environmental sites for pearls
- (Proof organization) Institutions and elements of pearls as jewelry assessment
- (Design) Pearl personalized development
- (Artificial) Impact of economic development of different regions on cultured pearls

The criteria for topic selection were straightforward. First of all, the topics were the elements that are currently generally accepted in the market to determine the price of pearls. The 4 elements were analyzed to see if they could stimulate the participants to determine the value of pearls and to test after the game if they formed a relevant knowledge of pearls. Based on the pearl products tested, the participants were asked to rate the value of pearls and to test whether they could choose to buy pearl products.

The workshop was conducted on June 12, 2022, with 4 participants. 2 males and 2 females. The average age of participants was 28 years old. 3 participants were from China and had lived there for more than 10 years, and 1 participant was a Japanese woman who had lived in China for 5 years. Each participant was given a questionnaire, which included knowledge of pearls and purchasing habits, and cultural background of jewelry.

The organizer introduced the participants to the knowledge and background of pearls as small and medium-sized cultured pearl farmers. Each participant learned about the background of pearl farming and shares his or her story during the workshop. Each participant was given a random pearl (a saltwater cultured pearl or a freshwater cultured pearl) at the beginning of the workshop. They were asked to assume that they were the farmer of the pearl, collect as much information as possible about the pearl during the game, and participate in a discussion during the activity, where the participant who received the most affirmation during the discussion would receive a pearl as a reward. In addition, their behavior were filmed by a camera for future analysis. After the workshop, participants joined

a one-hour focus group interview to assess their cognition towards pearls and purchase behaviors.

The focused interview was conducted according to the outline: accessing purchase behavior, accessing Pearl, accessing personal story, and accessing the pearl farm company.



Figure 3.2 Winner Reward a Cultured Pearl

### 3.2.1 Feedback and Insight

There are several interesting insights the author got from the workshop.

- Personalization

During the simulated farmer participation challenge, the participants were already watching the daily routine of the cultured farmers and the differences between different cultured pearls. Their participation during the game of discussion was not active. However, during the self-story-sharing session, the participants were willing to share the stories they heard about pearls and their own opinions about pearls. In the questionnaire session, the participants said that they were unable to express themselves because they had not had any contact with the farmers, even though they had learned about the various steps of cultured pearls.

Sharing her story and the process of self-presentation would make her feel at ease. Because as a consumer herself, she thought she would be moved

by the sad and hard-working stories. She believed there was a story worth telling about pearls, the whole process from growth to distribution to design into the hands of the consumer.

As a piece of jewelry, pearls, even if they are of the same category and grade, can present themselves differently in different environments, with different farmers, different designers, and different purposes and people to buy from. The personalized story is an important factor in jewelry.

Therefore, the most crucial factor is helping each individual to build their own pearl story according to their personal background.

- The meaning behind the relationship

Buying luxury goods is a way for young people to pursue social status and socialization. Some groups want to share their own stories and groups who don't want to share their own stories. How to provide the right environment for consumers in the group social activities more accurately should be considered.

Male users and female users experience different results performance, female users are more willing to go with friends to discuss the purchase of jewelry opinions and ideas, participants R said that pearls represent precious stones, pearl wearing occasions were formal occasions social. At the same time, when receiving pearls as a gift, there were situations where pressure will come out because of the inherent impression of pearls, and will think that they are expected to do better themselves and work harder.

Male participants, on the other hand, said that pearls should have a male matching design. As a social need, pearls were considered as one of the options for Mother's Day gifts and engagement gifts. Under the decision to purchase, the meaning behind the pearl and how it will convey the message they are expressing is considered.

Not only that, 45% of the participants said that they are not willing to share their stories with strangers and social communication, preferring to be quiet to understand the meaning and story of the pearls and the sea, and to make their own stories.

- Lack of knowledge

The lack of knowledge about pearls means that consumers are passive in their selection process. Although pearls have been introduced in China and Japan. The actual exposure to the knowledge of cultured pearls is still very low. They believe that a deeper understanding of the type of pearls needs to be guided by professional knowledge. But currently, as consumers, they only have access to branded pearl knowledge, and buying online can be a concern for falsification of goods, so the participants appreciated the opportunity to learn about pearls and the willingness to buy them.

From this workshop, the author summarizes the areas that need improvement, the first is the environmental setting, for example what factors make consumers more immersive experience the process of pearl farming would help consumers to build relationships with pearl. The second point is to increase the educational and interactive aspects. A good facilitator in a social gathering is a gateway for the user to understand pearl and also a tool to learn self and others preference. Responses of consumers under the stimulation of the real pearl farming atmosphere should be provided with accurate information. Third, the story should be a connection. Participants said that the topics discussed were difficult, and it was hard to explore and explain from the perspective of pearls, preferring to tell their own stories. Design should form a personalized pearl story category to do for customization.

Considering the game design from a workshop, the author re-considered the design of the pearl work play game. Education as a personalized, educational and communication platform to help consumers better understand the ecological value of the pearls.

# Chapter 4

## Design

This chapter covers the design process of pearl cultivation work play game, discussion section of self construction and “One product One consumer Story” worksheet. Based on the HongKong Pearl Association workshop and the first rough prototype workshop, the author has understood that providing the environmental value of pearls and bringing personalization of matching products to consumers are two keys to raising people’s engagement and purchase intention, especially as researchers conduct, it can be used to facilitate informed decision-making, scenario planning and joint management. The final prototype of the pearl education game tries to create an interactive education platform to create an interesting and informative online experience for users.

