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CREATING A FOOD MUSEUM IN BAAN SAAN, PHUKET: A CASE STUDY IN MATERIAL CULTURE AND MEDIA TECHNOLOGY

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ABSTRACT

This study utilizes the lens of design anthropology to describe the phenomena which occurred when community members underwent a process to transform their house into a public museum. The researchers' objective was to help the Baan Saan community, located near Phuket Old Town, develop a house museum. The research team decided to install embedded media technology—sensors and IoT technology—in the community space in order to display the historical background. Local foods were chosen to be the main topic of the exhibition. The community are historically Hokkien Chinese migrants, who brought their food recipes from China. The foods are not only local products on sale in the community, but also the result of a process which combines the utilization of local knowledge and the use of materials such as kitchenware, containers, and other equipment to prepare the ingredients. The authenticity of these foods depends on the process in which the knowledge about, and stories of, the materials are communicated. This study developed an innovative prototype media technology system to communicate the authenticity of the foods by linking them with the biographies of interrelated materials. Moreover, the prototype became an intermediary between community members, lab members, and visitors. This cooperation supports the possible future extension of the exhibition to other projects.

Keywords: Material culture; media technology; food exhibition; Phuket Old Town

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1. INTRODUCTION

In this study, a museum project was initiated in the Baan Saan community located near to Phuket Old Town. Phuket is an island province located in southern Thailand. It has been widely known as a place of tin mines since the reign of King Rama III[1] and developed from a tin-mining area to a tourist destination in the 1990s. The culture of Hokkien Chinese immigrant tin-miners became dominant in the area, and has been promoted recently for tourism purposes by the Provincial Administrative Organization (PAO) and the Tourism Authority of Thailand (TAT). Phuket's Hokkien Chinese cultural identities are communicated through various

[1] King Rama III reigned from 1824 to 1851.

touristic events such as Baba wedding ceremonies[2], an occasional walking street market, and various food festivals[3] which showcase authentic local foods. Phuket Old Town, located by the main canal for naval transportation, became the centre of the Chinese culture since it was the place where Chinese merchants opted to create shophouses for exchanging everyday products. These historical buildings are suitable for cultural heritage tourism. The local government thus invests in various tourism projects in the Old Town area to promote the tourism industry and the values of Chinese-Thai culture.

The Baan Saan community has not received much attention in terms of tourism development. It has received less support from local government due to its relatively minor historical importance and small number of examples of heritage architecture compared to the Old Town area. However, the community has been continually developed in parallel with the Old Town. Since the reign of King Rama VI[4], the community has been the central market to exchange food ingredients, day-to-day products, and paraphernalia for use in religious ceremonies. Most of the shophouse owners in this area are Chinese descendants who still practice their inherited cultures. The community members believe that they have adequate cultural resources for heritage tourism development. In 2019, to develop the area, a group of community members made a coalition with local scholars, university lecturers, government officers and politicians. The local government then assigned a committee to propel the Baan Saan development, and the members of the committee submitted documents applying to join the network of Creative Economy Agency[5] (CEA), Thailand. Subsequently, the Baan Saan community was recognized officially in the development plan of the local government.

The Baan Saan community members wanted to develop their locality into a creative city. Based on their local history and culture, their representatives proposed the idea to create new products and services such as souvenirs, art and crafts products, graphic designs, and the guide to historical-touristic routes. Local food was chosen to be one of the main topics which had the potential to portray the local way of life through its production and consumption process. The words '*baan saan*', used among the overseas Chinese in Southeast Asia, mean "market", influenced by the Persian word "bazaar". The fresh market, located in the center of the Baan Saan community, is considered part of the Phuket Old Town district, and is the oldest market in Phuket. Every day, various goods and ingredients are transported to the market and are purchased by people in the communities nearby. Moreover, it is found that many members of the Baan Saan community have inherited the skill of cooking traditional Chinese foods and desserts such as *porpia, ew pueng, dim sum, o-aew, loba,* and *arpong*. Their culinary heritage has been passed from one generation to another, and the local recipes have become a cultural resource which is now used to promote gastronomy tourism. In this regard, culinary culture represents an essential part of the identity of the Baan Saan community and Phuket Old Town.

