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An Implication of Design Thinking in Culture-based Product Design Process: A Case of Vietnamese Tradition

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Abstract

This study, based on Design Thinking initiative, proposes a newly developed culture-based product design process with six phases (i.e., Understand, Observe, Point of View, Ideate, Prototype, and Test) embraced with three levels of culture (i.e., Outer Level, Middle Level, and Inner Level) to promote cultural features in culture-based product design. The process first started with literature research on culture and cultural market survey to understand and observe the target cultural objects resulting in point of view; followed by Affinity Diagram method, Lotus blossom method, and C-Sketch mashed up with three levels of culture to develop as many creative solution concepts as possible; and then scenario building and storytelling with both AEIOU and 5W1H techniques were introduced to help provide distinct perspective and profound knowledge about the solution concepts with target customers. Finally, the chosen solution concept was prototyped and tested. A case with main topic on Vietnamese Lunar New Year Cuisine was demonstrated to present how this newly developed process works.

Keywords: Design Thinking, Culture-based Creativity, Culture-based Product Design, Vietnamese Cultures

1. Introduction

Vietnam is a generally multi-cultural country in which there is a blend of Chinese culture with significant South East Asian influences of Khmer and Japan, and strong Western influences of French and American. Vietnamese cultures have been variously treasured and developed throughout the entire history and geographic expansion of Vietnam, which is one of the factors promoting Vietnam's tourism in addition to natural beauty, geographic and ethnic diversity, fascinating history, political security and low cost (Rubin, 2005).

In the "Culture Program's Priorities in Viet Nam (2012-2016)" proposed by United Nations Educational, Scientific and Cultural Organization (UNESCO), culture is also considered as a powerful source of inspiration and unification as well as the national pride to reveal Vietnam and its best to the world. Culture can be the bridge to connect the local identity to the global market. One of three thematic areas UNESCO's Culture Program in Viet Nam also focused on is Cultural Creativity, which enabled transforming cultures into assets, offering new employment opportunities and maximizing Vietnamese's creative expression and enjoyment of diverse cultural goods and services (UNESCO, 2011). In a study on "The Impact of Culture on Creativity" by European Affairs (KEA, 2009), culture-based creativity is also considered as an important feature of a post-industrial economy from developing new products and services, driving technological innovation to inspire people to learn and building communities.

In other perspective, design is another crucial factor, which is believed as the "point where art and technique meet to create another culture," (Flusser, Maillard & Maillard, 2002). Design is now everywhere in human's life from public to private spaces. Whatever could be a product could be touched by design. Therefore, designers with culture-based creativity can break the usual way of thinking to acknowledge the evolution of a new vision, an idea or a product (KEA, 2009). However, recently in the contemporary design world, design is no longer limited focusing only on products but more becoming a methodology, which is known as

Design Thinking. Design Thinking is a human-centered approach results in innovative impacts on the society development from a large scale of the design industry to a smaller scale of academic environments. Design students have applied design thinking to build up their creative confidence (Kelley & Kelley, 2013; Brown & Katz, 2019). Moreover, Design Thinking also can create a multidisciplinary space in which collaboration will blend the designers' creativity with people's needs and a technological possibility to enable a business strategy to capitalize upon market opportunities (Brown, 2008; Brown & Katz, 2019).

From that point of view, the study focuses on Design Thinking as a crucial platform to build up a culture-based product design process, which can be applied to transform cultural features into modern product design. Moreover, product design with incorporating the cultural features can probably help attract young generations to appreciate the traditionally cultural customs and heritages.

2. Literature Review

2.1 Culture-based creativity

KEA (2009) developed the concept of culture-based creativity, which originated from art and cultural productions or activities "which nurture innovation", not only just "artistic achievements" but also "creative content" for broadband networks, computers and consumer electronic equipment. Moreover, they believed that culture-based creativity could "highlight the elements of culture which trigger creativity". A distinction between culture-based creativity and innovation is also proposed, "to highlight the specific contribution of culture". In order to "characterize" the connection between culture and creativity, the concept of "culture-based creativity" was developed (1) to emphasize the important of creative talents; (2) to recover the meaning of creativity; and (3) to distinguish creativity from innovation (KEA, 2009).

When discussing culture from the perspective of time and space, He (1992) divided "cultural space" into three structural levels: the external, tangible and visible "outer level", the "middle level" of human behavior rites, and regulations in the form of words and language; and the "inner level" of the manifestation of human ideologies. Then more than ten years later in 2003, in a dialogue on culture-based knowledge towards new design thinking and practice, a Hong Kong-based designer Benny Ding Leong mentioned that "spatial perspective of culture" (Figure 1) as one of his research tools. He said it was a manageable framework "to visualize and capture the fluid concept of culture", and helped him to identify the research focus. Using that framework could bring him the concentration on to the "inner" level of traditional Chinese culture research (Leong & Clark, 2003).