### 4.1. Prototype

This chapter introduces the 3 major sessions of S-D logic workshop design to assist consumers the formation of the environmental and ecological value of pearls, discover their own preference and purchase intention toward cultured pearls. (Figure 4.1)

#### 4.1.1 Pearl Cultivation Work Play Game

In the review of customer education above, consumers should be educated about the following:

- (1) diversity of pearl varieties;
- (2) different pearl varieties require different cultivation times. The longer time required, the more expensive the price will be;

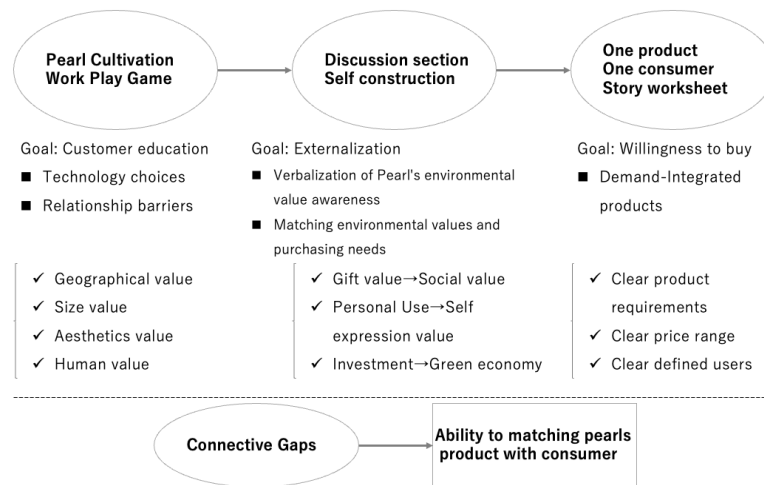


Figure 4.1 Service Dominate Logic

(3) the same kind of pearls, the price will be different in different growing seas;

(4) the cultured pearl industry requires the joint contribution of people and the environment, so pearls have environmental and ecological value;

(5) environmental factors affect the quality of the pearls, which in turn determines the price. This step tries to bring back the experience of visiting the cultured pearl farms, while the potential consumer has no background knowledge about cultured pearls.

Also, these steps are trying to guide consumers through complete cultured pearl cultivation and consumption experience. Every consumer choice will be recorded, and cultured pearl intelligence will become part of the pearl story. The more engaging the users are with the game, for example, to help clean the mussels and purify the sea, the more sophisticated the consumer profiles will be developed.

This part is the major part of the customer co-creation, it requires efforts from the customers to participate in and contribute to the service creation and delivery process. Customers selected nurtured pearls and information will be used for final and product recommendations. (Figure 4.2)

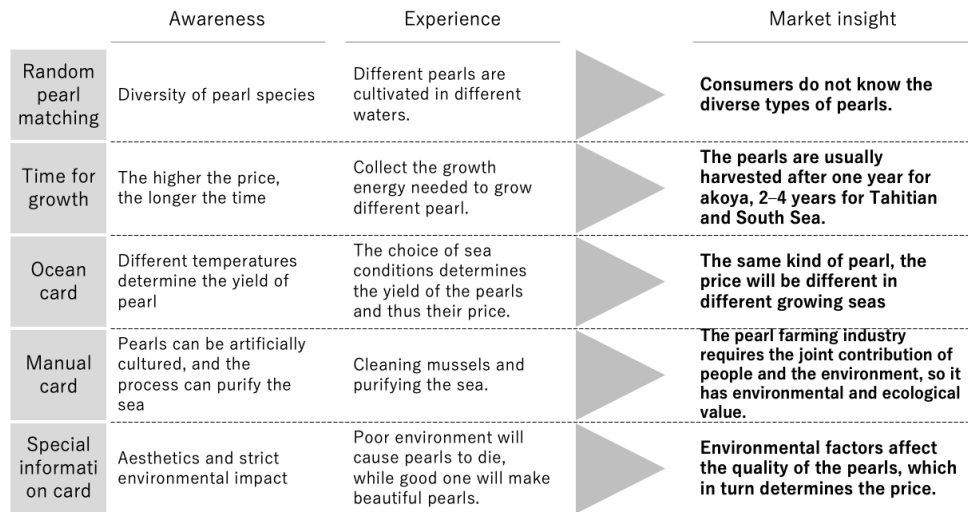


Figure 4.2 Game Logic

### Random Pearl Matching

The sea of nature enriches the diversity of pearl varieties. At the beginning of the game, a Gocha machine will be set to draw the type of pearls for consumers to choose. The type of pearl determines the color and size and aquaculture area. After the selection, there will be a brief introduction to the pearl variety. If the consumers do not like the pearl type, they can re-draw. After consumers choose the pearl type, they will enter the next step of breeding selection. This function is mainly to help consumers form awareness of the diversity of pearls, and recognize that different pearls come from different cultivation areas

However, one important point to be noticed is that the [random pearl matching] function is not a one-time function, but aims as a communicator to give consumers suggestions when they have no idea when they have no idea about types of pearls. (Figure 4.3)