Many Chinese families in the Baan Saan community have ceased their businesses since younger generations have chosen to work in other places. Some houses are abandoned so the members of the community have started to think about new ways to transform their old shop houses into museums which can generate income from tourism. The focus of development is to seek methods of preserving the renowned products of the community—especially foods and sweets—and develop them properly for tourism, which requires new packaging, promotions, advertising, and services. This development project has therefore been conducted by the authors of the present paper, working as a research unit from the local university, Prince of Songkla University, Phuket. The exhibition is one of the projects supported by the local government and CEA. It is not a commercial contract with a budget to design the exhibition, but a pilot study based on cooperation between the university and the local community. To communicate the historical background of culinary culture in the Baan Saan community, the food exhibition was designed for installation in the community. The researchers selected two representative foods—*ew pueng* and *ang ku* (Figure 1). These sweets are everyday desserts of Hokkien Chinese immigrants passed to Chinese-Phuket descendants. They have also inherited religious beliefs through their food consumption, such as venerating ancestral spirits with *ang ku*, celebrating

[2] The term Baba is used to refer to an ethnic group representing children born of marriages between Chinese migrants and Thai people. The wedding ceremonies thus included both Chinese and Thai cultures. The wedding ceremony is considered a tourist attraction because of the amalgamation of Chinese and Thai identity. The local community, with TAT cooperation, conducts public Baba wedding ceremonies for any young couple who wants to apply for the experience of local culture.

[3] The food festivals conducted recently in Phuket are not historic traditions, but the festivals aim to promote local foods for tourism campaigns. The food festivals became prevalent since the 2010s, led by the walking street fair conducted in Phuket Old Town. In the festivals, many food recipes are adjusted to conform with the tastes of foreigners. The adaptation is noted to reduce the spiciness and upgrade the packaging of local traditional street food.

[4] King Rama VI reigned from 1910 to 1925.

[5] Creative Economy Agency is a public organization which has a role to drive the creative economy—the industries related to arts and design—in various local areas of Thailand. This organization is managed under the supervision of the Office of the Prime Minister. The communities which become members of the CEA can access the network to exchange resources and knowledge in developing the creative industries. Baan Saan community is qualified to be a member of CEA because of its cultural resources and economic capital impact on the Phuket tourism industry.

new-born children with *ew pueng*, and conducting funeral receptions with Hokkien *mee* (noodles) which symbolize the longevity of the participants.

Figure 1: Photos of *Ew pueng* (left) and *Ang ku* (right)

The researchers worked with the interactive designers and engineers to embed media technology within the community space. To create an exhibition without drastically changing the physical space, in such a place, the designers chose to set up small instruments, namely sensors, voice-user interface, projection mapping, and tablets. These instruments display content relating to the displayed subjects by projecting graphical images onto the surface of the material itself. Consequently, the displayed objects could be placed as usual, and could tell visitors their stories through the embedded media technology.

However, the cultural distance between a community space and a design lab can result in misunderstandings in the use of new technology. Community members may not always fully understand the purposes of the installation, or how to apply such technologies in their community space. Simultaneously with communicating this information to community members, designers and engineers must plan the schematics of the media systems, consisting of user interfaces, databases, and processors. In solving these problems, prototyping methodology becomes the main design toolkit which supports the process of communication between these two groups.

This study therefore describes the phenomena which occurred when designers and engineers brought this new technology to the local community. The research elucidates how prototype materials—displayed objects and media instruments—were mutually conceptualized throughout a design process centered around local culture and history.

2. THEORETICAL FRAMEWORK: MATERIAL CULTURE AND MEDIA TECHNOLOGY

In this research, the theory of material culture and media technology are utilized to study how the use of materials influences the human practices in the design process.

2.1 Material culture

This research utilizes the concept of *material culture*, in which the process of creating the meanings of things is emphasized. The term *things* refers to household objects which are a result of the integration of techniques, materials, and labor. The main objective of the intervention process was to create a food museum, and so foods was to be studied as material cultural objects whose meanings are created through a network of people and other materials. The process of material intervention, hence, was conducted to understand the phenomena which occur when new materials and media technology are introduced to the network.