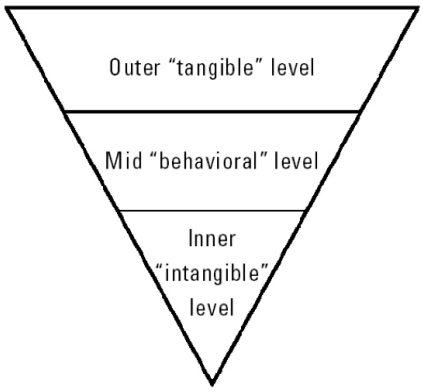


Fig. 1. The "spatial perspective" of culture (He, 1992).

Culture-based creativity is a crucial attribute of a post-industrial economy. It can help the development of products and services meet citizens' expectations or create these expectations. It is considered as "fundamental means for industry and policy decision makers" to embrace and implement more the concept of "user-centered strategies" rather than producing things but providing services (KEA, 2009). It also plays a leading role in provoking social innovation by helping "to promote well-being, to create lifestyle, to enrich the act of consumption, to stimulate confidence in communities and social cohesion". Moreover, it makes a big contribution "to product innovation, to branding, to the management of human resources and to communication."

2.2 Cultural design models

There are various reasons that determined the product consuming, including "practical functions of the product, cultural meanings,

aesthetics values, and emotional aspects." Emotional aspects of a product hold an important role in triggering consumers to buy a specific product as it might "evoke effective resonances". One of those might come from the cultural meanings. Every country has its own distinctive and prosperous cultural background, which is always considered as a precious resource of inspiration (Wang et al., 2013). In the 1970s, there was a speedy development in embracing culturally oriented goods and design "as a mean to attract consumers". Therefore "culturally sophisticated products were preferred rather than technological attributes in the 1980s" (Sparke, 2013). Nowadays, culture-based product design is generally mentioned as a creative strategy when some companies and design studios used symbolic value especially national cultural elements in product design to attain a better competitive advantage in the market (Clifton, 2011).

There are many studies revealed that there is an increase in product consuming for symbolic meaning, feelings of pleasure, enjoyed imagery, and aesthetic demand more and more than just for practical or functional needs (Holbrook & Hirschman, 1982; Ravasi et al., 2012; Verganti, 2009). For culture-based branding, Holt (2004) suggested cultural principles for companies, which are aimed "to build up an iconic brand to differentiate themselves to other competitors and also express their identity," (Wang et al., 2013). In the global market, culture-based products guide to make the distinctions instead of uniformity of aesthetic and content (Scott, 2004). Moreover, the intangible value of a product such as emotional arousing, humor, cultural meanings can persuade for the faith of customers to a company (Celaschi et al., 2011; Asokan & Payne, 2008). In summary, transforming cultural features into product design is a potential and future movement in product development, which is also under the impact of culture-based creativity.

2.3 Design Thinking process

Design Thinking process is best described metaphorically as a system of three spaces: Inspiration, Ideation, and Implementation; which separate different sorts of related activities that together might form a continuous sequence of innovation (Brown, 2008). The Inspiration space is for the circumstances, which might be a problem, an opportunity, or both. It is where the search for solutions gets motivated. The Ideation space is to generate, to develop, and to test ideas that might lead to potential solutions. Finally, the Implementation is "for the charting of a path to market" (Brown, 2008).

With a focus on innovation, creativity, critical thinking, problem solving, communication and collaboration, Design Thinking was taken as learning approach to Schools Research Project to prepare for future students with 21st Century Skills (Carroll et al., 2010). The Design Thinking process includes six key components: Understand, Observe, Point of View, Ideate, Prototype, and Test (Figure 2). The six key components are those developed by the Hasso Plattner Institute for Design in Stanford University, but other design process might have a slight difference.

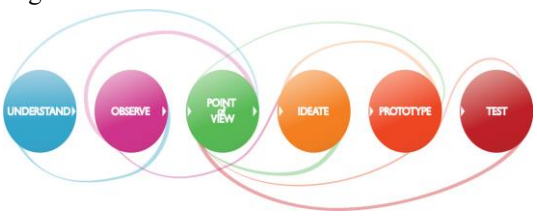


Fig. 2. The six key components of the Design Thinking process (Carroll et al., 2010).

3. Culture-based product design with Design Thinking

This stage of the research generated three spaces in Design Thinking process (Brown & Wyatt, 2010) (Inspiration, Ideation, and Implementation) with six Design Thinking phases proposed by Carroll et al. (2010) (Understand, Observe, Point of View, Ideate, Prototype, and Test) and Three Levels of Culture Theory (He, 1992; Leong & Clark, 2003) to develop a systematic framework for transforming cultural features of Vietnamese traditional Lunar New Year cuisine to ceramic tableware. There were different creativity activities and tools introduced as hands-on practices in different phases to help participants conduct an implication of design-thinking process and achieve specific tasks in each phase.