### Time for Growth

This step is to illustrate the time of pearl cultivation. Since the customer has already drawn the type of cultured pearl, this step is designed to guide the customer

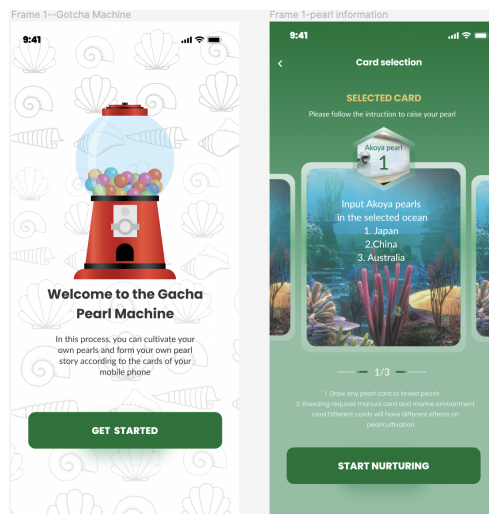


Figure 4.3 Random Pearl Matching

on how to cultivate a pearl.

One of the most important factors in pearl development is time. At that rate, it would take approximately two years to produce a marketable cultured half pearl with a 2.5mm layer of nacre. In this part, the factor of time is designed to be energy. The user needs to collect the energy required for a pearl to help the pearl grow. (Energy is shown as "g".)

Noticeably, in this step, the consumer can choose a longer time or a shorter time. When cultured for a longer period of time, higher-priced pearls will be obtained, which emphasizes the situation that will be more willing to choose more valuable products in the shopping environment. Therefore, consumers' need to highly engage themselves to get the best result. Through of rule setting, it will help consumers to understand the rules of the game and participate in the next pearl farming action for collecting the energy. (Figure 4.4)

### Ocean Card

Pearl nacre growth and thickness are related to the water temperature of the aquaculture site. The Ocean Card is to help consumers understand that different sea areas may produce the same type of pearls. The choice of sea conditions



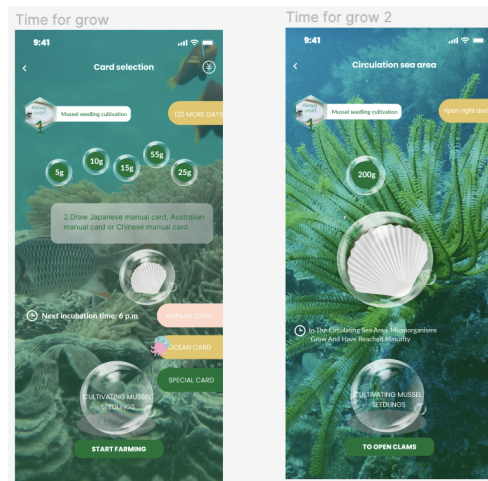


Figure 4.4 Time for Growth

determines the yield of the pearls and thus their price. There are 3 sea areas with different ocean temperatures in the ocean card. However, not all sea areas are suitable for cultured pearls, in order to give consumers a deeper understanding of the pearl culture environment in relation to the marine environment, an incorrect option will be set in the tab. This ocean card option is designed to make consumers aware of the same kind of pearl, the price is different in different growing seas. The consumers' preferences area and price will be analyzed by the area components and there are several pearls products recommended to the users. (Figure 4.5)

### Manual Card

Manual cards are set up to help consumers harvest energy. Since there is no way to speed up the cultivation of pearls in the real environment, the setting of the game in this step adopts the virtual time setting. By clicking "Manual Card", the consumers are going to the cleaning mussels step and purifying the sea. One of the special points here is that by further clicking the "clean up" button in the page, the system will recommend the steps of manual participation in different pearl cultivation processes. The goal of this step is to show that the pearl farming industry requires the joint contribution of people and the environment, so it has environmental and ecological value. Consumers can bookmark their

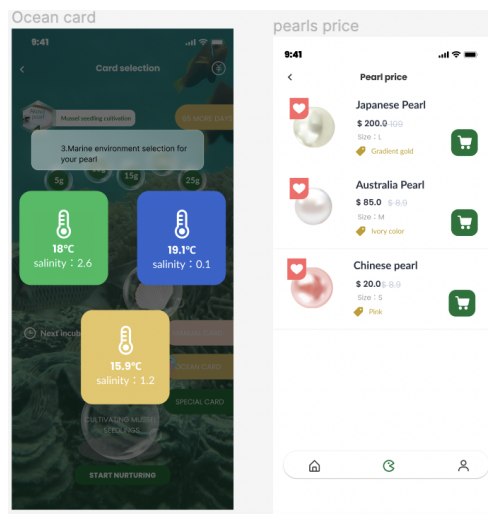


Figure 4.5 Ocean Card

favorite manual participation steps, and use this information as the customization of subsequent product stories.

### Special Information Card

Strict environmental impact on the beauty of pearls. In the process of cultivating pearls, unexplained deaths of pearls will be encountered, and beautiful products that meet market standards will also appear. The setting of this step is because the uncertain factors of the environment will affect the aesthetics of the product. The poor environment will cause the pearls death, while the good one will make beautiful pearls. Environmental factors affect the quality of the pearls, which in turn determines the price. Consumers can deepen their understanding of cultured pearls and increase their sense of interaction by experiencing the random special events they will encounter in the process of pearl farming.