The *material culture* discerns the association between time, space, object, and subject (Maurer, 2006, p. 25). In our environment, people are surrounded by both natural and manufactured materials. People have utilized these materials resulting in products and objects for subsistence. Through the processes of production and consumption, the meanings of things are formed subjectively and objectively (Hebdige, 2002, p. 81). Products are manufactured for selling in the market. Consumers then buy the products according to their lifestyles, social classes, religious beliefs, ways of life, and knowledge. Consumption becomes a way to express personal identity to the public. People who have a common identity tend to gather as a subgroup. Thus, the possession of things can have meaning in terms of sociality backed up by the cultural frame.

In general, people give specific meanings and functions to things. The meanings are not fixed. They can vary depending on the relationships between humans and things (Ingold, 2007, p. 14). These relationships could be reorganized to connect individuals with other people in society (Miller, 2008, p. 295). For example, the appearance of things can make people reminisce about their past events with family and friends. Some events are made remarkable by the appearance of a series of objects. When new materials are included in daily life, new memories could be additionally preserved. Humans recognize the meanings of materials culturally, socially, and economically by processes in which various objects in day-to-day life are mutually and reflexively perceived. This becomes a background of material culture, which affects individual perception in the materialistic world.

In sum, the meanings of things are created in two ways. First, people experience the utilization of things and designate connotative and denotative meanings. They express their identity through interaction with things (Clarke, 2021, p. 25). Second, the things themselves also have agency to influence human lives and actions (Tilley, 2007, p. 19). The things which are widely used in society for a period—e.g., antiques, products for daily life, arts and crafts, and foods—have meanings widely accepted among societal members. By this comprehensive meaning, people are usually nurtured with the understanding of how to handle the objects around them. In other words, the objects become the environment which influences human practices.

It is possible to introduce new technology to society as a new material. Besides, the culture of people in society should be prioritized in the process of technology adoption (Eglash, 2006, p. 334). People utilize technology to support their activities. Some technologies are widely used among specific groups and tend to be necessary objects for expressing the identity of groups, such as tech-savvy people with mobile gadgets, social media influencers with smartphones, and nomad programmers with laptops. However, in the case of a community, the perception of media technology not only concentrates on the market and global trends, but also connects to the cultural frame of the community members.

2.2 The use of media technology in museums

The exhibition aims to emphasize the learning process of the audience, who gain information from exhibited materials in the museum. The use of sign and print images close to the materials is a way to communicate knowledge. Nevertheless, the use of materials as central to the learning process in the museum is significant since the materials *per se* are potent to encourage audiences to raise questions, make discussions, and share their opinions (Hardie, 2015, p. 20; Kreps, 2015, p. 109). Therefore, the materials become media in a process called "object-based learning" (Schultz, 2018, p. 300). By utilizing materials in the learning process, the audience not only learns about the materials, but also studies other interrelated subjects (Cobley, 2022, p. 87). It is clear that the materials can initiate the correlated learning of subjects such as history, economics, politics, and technology. The audience, in their aspect, can freely initiate and prolong the learning activities. Teachers thus become facilitators in object-based learning rather than knowledge providers.

Additionally, the integration of media technology, namely, animations and videos, simulations, audios, and digital documents can support audiences in the learning process (Ocepek et al., 2013, p. 353). In utilizing media technology, the important key is how to create an engagement between audiences and learning environments (Moorhouse et al., 2019, p. 411). This influences the research in the field of education and technology to study the learning space and the use of smart objects in museums. There are myriad ways to utilize technology in museums, such as sensory rooms where audiences can interact with materials via body gesture recognition equipment and software (Garzotto et al., 2020, p. 216); smart objects in which game engines and distance sensors are integrated (Jimbu et al., 2020); toys with embedded sound recognition systems to support voice communication (Ligthart et al., 2020, p. 411); and a museum in which the additional data of the materials in exhibition can be retrieved through online applications and is shown in three-dimensional models (Harrington, 2020, p. 72). By integrating materials with technology, smart objects are created. It is open to audiences to interact and gain experience from materials without coercion (Voit et al., 2019, p. 7; Asakawa et al., 2019, p. 7). Consequently, engagement among materials, learning spaces, and audiences can be encouraged, since persons have different interests and styles of learning.