In Phase 1 – Understand: participants conducted pre-research on culture with literature review, data collection and group discussion in order to understand the fundamental relevant knowledge on cultural objects. In Phase 2 – Observe: participants were required to do a market survey following the three levels of culture (Outer, Middle and Inner Levels) to comprehend deeper customers' behaviors, needs and insights as well as contemporary technologies and cultural products on the commercial market. In Phase 3 – Point of View: participants with data analyzing figured out the customers' needs as well as narrowing down the design problem, in this case for ceramic tableware. In Phase 4 – Ideate: participants were instructed to use a various collection of hands-on practices with creativity tools such as: Affinity Diagram Method, Lotus Blossom Brainstorming Method, Collaborative Sketching (C-Sketch), AEIOU & 5W1H, Scenario & Storytelling, to diverge, converge and develop conceptual idea solutions. Finally with Phase 5 – Prototype and Phase 6 – Test: participants were required to come out either virtual or physical prototypes (rapid prototypes and then 1:1 scale prototypes) for testing with Value Opportunity Analysis (VOA) (Cagan & Vogel, 2012) to help participants ensure if their design solutions could meet customers' needs. Figure 3 demonstrates the framework of this stage, which is based on three main spaces of Design Thinking with six phases and three levels of culture.

Define design problem

Space 1: Inspiration	Phase 1 **Understand**	Cultural Research	Cultural Object		
	Phase 2 **Observe**	Cultural Market Survey	Outer	Mid	Inner
	Phase 3 **Point of View**	Define Customers' Needs	Product Design (Ceramic Products)		
Space 2: Ideation	Phase 4 **Ideate**	**4.1** Brainstorming & Classification	Affinity Diagram Method		
		4.2 Divergence & Convergence	Lotus Blossom Method		
		4.3 Mashing up with Cultural Levels	Outer	Mid	Inner
		4.4 Group-structured brainstorming	Collaborative Sketching		
		4.5 Scenario Building	AEIOU	Persona	Storyboarding
Space 3: Implement ation	Phase 5 **Prototype**	Prototype	Virtual	Rapid	1:1
	Phase 6 **Test**	Test	Test I	Test II	Test III

Fig. 3. The systematic framework of the Stage 3: Applying Design Thinking Process with Culture-based Inspiration in Transforming Cultural Features of Vietnamese Traditional Lunar New Year Cuisine to Ceramic Tableware.

3.1 Phase 1 – Understand

After the design problem had been designated, participants who attended this design thinking process were required to: (1) carry out a cultural research for foundational comprehension based on three questions: What is the cultural object? How does it influence the customs and daily products? Is there any cultural product design in our daily life? Therefore the participants could get an overall understanding about the cultural object with its background as well as the influenced customs; (2) present the pre-research before teammates which are from cross-disciplines and conduct a group discussion for a more extensive interpretation of the problem.

3.2 Phase 2 – Observe

With the foundational comprehension from Phase 1 and followed by three levels of culture (Outer, Middle and Inner Levels), participants carried out a market survey with an online field trip to several commercial websites on ceramic tableware in Vietnam in order to verify if there is any possibility of ceramic tableware with cultural features from Vietnamese traditional Lunar New Year cuisines available on the Vietnamese market. Moreover, they interviewed some prospective customers to understand their behavioral and reflective insights. This was also one of the significant features of Design Thinking: human-centered approach (Brown, 2008; 2019).

3.3 Phase 3 – Point of View

Participants analyzed the output data from two previous phases to make a narrower focus on the design problem and define the customers' needs.

3.4 Phase 4 – Ideate

Step 1: Brainstorming & Classification: Affinity Diagram Method. After conducting the market survey, participants were asked to write down all keywords relating to cultural topic of Vietnamese traditional Lunar New Year cuisines on post-it papers. After that, they categorized them in groups of issues. This activity helped participants focus on the potential group of issues, which could meet the customers' needs and be applied in the real market.

Step 2: Divergence & Convergence: Lotus Blossom Brainstorming Method. Participants set cultural topic in the center of Lotus Blossom Map, and then fill the first layer of boxes with main keywords from the previous step of Affinity Diagram Method. Those main keywords in the first layer of boxes would be set as main topics in the center of the second layer for divergence. Following those new central keywords, participants figured out more keywords to expand the map until it was completed. Finally, the convergence of the Lotus Blossom Map would be started from the outmost layer towards the center. With the central keywords of each layer, two other keywords would be chosen for the idea combinations. There would be 8 idea combinations from the final map. They would be written in the format: "Design topic = Keyword 1 + Keyword 2 + Keyword 3 +…+ Keyword n."

Step 3: Mashing up with Cultural Levels: 3 Levels (Outer, Middle, and Inner). For the purpose of concentration on cultural topic, each of the idea combination from the previous step of Lotus Blossom Brainstorming Method was mashed up with one cultural level form three levels of culture. For example, a new idea combination would be re-written in the format: "Design topic A = Keyword A1 + Keyword A2 +…+ Keyword An + Outer Level." The others might be "Design topic B = Keyword B1 + Keyword B2 +…+ Keyword Bn + Middle Level"; "Design topic C = Keyword C1 + Keyword C2 +…+ Keyword Cn + Inner Level."