If the consumers died of pearl farming during a special event, the customer needs to go back to the starting page to re-farming pearls.

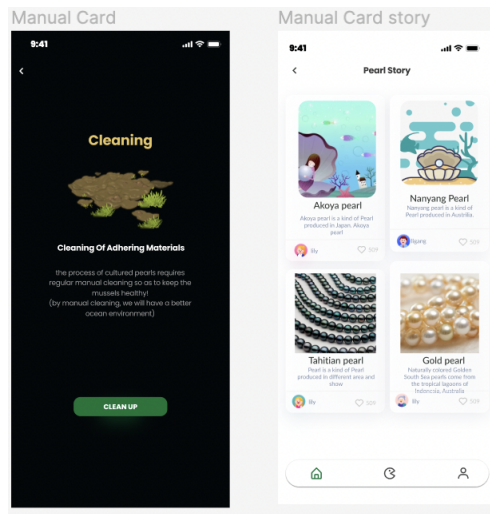


Figure 4.6 Manual Card

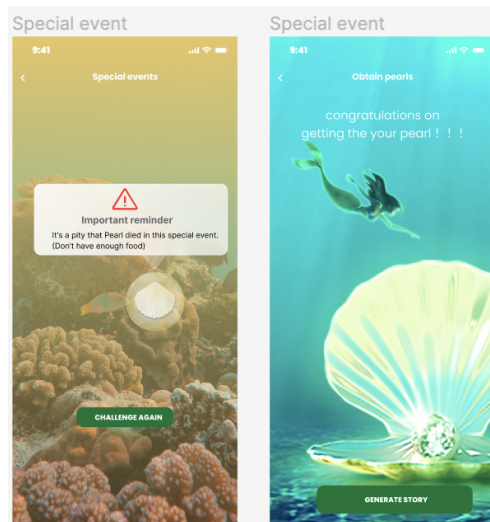


Figure 4.7 Special Information Card

## 4.2. Discussion Session of Self Construction

Customers who have completed pearl farming require a further discussion before being recommended for the final product. Since consumers are used to the community-style application to share and seek similar experience for further reference information. The purpose on this session is to better understand consumers and help consumers explore their inner needs of pearls. Discussion session enables consumers to verbalization of pearl's environmental value awareness through discussion.

The discussion session consists of two parts. First, revolve around the pearl's environmental value, second is around the pearl's other values (such as gift value, personal Use value and investment value).

Through the experience of the above farming games, consumers are encouraged to express their experiences. Second, topics of discussion revolve around the consumer itself. Consumers share and discuss the value factors they consider when buying jewelry, such as the social value, self-expression value, and green economy value of pearls. The enthusiasm for participating in the discussion can be more accurately positioned for the pearl products and prices suitable for consumers.

After the process of further discussion, consumers need to fill in an information card. The information includes the end user of the pearl purchase, the details of the jewelry value that they care about most, and a sentence of feelings.

## 4.3. Story Session

Last but not the least, the story session serves as a "one product one consumer" recommendation service. This part applies to the recommendation system of big data.

Generate a collection of recommended pearl products and stories based on the pearl farming information from the work play game part and the consumer information from the discussion part. This session hopes to serve as an information base by keeping the information as informative and clear.

### 4.3.1 Pearl Information

Pearl information consists of origin, color, type, growing time, size, and designed-pearl products. Pearl products are provided by the official website of SMEs' companies.

Understanding that consumer demand for a product as a function of income, product prices, and product's yields of characteristics, the innovation rate is huge, the initial stage only support information from Koshi Pearl Co.Ltd<sup>1</sup>, there are exactly 4 types of designed-pearls product in the system, which are rings, earring, necklaces and bracelets. Apart from the fact that it is extremely difficult to put all the designed-pearls product from different pearls companies at the current stage, there are 2 reasons for picking up the Koshi Company. Since the Akoya pearl is well-known in Japan, the small and medium-sized enterprises mainly promote and publicize their products online. Secondly, the Koshi Company recommended for pearls that are not toning by machine, and it is provided by the same pearl farm with the same pearl origin information. Making it easy for the author to choose different types of pearls in this initial stages into the pearl story system.

### 4.3.2 Consumer Information

To visualize the expression of value, consumer information consists of how it farmed, end users, custom value and environmental value of pearl products and one sentences of feelings of customize.

This step is mainly to query whether consumers are willing to in-depth product understanding and purchase.

By clicking open the pearl, the consumers are going to the exact pearl information and how it was raised and market value with the consumers' preference and target price for the moment. One of the special points here is that by further clicking the pearl story in the page, the system will analyze and recommend matches to the consumers' story. Also after producing their own story, the consumers can rate and save the story of the pearl. Consumers can save the cultured pearl information and story to their story wall and decide to share or not. After

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1 <https://www.koshipearl.com/>

raising a pearl, consumers can select a pearl card to raise, or randomly pick by the Gocha machine.

The more pearls are raised, the more pearl information can be provided. Consumers can go through the function of sharing and story wall to choose the pearl story they are interested in as a farming experience. (Figure 4.8) The related products formed by the story will be imported to the official website of the product, which is convenient for consumers to make further purchases and understand.