Internet of Things (IoT) can be a framework used for creating smart objects and interconnections among materials in the learning space (Nazari Shirehjini & Semsar, 2017, p. 13350). The IoT can support the communication between materials and audiences in two ways: first, passive communication, in which the contents of the materials are chosen by an automatic system (Lee et al., 2016, p. 200; Rao et al., 2017, p. 4); second, active communication in which the information about the materials is selected by audiences (Yousefi et al., 2015, p. 259). The IoT not only connects the transmission of information among things in the close environment, but also retrieves data from the internet (Aksu et al., 2018, p. 139). The IoT potentially transforms a museum space into a virtual space whereby the learning process can be prolonged.

This research hence uses IoT technology which aims to create the communication of knowledge via interactions between audiences and materials in exhibition. However, the interaction process should be simple

without distraction from the use of complicated software since the materials should be mainly focused on the learning process. Furthermore, this research aims to understand the role of technology and materials in the design process in which different groups of participants cooperate. The IoT with its potency to support communication between materials and humans may have a significant role in the design process.

3. RESEARCH QUESTION AND OBJECTIVES

In general, the media design in museums is evaluated by its success in transferring knowledge from the exhibited subjects to the audiences. However, the use of materials with media technology is potent to extend the museum space in various dimensions. To develop the cooperative space for design, is it possible to use the materials as a center to extend the exhibition in two axes: first, as an extension of social relations among designers, community members, and audiences, whereby the material culture is given a social foundation; and second, as an extension of the design process through time, both before and after the exhibition?

To answer the research question, the objectives of the study are as follows.

1. To investigate the mechanism of the design process when materials with media technology are applied.

2. To analyze the social relations among community members and the design team in the design process in which the materials in the exhibition are centered.

4. MATERIALS AND METHODS

This research conducted an ethnography between two cultural fields—the design studio and the Baan Saan community. It reveals the process of material culture in which similarities and differences of material meanings are outlined within the boundaries of these two interconnected fields (Drazin, 2021, p. 121). The historical data of food culture in Baan Saan community was periodically collected from interviews and participant observations from October 2020 to August 2021. Among various foods, two dishes were chosen—*ew pueng* and *ang ku*—in accordance with their distinguished historical and social engagement.

From the above-mentioned framework, this research focuses on Phuket foods as material processes that base the meanings of foods within the cultural frame of the Baan Saan community. The term *materials* also includes the interrelated equipment, ingredients, and social spaces where people produce and consume the local foods. Thereafter, media technology is introduced to the community members in order to communicate the historical background of foods. The prototype of the media technology was developed and brought to the testing process in the community.

The main methodology included interviews and participant observation to acquire ethnographic data. Snowball sampling was applied. The participants were chosen by their significant roles in the design process. Therefore, the researchers interviewed designers, engineers, and community members who potentially had roles in carrying the project forwards.

The interviews and participant observation were conducted in three social spaces. First, the researchers observed the process of prototype development in the design studio. The conversations among designers and engineers were documented while testing and sharing opinions about the prototype. Second, the researchers observed the testing of the prototype in the Baan Saan community, whose members could perceive the historical background of the materials used in the exhibition. In the community, the prototype was tested for around three months with ten participants. Third, the data was also gathered from participants who did not have experience with local Phuket culture. A temporary exhibition was set in a 16 square-meter room. Researchers invited 10 volunteers to the exhibition. The volunteers were aged from early 30s to late 40s. Each volunteer had 30 minutes to attend the exhibition and was interviewed retrospectively.

5. RESULTS AND DISCUSSION

This section explains culinary historical context of Baan Saan community, ethnographic data gathered from the prototyping process, and the discussion.

5.1 Cultural meanings of foods in Baan Saan: Baba sweets

The results demonstrate the social value of Phuket local desserts through their historical and cultural background. The aim of this research was to analyze the relationships between new media, materials, and things in the daily lives of participants. However, ordinary things can have specific biographies which influence ways of life socially, culturally, and economically (Kopytoff, 1986, p. 66). Particularly to this research, foods as

materials are central to the communicative process. The relational subjects—ingredients, utensils, recipes, knowledge of local people—were also included in the food process. This created a system whereby the perception of local foods is communicated.