Step 4: Group-Structured Brainstorming: Collaborative Sketching. From the new idea combinations got in the previous phase of Mashing up with Cultural Levels (Outer, Middle, and Inner) participants would write down that new idea combination on the top of the sketch paper and performed a round of collaborative sketching. They would not have any communication during conducting the Collaborative Sketching. At the end of this activity, they would stick all the sketches on the wall to present about their conceptual sketches and ideas. At this moment, they would discuss more about all the conceptual sketches they got from a round of Collaborative Sketching, and then they would vote for three most potential concepts for next steps of Ideation.

Step 5: Scenario Building: AEIOU & 5W1H, Persona & Storyboarding. From the conceptual idea chosen in the precious step of Collaborative Sketching, participants would use some methods or techniques to build up the scenarios in which the products would meet customers' needs. AEIOU (standing for Activities, Environments, Interactions, Objects, and Users), 5W1H (standing for Who, What, When, Where, Why, and How), Persona (with more detailed characteristics such as: name, gender, occupation, education, hobby, and personality, etc) and Storyboarding (with six panel framework and a brief description based on "who, where, what, when, why, how") are some methods suggested for visually establishing more detailed development for potentially conceptual design solution.

3.5 Phase 5 – Prototype

Participants would make: (1) virtual prototypes by detailed sketching or 3D modeling rendered images; (2) rapid prototypes with paper or simple and cheap material to quickly model up a physically prototyped product; (3) a group discussion with virtual prototype and rapid prototype to evaluate and refine for a better solution, after that a 1:1 scaled prototype by 3D printing with refined details and shape for a better image of conceptual solutions for next step of Implementation.

3.6 Phase 6 – Test

Following three times of prototyping, participants would make three times of testing: (1) The first time was to check if the conceptual sketches from previous phases could be developed after the group discussion about the possibilities and limitations. (2) Getting feedback form group discussion through rapid prototypes might lead to more ideas for improving or developing the product solutions in the real commercial market. (3) At the final testing, the 3D printed conceptual product at the scale 1:1 with refined details and shape would be used to take a qualitative survey with Value Opportunity Analysis (VOA). An in-depth interview would be conducted with a potential customer for more feedback to enhance the conceptual product in Implementation. This phase is to ensure the

possibility of the conceptual product as a culture-based product design.

Figure 4 shows a Value Opportunity Chart, which would be used to evaluate how product might meet target customers' needs or insights for usefulness, usability, and desirability. The chart lists 7 classes of Value Opportunity with its attributes in a column. The values are measured in a qualitative range and are described as low, medium, and high for each attribute. If a product did not meet any level of that attribute, no line is drawn (Cagan & Vogel, 2012).

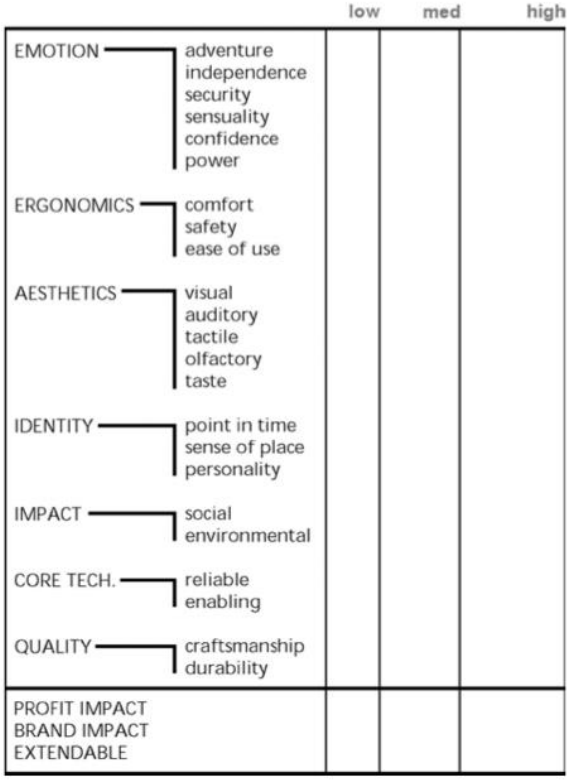


Fig. 4. Value Opportunity Chart (Cagan & Vogel, 2012).

4. Results and discussions

Five Vietnamese graduate students from different departments in Ming Chi University of Technology (New Taipei City, Taiwan) conducted this Stage 3 in one-day mini-workshop on May 5th, 2018. Some parts of the process were conducted after the workshop.

There is a multi-disciplinary collaboration in the group of five participants who joined to demonstrate this implication of design thinking in culture-base product design process. The demographics of this group functionally imitated a "typical company" in its small scale with roles and responsibilities:

* Design Team: including two graduate students from Industrial Design; both of them used to work in Vietnamese companies producing ceramic products. These team members are mainly in charge of designing the products, from the conceptual to developed sketches and models till the sample products.