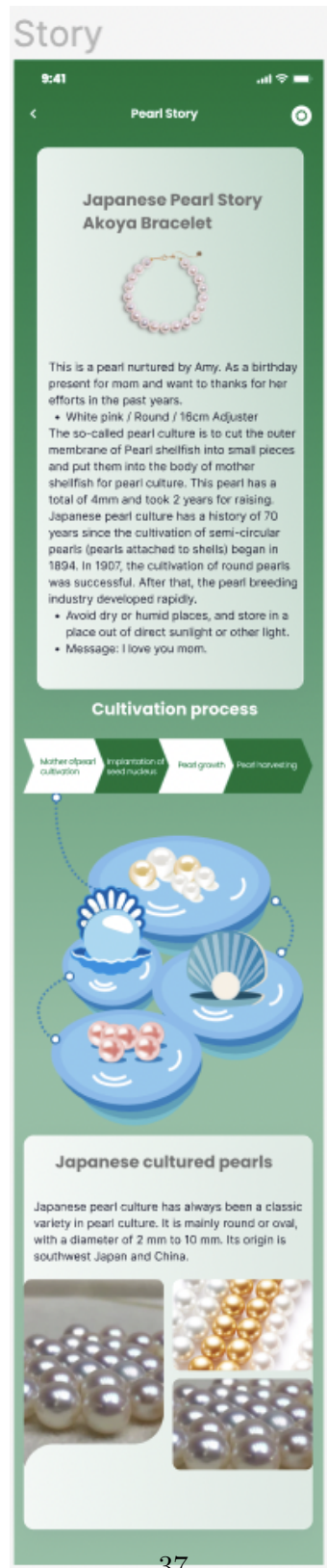


Figure 4.8 Pearl Story

# Chapter 5

## Evaluation and Summary

The evaluation is conducted through workshop towards pearl work play game based education to assess the value of the service, and a detailed description of the methodology, user study implementation, results and reflections are described in the following sections. Figure 5.1 demonstrates the flow of this chapter are easier to understand.

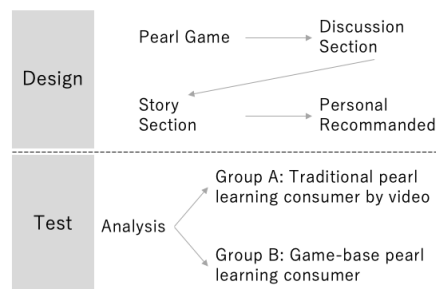


Figure 5.1 Flow of the Research

### 5.1. Workshop II. Trial

In this research, the author tried to answer the following hypotheses:



- The addition of environmental value of cultured pearl have a positive influence on their intentions to buy pearls.
- The environmental value of pearls is more effective by means of game experience than traditional means such as video and text messages.

### 5.1.1 Participants

The main target consumers are the young consumer group(the ages of 18-39) in China. Participants who have confirmed their intention to buy jewelry by filling out a questionnaire before selecting and have no background knowledge about pearls. Consumers' self-assess how important jewelry is to them based on the three major values and occasions of use. The educational and living background of the participants determines the investment value, aesthetic value and gift value when they consider choosing jewelry, while, environmental values are not considered to be measured or have a low percentage. The participants were randomly divided into 2 groups. A group was 12 people, and B group was 10 people. The youngest participant was 20 years old, while the oldest was 34 years old.

### 5.1.2 Evaluation Method

The purpose of the experiment is to test whether users are more willing to buy cultured pearls. The evaluation for this service was based on surveys, observations, and casual interviews. In order to verify the feasibility of the game based education, the participants were randomly assigned to two groups for testing.

Group A participants were asked to watch a 23-minute documentary on cultured pearls industry, which provided by Kiri Pearls Company, produced by NHK<sup>1</sup>. It claims that it is a strong advocate of environmental responsibility within the pearling industry by introducing knowledge about farms and pearls to consumers through videos. The reason for choosing this video was that it was a documentary filmed by a company that promotes pearl products and can be compared with a control group. The content of the video includes, the formation of pearls, how to take care of cultured pearls, the impact of pearls on the sea and the market value

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<sup>1</sup> <https://www.youtube.com/watch?v=ZiM1RMrckIc>

of pearls. Then they were asked to join the discussion session to share their inner needs of jewelry. At the end, the participants were provided with the web address of the pearl to purchase, and the participant's viewing page and purchase were recorded.

Group B participants were asked to use pearl cultivation work play game for learning pearl knowledge, discussion session and story session. The recommended pearl products were linked to the official website of the pearl enterprise, and participant's viewing page and purchase were recorded.

- Time: June 22nd - 28th, 2022 16:30 - 18:30
- Place: KMD project room, Japan
- Observation target: 22 young Chinese 12 consumers(Group A) 10 consumers(Group B)
- Experimental purpose: By testing the pearl game can positive influence the consumer in education and experience, I can observe and verify that.
- 16:30-16:45 Introduction: why cultured pearl is important to our society  
16:45-17:15 Group A video time  
Group B Pearl game time  
17:15-17:45 Discussion section  
17:45-18:15 Story section  
18:15-18:30 Interview and feedback

### 5.1.3 Data Collection

Participants conduct 3 questionnaires, before participating in the test, after completing the pearl work play game, and after completing the discussion. Each item on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree). After the workshops, the author conducted in-depth semi-structured interviews with each participant. The value of pearls by consumers were collected and calculated to show if it increases or not as a comparative analysis.