As a result of the political conflict during the Qing dynasty in China and the opportunity to settle a new community in Thailand, Chinese people migrated en masse in the early 19th century (Mackay, 2012, p. 271). In the 1920s, the group of Chinese migrants in Phuket mainly originated from Fujian, located in southern China, and were known as the Hokkien Chinese ethnic group. Most migrants in the first influx were men who anticipated working in the tin-mining field, while the number of female migrants increased ten years later (Coughlin, 2012, p. 23). It can be seen that many Chinese men married with native southern Siamese women, and therefore caused an increase in mixed-race children, known as 'Sino-Thai', who were assimilated into the group of Thai people (Skinner, 1957, p. 3). In the south of Thailand, the Chinese migrants maintained the relationship between Penang and Phuket by establishing businesses in the tin-mining industry and exchanging the necessary economic resources between the two areas. The Chinese people in Phuket also brought various cultures from the Malay Peninsula to the south of Thailand. Intermingling cultures between Malay, Thai, and Chinese became day-to-day practices of people, especially the second generation following marriages between Chinese migrants and local people. "Baba" is a specific term used to address such second generations in Phuket, while the term "Peranakan" is widely used in other areas like Malaysia, Indonesia, and Singapore.

Baba traditional foods included *kopi* (coffee with condensed milk), *siew boi* (steamed pork dumplings), and different kinds of *punte kueh* (local sweets) for breakfast such as *khao niew heep* (sweet glutinous rice with Thai custard), *jia kueh* (deep-fried dough stick), and *pao lang* (grilled ground dried shrimp and coconut stuffed with sweet glutinous rice). Since most Phuket Baba men had to work in the tin mines, the culinary culture was much related to energy in the diet, as seen from the high protein and carbohydrate content. The sweets have descended from one generation to another and have become part of the food heritage of Phuket people as a whole.

Many Phuket local dishes are associated with cultures and traditions, signifying connotative meanings in their ways of living. The two most significant local desserts influenced by Chinese Baba culture are introduced in this study since they are profoundly associated with the cultural practices of Phuket traditions. *Ang ku kueh* (red tortoise desserts) are used in many overseas Chinese rituals and ceremonies to bless people with prosperous longevity. Traditionally, they are found accompanied by other similar significant sweets, such as *ang-i kueh, ang kan kueh,* and *ang tow kueh*, used in worshiping Chinese Gods at Chinese New Year and paying respect to ancestors in spirit festivals[6]. Another dessert with spiritual symbolism is *ew pueng* (fried glutinous rice with red pork, fried dried-shrimp, and fried onion). It is a savory sweet suitable for breakfast or an afternoon appetizer. Any Phuket Chinese families who have a one-month-old child would prepare a set of *ew pueng* with *ang ku kueh* to worship their god as a way to bless the child. After that, the two auspicious desserts are given as a propitious message to relatives. Then they would bless the child with an *ang pao* (red envelope containing money) as a gift in return. In such different occasions in Chinese traditions and culture, food is utilized as a meaningful symbol of Phuket people's ways of living and becomes an ethnic legacy continuing until modern times.

5.2 Desserts and material culture

In terms of material culture, the researchers have gathered information about local foods from community members. There has been an ideology about authentic foods in the mindset of the members. The ingredients, forms, colors, and tastes indicate the quality of authenticity. The foods with authenticity are valued as products for tourism. The community also wants to inherit the biography of authentic foods. Museums should communicate these concepts to their audiences.

> *Ang ku* should be made of glutinous rice. The dough is thin. The pattern created by the wooden mold is sharp. We use the word "ang" to refer to red in Hokkien Chinese language. Regarding *ew pueng*, the main ingredients are fried rice and black-bean sauce. The original version contains dried shrimps. (Chu[7], 65-year-old housewife, member of Baan Saan community, personal communication, December 19, 2020)

[6] Phuketians have inherited their culture based on the cosmology of Chinese people. The cosmology comprises the heavenly world, the earthly world, and the underworld. The festivals aim to create harmony among the three worlds. In the festivals, Chinese people venerate deities to bestow luck, prosperity, and fruitfulness of their agriculture. Some festivals aim to pay respect to ancestral spirits which entail good fortune to living people as well. The period to conduct festivals is following the Chinese lunisolar calendar which distinguishes important times on Earth by regarding the seasons—rainy season, spring, summer, dry season, autumn, and winter. In Phuket, the main festivals are Chinese New Year in the 1st month to celebrate the coming of spring season in China, the *Qing-Ming* in the 3rd month to venerate ancestral spirits at cemetery, the Ghost Festival in the 7th month to worship the spirits from the netherworld who are permitted to visit the earthly world, and the Vegetarian Festival in the 9th month to worship the deities of the North Stars.