* Technical Team: including two graduate students. One is from Industrial Engineering and Management; his major is about Ergonomics. The other is from Safety, Health and Environment Engineering. These team members are mainly in charge of technical manufacturing of the products.

* Business Team: including one graduate student from Business Administration. This team member is mainly in charge of business model and profitable abilities of the products.

Moreover, for the culture-based advantages, there is also a multi-regional collaboration in this group. They are from the North of Vietnam (Ha Nam Province), the Middle of Vietnam (the old capital Hue City, the newly developed Da Nang City), the South of Vietnam (Ho Chi Minh City), and one is Guangdong Vietnamese from China Town (Ho Chi Minh City). This interestingly influenced the diversity of the cuisine cultures and customs in the group.

4.1 Phase 1 – Understand

The group of five participants conducted a research for fundamental knowledge about Vietnamese cuisine in Tet – the Lunar New Year in Vietnam. Firstly, the team leader presented her pre-research before other team members, based on three questions: What is Vietnamese traditional Lunar New Year cuisine? How does it influence their customs in using ceramic tableware? Is there any daily life ceramic tableware designed with cultural features of those cuisines? After that, the team discussed more on the research to help other teammates understand deeper the reality of Vietnamese cuisine and customs for Tet among different areas in Vietnam, such as: main traditional cuisines, cuisines required for ancestor worship, activities during the time of "eating Tet", eating-style diversity in various regions in Vietnam (the North, the Middle, the South of

Vietnam, and in a typical Chinese Vietnamese family), etc.

4.2 Phase 2 – Observe

Based on the Understand phase, the group conducted a market survey to learn if there is any application of Vietnamese cuisine to ceramic tableware on the commercial market, especially in export market. With human-centered spirit, they also interviewed potential customers to understand their behaviors in using ceramic tableware, especially Vietnamese ceramic tableware. This observation encourages the group to develop a sense of empathy (Carroll et al., 2010).

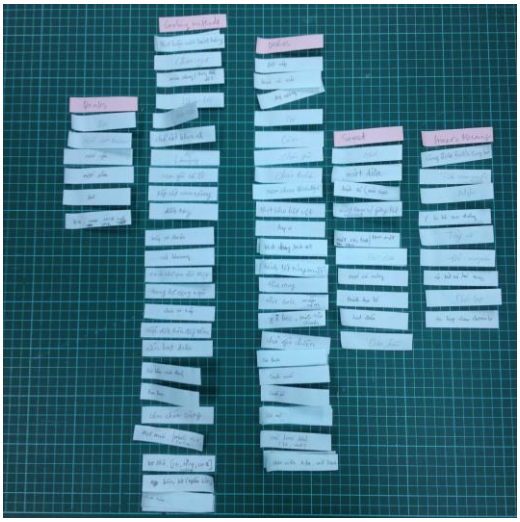
4.3 Phase 3 – Point of View

After the group learned form Phase 1. Understand and Phase 2. Observe, they developed a Point of View that focused on potential customers' needs and insights (Carroll et al., 2010). In this case with culture-based product design, the design problem was narrowed down through their research: (1) there was a lack of design in Vietnamese ceramic tableware market especially for export purposes, (2) Vietnamese young people prefer second-hand Japanese industrial ceramic tableware for the cheap prices and variety in design, (3) the Vietnamese cultural features were often exploited with very old-fashioned concepts and images.

4.4 Phase 4 – Ideate

Step 1: Brainstorming & Classification: Affinity Diagram Method. With new knowledge after the market survey and defined design problem from previous steps, the five participants in the group wrote down all relevant keywords on post-it papers and categorized into groups. They came out totally 71 keywords and grouped into 5 themes: Traditional dishes, Cooking methods, Drinks, Sweets, Cultural Meanings (Figure 5).

Step 2: Divergence & Convergence: Lotus Blossom Brainstorming Method. The participants set Vietnamese traditional Lunar New Year cuisine (coded "VN Tet cuisine" in short) – the cultural topic – in the central box of Lotus Blossom Map, then fill 5 main keywords from the previous categorized groups. They need 3 more to complete the very first level of the 9-window-map. These 8 keywords would be the central keywords of the second level 9-window-map to be continued for divergence. After fulfilling the whole map of 3 levels of 9-window-map, they came out 8 idea combinations (Figure 6).