## Questionnaires

- How much would you like to buy pearls in the following situations? (Self-expression/Investment/Gift/Environmental value)
- Pearl is a kind of gemstone, how much do you know about its participation in environmental protection?
- Do you know the importance of environmental protection in the process of pearl farming?
- There are very many varieties of pearls, please select the one you know from the options below.
- How much do you think each of the following factors affects the price of pearls? (Types of pearls/Design/Cultivation time/Cultivation environment)
- Among the following factors, how much do you think each option affects the beauty of the pearl product? (Types of pearls/Design/Cultivation time/Cultivation environment)

After the experience, an evaluation form is given:

- i) The overall experience in the mobile game and willingness to use the game-based service in the long term;
- ii) Rate and feelings towards each session;
- iii) Other functions that would be good to have;
- iv) The effect of pearl's ecological value on the environment on the purchase intention;
- v) Demographic information: age and gender.

Qualitative and quantitative methods are used to evaluate the program. For qualitative methods, observations over each session in the workshop were implemented to see the consumers' behavior and attitude change during and after the game.

## **5.2. Effect of Workshop on Participants' Purchase Intention**

### **5.2.1 Feedback Survey of Pre-test**

During the pre-testing process, the author distributed questionnaires for target user demographic, both online and offline, and received 120 valid questionnaire responses. 32% of respondents were male and 68% were female. The results showed that 63% of people have the will and budget to buy jewelry. 27% of people believe that they have the knowledge to choose the pearls. 82% of people learned about pearls by way of offline stores.

During the interview, consumers mentioned that there were not many contents and platforms where they can learn pearls. They didn't know that pearls can help purify the ocean as a sustainable industry. 22 participants who participated in the experiment were selected from valid questionnaires.

As each item on a scale from 1 (Strongly Disagree) to 10 (Strongly Agree). The 33 participants rated the importance of pearls as 4.3. Conscious Attention to pearls which contained the self-expression value, investment value, environment value and gift value.

The self-expression value is 4.4, investment value is 3.2, environment value is 4.3 and the gift value is 5.6. Participants are willing to pay 200-500 RMB for pearls product. The evaluation of the degree of understanding of pearls is 1.8.

### **5.2.2 Feedback Survey after Pearl Education Learning**

Participants experience the process of pearl farming and gain knowledge about pearls through video or games. The goal is to increase consumers' awareness of the marine ecological value of pearls. The question is to test whether participants' awareness of the environmental ecological value of pearls is improved.

Scale from 1 (Strongly Disagree) to 10 (Strongly Agree). For group A, the traditional learning way consumer, environmental ecological value of pearls is only 4.3. The self-expression value is 4.8, investment value is 3.8 and the gift value is 6.2.

They mentioned that just by way of the video, they did not understand the role

they could play in pearl farming and had a strong feeling that it was a promotion action. The average score of learning more about pearls is 3.2. The average of price they are willing to pay for pearls is 500-700 RMB.

For group B, the game learning way consumers, the perception of pearls and sustainable development program is 7.6. They replied that they could understand how humans can manage the pearl raising and assist in ocean conservation. The average score of learning more about pearls is 8.2. The self-expression value is 6.8, investment value is 5.7 and the gift value is 4. 82% thought it was a novel attempt at a new way of learning about pearls for consumers. Group B participants imagine themselves would use work play game to understand all types of pearls. The average of price they are willing to pay for pearls is 800-1000 RMB.

### 5.2.3 Feedback Survey after Discussion

Through the process of discussion, help consumers to clarify their purchasing needs and usage scenarios, and re-fill their ratings for pearl products. Both groups were answered the same questions on a scale of 1 to 7, where 1 means "strongly don't agree" and 7 stands for "strongly agree". 90% of all participants replied that they thought the cultured pearl was valuable of purchase as jewelry. As Group A people, 85% of them tried to imagine themselves to get involved in the cultured pearl industry, however, it is hard for them to imagine how the pearl can connect the relation. About the pearl value, 30% of the participants give out a point of 3, meaning that they express a neutral attitude towards the value and price of pearls. 50% of customers can clearly state the type of pearls they like, and 55% were willing to share their preferences and ideas.

Group B replied that they experienced co-creation story with pearl in the game. While 70% mentioned that they had contributed to provide a better ocean environment and do cleaning job for their own pearl. The participants also actively talk with the others and organizer about pearl topic to form their personal pearl story. 90% of this group shows interested in cultured pearl product, and they relied that through this activity, they would visit pearl farms and experience pearl farming. And they would also go to the pearl farming place to experience real farming experience. 85% participants in this group said that they would place more importance on the origin of the pearls. Through game education, they learned that

it makes sense to support cultured pearls from different regions. There was only one person who didn't feel the connection through the game and discussion section. The average self-expression value is 8, investment value is 7.2 and the gift value is 7.6. The average of price they are willing to pay for pearls is 800-1200 RMB.

#### **5.2.4 Feedback Survey after Story Session**

In the Pearl Stories section, based on the average price bracket willing to pay, group A of consumers were given out SMEs' pearl farming stories and a pearl product catalog. Consumers' browsing times and consumption behavior were recorded. Interviews and counts were conducted during the week of the experiment.