[7] In order to maintain privacy and confidentiality, the names of all informants in this article are pseudonymous.

The research data of *ew pueng* cuisine was collected through the workshop conducted in 2019 while that of *ang ku kueh* was from the interviews and video clips. From the studies, various materials were important in the process whereby the authenticity of such foods are created. In the cooking process, the kitchen utensils also create an authentic meaning to the foods. Ploy, a member of Baan Saan community, of the third generation of a Phuket-Chinese family, decided to sell *ang ku kueh* during festive occasions.

> My grandmother left a rectangular wooden mold to form *ang ku kueh*. It is quite large. There are patterns on each side, small tortoise, large tortoise. *Ang khan* is longer than *ang ku kueh*. My aunt said that this mold is around 100 years old. When I try it to form *ang ku*, I can see its pattern is sharper than using a new mold. (Ploy, personal communication, July 29, 2021)

Kul, a 67-year-old retired teacher who previously taught Phuket history and Thai language in a high school, was one of the informants who participated in the discussion. She shared her life experiences as her mother's assistant in making Baba sweets during special occasions and festivals. In the 1960s, all sweets were made from scratch and each batch would require quite a lot of utensils to accomplish an exquisite dessert.

> Back in those times, our homemade sweets were quite famous among people in the Bang Niew neighborhood for their delicate tastes. My mother even had a treadmill at home to mill the glutinous rice flour. I still recall that I was the one who did the milling. First, I soaked the glutinous rice until it was puffy, then I gradually filled the treadmill with the rice and water and spun it till the flour came out. It was not easy to get a good-textured flour. My job was to mill the flour when my mother started to make sweets. When *Wan Wai Khanom-ii* (winter solstice) happened, my neighbor asked me to mill them one to two kilos of glutinous rice flour. I could make money from making and delivering it to the neighbor's homes. The dough from the treadmill could gain the authentic glutinousness, unlike the instant one. (Kul, personal communication, August 28, 2021)

The next two sections introduce the data observed from two fields—the media lab which produced the prototypes and the community in which the prototypes were brought to the testing process.

5.3 Prototyping: From media technology to home museum

This section discusses the use of media technology. The knowledge in technology was provided by Digital Media Lab, a research unit established by the College of Computing, Prince of Songkla University, Phuket campus. The lab's members were interactive designers, media creators, and anthropologists. In the design process, the role of the anthropologists was to collect the necessary information about Phuket food culture and the context of the Baan Saan community. The designers chose the appropriate technology for installing in the exhibition. The media creators calculated the quality and quantity of videos and sounds. They also chose the video format and conditions when the videos would be displayed. The process of prototyping required around three months to study the technology, design the content, and create the media.

5.3.1 Technology and space of the Baan Saan community

Since the exhibition was displayed in a house, the design team had an agreement to use lightweight technology which could enhance the way to communicate the biographies of *ang ku* and *ew pueng*. At first, projection mapping was chosen to be the main technique for this exhibition because the designer wanted to project the information onto the materials directly (Figure 2). This prototype could only receive information from one material; thus, the designer needed to produce 2 sets of prototypes to interact separately with *ang ku* and *ew pueng*. However, from the testing process in the community, it was clear that it was quite complicated for the community members to control the equipment by themselves. The content creator then supported the idea to select another technology for this project.

> Pom, 36-year-old content creator, member of the design team, said, "I think that the strong point in using a projector is to create the large-size videos. The size of projection depends on the brightness of the projector and the distance between the projector and screen. Thus, the size might be as large as possible if we find the appropriate space. If we only show a small image, it does not reflect the characteristics of the projection mapping." (Pom, personal communication, September 28, 2021)

Nonetheless, this does not mean that the projection-mapping technique is inappropriate to use within the space of the house. A house is not only a physical space, but also a social space in which the personal activities of the community members are integrated. Pin, one of the Baan Saan community members and the owner of a coffee shop located at the center of the street market, has an agreement to install a projector in front of her house. This extends the food museum to other related design projects. Although such technology was

not used in the design project at first, it might be an alternative way for the house owners to design related projects.