Traditional dishes	Cooking methods	Drinks	Sweets	Cultural meanings
bột nếp	thịt luộc cuốn bánh tráng	bia	mứt	cúng đưa rước ông bà
bánh củ cải	chua ngọt	nước ngọt	mứt dừa	tình cảm gia đình
lạp xưởng	màu vàng	nước yến	bánh tổ	mặn
tré	lột ăn liền	nước sâm	mứt tam vị	bộ bộ cao thăng
cà ri	hầm mềm	trà	làm mứt	tẩy uế
chân giò	chả cắt khoanh		hạt dưa	đó là may mắn
cháo thánh	để lâu ngày		mứt củ năng	ăn bất cứ lúc nào
nem chua Bình Định	nem gói lá ổi		bánh kẹo Tết	phức tạp
thịt kho hột vịt	xếp cắt nem cúng		hạt điều	tụ họp nhau chuẩn bị
lạp vi	đính tay		dưa hấu	
bánh chưng	hấp chiên			
bánh tét trứng muối	cắt khoanh			
tôm rang	canh khổ qua dồi thịt			
thịt luộc mắm nêm	trang trí cọng ngò			
gà luộc muối tiêu chanh	xếp đĩa tròn đồng tâm			
chả giò chiên	cắn hạt dưa			
canh miến	gà cách thủy			
canh củ	rau luộc			
các loại khô	cơm chén cúng			
dưa món kiệu	thịt muối			
mỡ hành	bò khô sợi tăng cục			
	bím bò			
	nem rán			

Fig. 5. Affinity diagram.

Step 2: Divergence & Convergence: Lotus Blossom Brainstorming Method. The participants set Vietnamese traditional Lunar New Year cuisine (coded "VN Tet cuisine" in short) – the cultural topic – in the central box of Lotus Blossom Map, then fill 5 main keywords from the previous categorized groups. They need 3 more to complete the very first level of the 9-window-map. These 8 keywords would be the central keywords of the second level 9-window-map to be continued for divergence. After fulfilling the whole map of 3 levels of 9-window-map, they came out 8 idea combinations (Figure 6).

Step 3: Mashing up with Cultural Levels: 3 Levels (Outer, Middle, and Inner). From 8 idea combinations got from the previous phase (Lotus Blossom Brainstorming Method), each

participant chose one idea combination and one cultural level to mash up. Therefore, there would be 5 newly culture-based idea combinations (Table 1).

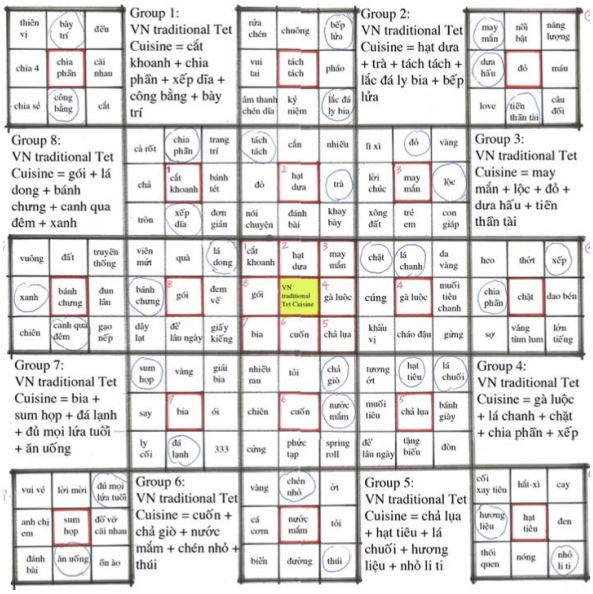
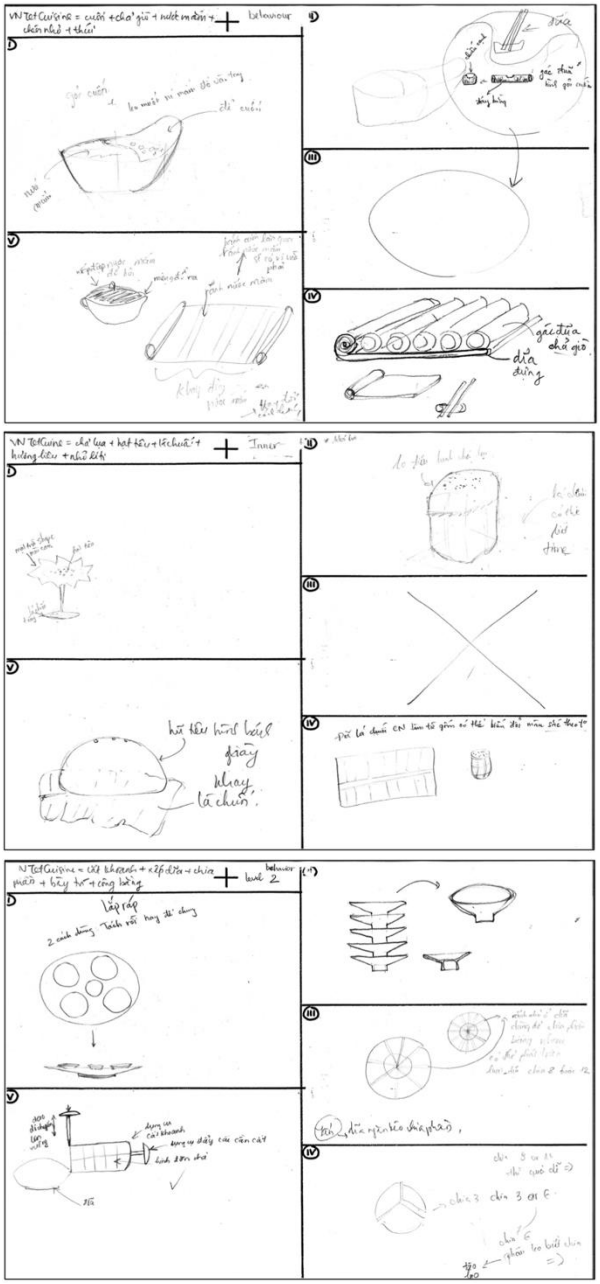