40% participants in group A visited the website and pearl products. Average browsing time is 7 minutes. Participants indicated that the price they are willing to pay for pearl products is in the range of 500-1000 RMB.

Since the group B implements one-to-one product recommendations, 95% participants visited the pearl product page and average browsing time is 12 minutes for viewing the overall catalogue and business stories of SMEs. They are willing to pay 800-2000 RMB for pearl products.

#### **5.2.5 Interview**

At least 30 minutes deep interview was conducted for participants after the workshop. The questions of the survey were designed to measure which stage of what had developed.

- Subjective norm

“People who influence my decisions would approve of me buying/giving cultured pearl.”

“I believe that I have the resources and the ability to buy cultured pearl.”

“My image associated with pearls has improved.”

- Environmental ecological value

“Whether there is a part of participating in the environmental ecology in the process of learning.”

“Environmental ecological value affects social value, which affects purchasing decisions.”

- Novelty

“Through this experience, I realize that people are the managers of the earth.”

“Please rate the degree of satisfaction with the experience.”

- Purchase intention

“It is likely that I will purchase cultured pearls.”

“If cultured pearls that I raised are available, I will buy them.”

“What is your suggestion to improve pearl education for consumers?”

Several interviews were conducted with the consumers. Here are some of the results.

- I originally had no knowledge about pearls, so I learned a lot by learning about the different types of pearls and the current pearl industry through the workshop. I was able to learn about my friends' opinions through the discussion. Even I learned a lot about the SDGs, I don't get to talk about them in my daily life. Basically I sometimes study about them in my company. I think it's an interesting experience to learn through games.
- I think it makes sense to promote the education and popularity of pearls. But it doesn't change my first choice of diamonds as a wedding ring. Through this game and campaign, I will pay more attention to the products of pearls. Although I did not purchase pearls directly at this event, my willingness to purchase pearls was generated through this event.
- It was nice to have a chance to discuss about what we think about SDGs and pearls.

- I think there are a lot of issues in environmental protection that are worth exploring, and I suggest that we give more points on pearl breeding and other issues, and look forward to more topics to be discussed and solved, just like the training and education in the field.

### 5.3. Result and Discussion

Overall, participants found the workshop was very interesting and had an introductory effect on their understanding of the field of cultured pearl. The results showed that, education through video and games were effective channels to contact the environmental and ecological value of pearls. Whether it is video education or game education, consumers' awareness of the ecological value of pearl environmental protection has improved.

However, it was found from the data that consumers who learned pearl knowledge through games rated the environmental value of pearls higher. Data can be seen from participants' ratings of pearl value and price. Meanwhile, group A participants' attitudes to pearl prices remained the same after the pearl education experience. Although group A participants' expressions enhanced the ecological value of pearls, the willingness to pay for pearls did not increase.

It can be seen that Group B participants can better understand the reasons and value of pearl price composition and are more willing to pay in the environmental value of pearl. Consumers' participation in the environmental and ecological value of pearls effectively increases consumers' willingness to purchase pearl products.

In the discussion section, it was a process to help clarify consumers' purchase intentions and externalize the ecological value of pearls. Through communicating with participants by language or text, the facilitator can help match products with personal needs. There were three types of participants:

- i) Price oriented customer. Feedback towards this session include having "discount" or "search the lowest price" would attract them to see if there is a suitable pearl product, they make up 54% of the total.
- ii) Avoid communication type. They expressed their knowledge of pearl products that they had formed and were willing to look at the products



further. They make up 20% of the total.

iii) Topic-oriented participants make up 26% of the total. This part of the participants suggested ways in which pearls can be used for their versatility. Through the discussion, consumers have a further in-depth understanding of the environmental and ecological value of pearls and the market value.

In the process of discussing pearl topics, consumers have formed the social value and self-express value of pearls. It is worth noting that the group B participants who were in the game education, the average amount that they were willing to buy for pearls became higher after discussion.

In the story session, referring back to Chapter 4.3, this function serves as a “One Product One Consumer” recommendation service, in order to verify the impact of the story link on consumers’ purchase intention. It can be seen from the data that customers browse the stories and transfer to the official website of the product, the recommendation of one-to-one products stimulate the interest of participants. Every customer who reads someone else story is a consumer who has experienced pearl farming with their own pearl story. Not only that, 60% of the participants said they would play the game again to raise different type of pearls and look forward to new content and information input. They also suggested that more pearl cards can be designed and knowledge related to region culture to enrich the story model of the Pearl and the local culture.

At a looking at the entire workshop process, one area that stood out to facilitator is to lead consumers to consider the direct connection between the pearl farming process and consumer’s self construction.

Through the pre-workshop and post-prototyping, there were three main findings.

- Consumers’ increasing awareness of the environmental ecological value of pearls affect the amount they are willing to pay when making a purchase decision.
- Consumers’ purchase intention can be increased by a fun and interactive connection, through work play experience.

- The increase in topicality will strengthen the social value of pearl products and increase consumers' purchase intention.

It also gave more ideas for future purchase behaviors in pearls and enriched their imagination about future education about pearl industry.

## 5.4. Limitations of Work Play Game

The game is used as an educational platform to simulate the real pearl farming and trading market, and the following factors have not been considered.

- i) Authentic marine environment experience.
- ii) Custom pearl farming stories for each period and region.
- iii) Pearls are not provided during the work play game, so consumers' quality rating of pearls is based on the value guidance during the game.