> I think it is interesting. The projector could be installed on the second floor of this house and project the videos onto the old Sino-European house at the opposite side of the street. We can conduct an event once a week and invite tourists to see the artworks. I can tell the school principal to ask elementary students to join us with their paintings. (Pin, personal communication, August 21, 2021)

Figure 2: The First Prototype—IR Sensor with Projection Mapping Technique

The technology should come with the scenario when house owners and audiences utilize it. Kon, the owner of a coffee shop and hostel, has used some parts of his building as an art gallery. Kon permits artists to display artworks in front of the coffee shop and on the upper floor of the hostel. He then thought about the utilization of his space.

> The projection mapping is appropriate for a one-day art exhibition. The artist can give advice to the audience in case there is a problem with the system. The electricity wires and location of the projector should be prepared so as not to disturb the art experience. If we use a smaller display rather than a projector, we can place it on the wall. It might be more appropriate with day-to-day use. (Kon, personal communication, August 21, 2021)

The space includes a time-frame. The period when participating in the exhibition should be prioritized.

> Audiences usually want to watch the videos for 30 seconds, which is the standard length of film trailers. However, the explanation of the culture might need 90 seconds or 2 minutes. So, we can start the first 30 seconds of the videos with general information about the food, like Hokkien name, taste, and where to buy. Then, the in-depth information could be placed after that. The audience can choose not to pay attention to the part they are not interested in. (Pom, 36-year-old content creator, member of the design team, personal communication, September 28, 2021)

Since the projection mapping technique had a complicated installation process in the house, the sensors and IoT technology were chosen as the second choice. The exhibition needed a method to control the video player when the audience interacted with the exhibition system. Thus, the designer decided to use *ang ku* itself as the main trigger to reduce the complexity of the interaction process. Users were to place the *ang ku* dish on the box in which the sensor was hidden. When the sensor detected that there was a thing placed on the box, the information was sent through the Internet-of-things (IoT) system. Graphical software read the information and played the videos to give the information to the audience. The projector was replaced by a tablet which was smaller in size. The house owners just visit the website, whose videos could be changed according to the information from the sensor.

The communication between humans and the machine became difficult because the audience could not understand what was happening when the machine was calculating and did not give any information back. From the test, the IoT needed 5 seconds for such calculation. There should have been a way for the machine to communicate with the audience visually and audibly. The designer decided to include an LED light which showed when there was an object on the sensor (Figure 3). There should also have been instructions displayed when the system was inactive to inform the audience about the next procedure. The interface—text, color, size

of screen, and the form of sensor—needed to be universally appropriate with audiences of all ages. These criteria are noted for making the prototype of an interactive system; however, the team members understood that the complete prototype needed multiple tests and developments which could not be included in this initial project.

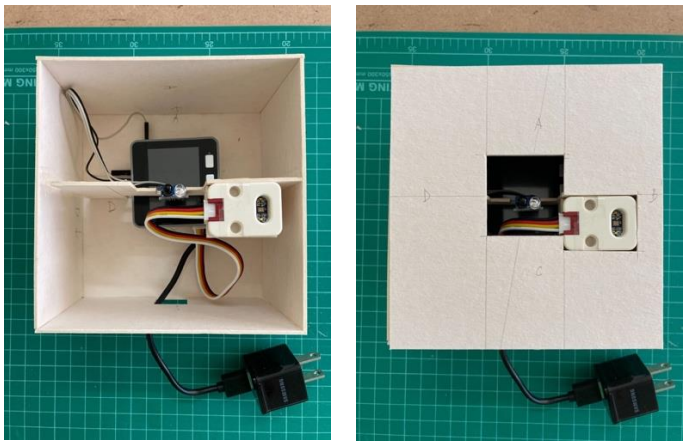

Figure 3: The Second Prototype—The Color Sensor Added to the Interactive System

The interactive system not only supports communication with humans, but it also transformed the room into an interactive space. The sensors could be installed anywhere if there is electricity and the Internet. One lab member suggested: "We can place the sonar sensor over the entrance of the room. If we put it in the cylindrical objects, the signal reflecting back from the target will be strong enough to trick the interactive system. Thus, the room could automatically interact with the audience when they walk into this room." (Pom, personal communication, September 30, 2021)