Fig. 6. Fulfilling the whole Lotus Blossom Map with the cultural topic: Vietnamese traditional Lunar New year cuisines.

Table 1. Mashing up 5 idea combinations with Cultural Levels.

	Idea combinations	Cultural Levels
1	VN Tet cuisine = roll + spring rolls + fish sauce + small bowl + smelly	Middle
2	VN Tet cuisine = pork bologna + peppercorn + banana leaf + spice + tiny	Inner
3	VN Tet cuisine = ring cut + arrange plates + partly divide + decorate + equal	Middle
4	VN Tet cuisine = boiled chicken + lemon leaf + chop + partly divide + arrange	Middle
5	VN Tet cuisine = lucky + fortune + red + God-of-Wealth money + watermelon	Inner

Step 4: Group-Structured Brainstorming: Collaborative Sketching. With those 5 newly culture-based idea combinations, participants performed one round collaborative sketching in 25 minutes. After finishing, they came out 25 sketches (5 sketches for each of 5 newly culture-based idea combinations) in which they voted for 3 final conceptual sketches for the next phase of Design Thinking Process (Figure 7).



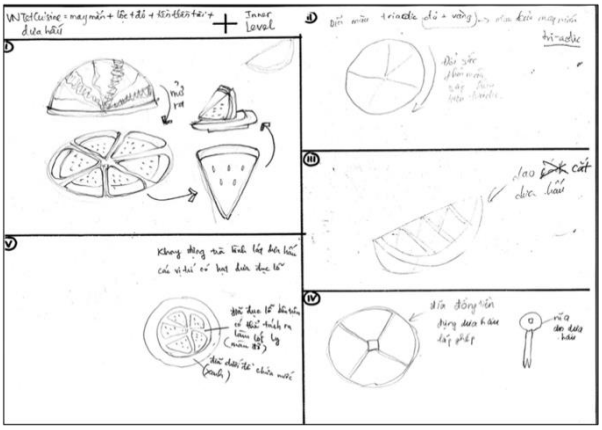


Fig. 7. 5 newly culture-based idea combinations from 25 sketches.

Step 5: Scenario Building: AEIOU & 5W1H, Persona & Storyboarding. From the final conceptual idea from the collaborative sketching (Step 4), with the case Spring Roll Sauce Bowl, participants used 5W1H & AEIOU to get the detailed and imaginative approach to potential customers who might use the product in some situations. In this case, these methods could help students understand more about the possibility and convenience of using the Spring Roll Sauce Bowl with a purpose of avoiding smelly sauce on hand (Figure 8).

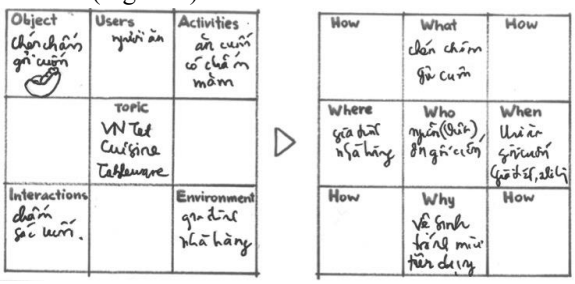


Fig. 8. Using 5W1H and AEIOU to approach to potential customers.

With detailed and contributive information from 5W1H & AEIOU, participants carved more clearly with the personas that would be potential customers of their product design by developing storyboards visually (Figure 9). In this case with Spring Roll Sauce Bowl, they described the scenario in which a young lady named Que Que (who) wanted to eat spring roll in a Vietnamese restaurant (where) for dinner (when). However she was afraid of smelly sauce on hand when holding and eating the spring roll (why), so she used the Spring Roll Sauce Bowl (what).

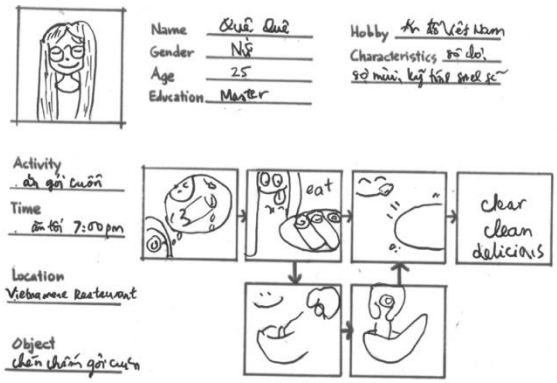


Fig. 9. Using Scenario and Storytelling to have a better imagination of potential customers.