The role of games is to cultivate the environmental ecological value of pearls for consumers to increase consumers' willingness to buy pearls, but it does not affect the verbal expression of consumers' needs. Therefore, for consumers who tend to communicate verbally, the game experience may not be effective in purchasing behavior. In two groups of the experimental survey, despite the increased purchase intention, there was no purchase behavior. Aiming at other factors that affect purchasing behavior, such as the improvement of service quality, the setting of conversation content, etc., can be considered as factors for future research.

# Chapter 6

## Conclusion

This chapter includes the conclusion of the current research with the discussion of design, and research contribution. Also, this chapter discuss the future works and opportunities in the field.

### 6.1. Conclusion

This program aims to provide a game experience through a service design to help consumers better understand cultured pearl and enhance purchase intention thus further effect on purchase behaviors. For small and medium-sized farmers, they are also faced with the problem of price competition, so how to go about promoting regional farming and pearl education is their attempt to carry out. Refer the model of SECI knowledge creation, according to the environmental ecological value of pearls, the author designed a pearl work play game for customers. Targeting the 3 elements that Chinese consumers looking for in a jewelry purchase, the service mainly educate customers about the ecological value of pearls. The game simulates the process of raising a pearl, building the consumer's perception of the value of the pearl and designing a personalized story with the specific products for the experience. There were 3 stages in the workshop, game stage, discussion stage and story stage. The work play game was conducted as part of the workshop as a facilitation and based on educational interaction. Through the data changes before and after playing the game, after the discussion, it can conduct whether the customer has knowledge conversion and whether it has an impact on the purchase intention during the learning process.

The results show that there are a significant and positive relationship between game experience and SECI model. Game has effectively improved the participants'

willingness to buy pearls. The factor that influences them to buy the product is the ecological value education of the product and game mechanics. Game gave consumers a chance to learn from failure and make original story. When they did a great job, pearl will be raise better and present a higher price. Through this way, consumer would be get praised and have more confidence to start a good conversation with pearl companies. It makes the atmosphere more relaxing and the experience value will enhance consumers' intention to purchase. In fact, the participants in the whole program are willing to engage and contribute to the cultured pearl education in the future. Data shows that the experience through gaming can enhance consumers' knowledge of product quality and increase the price they are willing to pay. At the end of the experiment, by introducing the concept of one product to one consumer service, author try to verify whether it can improve purchasing behavior. Also, this research confirmed that the associated combination of pearls and personal stories help increase purchase intentions. According to these finding, it could be concluded that knowledge of value awareness does not directly connect with the purchase behaviors, but can positive influence the purchase intention. It adopt of a new way of thinking about marketing.

As a result, the pearl game design can be used to promoting cultured pearl tool and communication platform. The survey and interviews showed that the budget that customers were willing to pay for pearls has increased after attending pearl education. Increasing consumer engagement brought by gamified interactions has an impact on the value proposition that is generate.

## 6.2. Research Limitation

There were still a number of components in this program that could be improved. The limitations are as follow:

- Sample size

The research only involved 22 consumers from China. The limited experimental data and questionnaire can only be used as a reference for subsequent game improvements. In future stages, more experiments can be done to verify the long-term user through game education about cultured pearls can promote purchase behaviors or not.

- Story database

At the current stage, the pearl story was formed by area, climate and human environment, building story connections with users through anthropomorphism. The current technology does not cite real-time data to complete the link between the game and the physical object.

- Environment

The main purpose of this paper is to enhance consumers' awareness of cultured pearls and increase their willingness to buy them. Through consumers' actions to help SME farmers to cultivate scientifically and protect the marine environment. The design of the protection of the marine environment is not yet perfect, and there are still many design additions in the future.

### 6.3. Future work

The current game setting is for the Chinese consumer game setting, taking into account the influence of cultural and regional factors. Small and medium companies can promote their original pearls product through "One Product One Consumer" recommendation service. In the future there are a lots of target users or organizations to design for.

- Live sound element into the game design

Sound, as an important part of the five senses experience, is also a part of driving consumer emotions. During the cultured pearl factory experience, there are elements such as wave sounds and wind sounds. In the shopping scene, there are also background sounds to soothe the consumer mood. Therefore, future designs can add the element of sound to help consumers have an immersive experience.

- Application scenarios in our daily life In the future, this game could have different influences on people in different age, region, or places. Pearls can be used as a part of the gift, for some target groups. They need to create

consumption scenarios, for example, proposal scenarios, anniversary scenarios or holiday scenarios, etc. The scenario can be used as a consumer customization experience service to optimize for future design.

## 6.4. Contribution

Due to the lack of education of consumers on the ecological value of pearls in the pearl market, the contribution of this thesis is to increase the exposure to pearls to the new consumers and to increase the willingness of young people to buy pearls by increasing their access and form original story for them.

The service design for consumer's communication platform system for pearl market need to be innovation. The goal of the research is to re-establish the value perception system of cultured pearls by game and increase the intention to purchase for young people through a playful experience.

In this research, author tries to use theory of SEIC model for knowledge creation to practice service design for marketing. This is an attempt from theory to practice. A service design concept of one pearl and one customer can be established in the future, it can also promote the development of the pearl farming industry and contribute to the circular economy of the marine environment.

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