4.5 Phase 5 – Prototype

Participants in Design Team conducted this phase three times to refine the conceptual product whether it could fulfill the customers' needs or requirements as products of culture-based ceramic tableware which easy to use for daily purpose in family, restaurant, and for tourist souvenir as well. Figure 10 would show more about the Spring Roll Sauce Bowl with virtual, quick and 1:1 prototypes.

Fig. 10. Prototypes (virtual, rapid and 1:1 scale) of Spring Roll Sauce Bowl.

4.6 Phase 6 – Test

Participants in Design Team had team discussions twice with virtual and rapid prototypes before taking target customer test with 1:1 scale prototype and Value Opportunity Analysis. (VOA). This phase is to ensure the

possibility of conceptual product Spring Roll Sauce Bowl that was persuaded as a product of culture-base ceramic tableware (Figure 12) compared with other designs in the real market (Figure 11).

Fig. 11. Existing commercial products in the market.

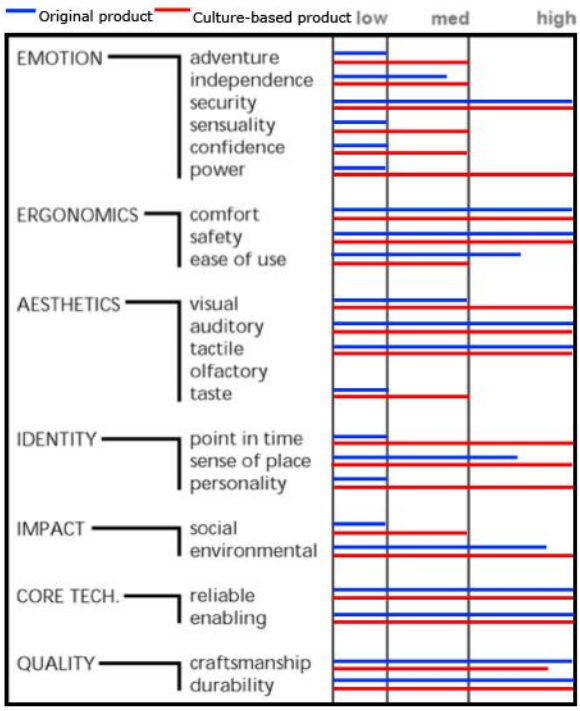


Fig. 12. Value opportunity analysis for the conceptual product Spring Roll Sauce Bowl.

The chosen target customer is a Vietnamese female graduate student also from Ming Chi University. She is 23 years old, and from Industrial Engineering and Management department. She is quite introverted and cautious but interested in Vietnamese traditional folk games and cuisines. Figure 12 shows among many specific Value Opportunities, Emotion and Identify are much more value added for the culture-based product rather than the original product. While other Value Opportunity is almost the same between the culture-based product and the existing commercial product. The target customer also shared her belief on the importance and challenge of storytelling in culture-based products for approaching customers as well as educating for the new culture-based impact.

5. Conclusions

This study generated three spaces in Design Thinking process (Brown, 2008; Brown & Wyatt, 2010) (Inspiration, Ideation, and Implementation) with six Design Thinking phases proposed by Carroll et al. (2010) (Understand, Observe, Point of View, Ideate, Prototype, and Test) and Three Levels of Culture Theory (He, 1992; Leong & Clark, 2003) to develop a systematic framework for transforming cultural features of Vietnamese traditional Lunar New Year cuisine to ceramic tableware. Understand, Observe, and Point of View in the first space (Inspiration) help participants understand the fundamental relevant knowledge on cultural objects, comprehend deeper customers' behaviors, needs and insights as well as contemporary technologies and cultural products on the commercial market, and figured out the customers' needs as well as narrowing down the design problem. In the second space (Ideation), there are many creativity tools such as: Affinity Diagram Method, Lotus Blossom Brainstorming Method, Collaborative Sketching (C-Sketch), AEIOU & 5W1H, Scenario & Storytelling for participants to diverge, converge and develop conceptual idea solutions. Finally in the third space (Implementation), Prototype and Test encourage participants to come out either virtual or physical prototypes (rapid prototypes and then 1:1 scale prototypes) for testing with Value Opportunity Analysis (VOA) to help participants ensure if their design solutions could meet customers' needs. The implication of Design Thinking to Culture-based Product Design Process is a two-dimension framework combined from three levels of culture as the vertical dimension, and Design Thinking process as horizontal dimension. Therefore, the study might produce a different approach in which cultural features still focusing but keeping as the main and strong target for designers to conduct divergence and convergence in more effective ways.

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