The prototype created in the lab showed that the machine could make things speak. The biography of things could be communicated with voice records and videos by positing the materials as the central focus. The videos of cooking sweets could portray the images of necessary utensils, ingredients, and actions of the chef. Moreover, the interactive system with sensors could work with real materials. The audience could touch the objects and simultaneously gather their biographies when the sensors are triggered. In other words, real materials can become a part of the interactive system. In the case of Phuket sweets, the *ang ku* and *ew pueng* themselves can communicate the story of Phuket culture. However, the other related materials like ingredients and utensils could be interconnected using technology as well. Anthropologists portray food culture as being not only about the foods themselves, but also the space of the house and relationships among people.

> When I see the sweets, I imagine a person who is cooking in the kitchen. The kitchen is a space for elderly people. They can show their ability in cooking and enjoy the moment when their children come to join the cooking. (Tip, 36-year-old designer, member of the design team, personal communication, September 10, 2021)

In summary, media technology has the potential to become an intermediary among spaces and materials. The former means the spaces of the house, street, and community. The community members can utilize the technology in their spaces and create new projects. The latter means objects which are ordinarily used in everyday life. Such objects expose extraordinary meaning when connected with the material in focus. For instance, the sauce, named *Rotyon*, manufactured in Phuket, becomes a subject to preserve because it is the local taste of *ew pueng*. The media technology can communicate this concept to audiences.

5.3.2 The cooperative process with the technology and material culture

This section portrays the participation between the community members and the design team by which media technology is utilized. The meetings were conducted once a week, not only to cooperatively find the solution for the home museum, but also to exchange ideas in other development projects. The use of technology became a main topic in the meeting. When there were ideas to create new projects, the possibility of using technology often became another subject to discuss. In other words, the use of technology came as an alternative solution if there was a specific problem. Thus, the form of technology which tends to be accepted should be adjustable to the ideas of both designers and community members.

Materials should be prioritized in the process of creating cooperative design of media technology. Most people can understand the meaning of materials and do not understand what the role of technology is

since they are not technicians. Designers should at first communicate the contents of materials in focus with the members. The concept of materials could be extended and reveal the profound meanings of the food culture. In the case of Baan Saan community, the conversation related to ingredients, equipment, and utensils were found during focus group discussion.

Cultural background influences how people perceive technology and design objects. People find a way to utilize technology regarding their personal interest in cultures. Kon, a 50-year-old graphic designer, was from Nakhon Si Thammarat. He graduated from an art university and has practiced as a professional graphic designer for 25 years in Bangkok. He made a decision to move to Phuket with his wife who is a descendant of a Phuket Hokkien Chinese family. His wife, Pin, in her late forties, ceased her career as a real estate advertising copywriter, and decided to develop her own business in Baan Saan district. They opened a coffee shop and hostel in the community. The researchers introduced the prototype to them according to their needs to develop a house museum (Figure 4).

> I have developed four kinds of Hokkien sweets as local products. I call them *kanom monkol* [sweets of prosperity]. There are *hun kueh*, *kao teng kueh*, *bigo*, and *ang ku*. I have a plan to write the information about such sweets on our website. The QR code will be written on a small card. The customers will receive it when they buy a sweet, so they can access the online information. I think this prototype is interesting. It permits customers to play with the system. They can touch and observe the real material and use it to interact with the media system. (Kon, personal communication, August 21, 2021)

Figure 4: An iPad Being Used as the Main Display as the Second Prototype Was Tested in a Baan Saan Coffee Shop

Pin initiated an idea to use the interactive prototype during the Vegetarian Festival, annually conducted in October to venerate the Chinese deities. The festival is the largest event in Phuket and the most popular shrine, Juitui, is in the Baan Saan community.

> Can I use it with the miniatures of Chinese deities? When our guests have a question about the name and ability of particular deities, they can place the model of the deities on the sensors. I think it could be suitable for the coming event in October. (Pin, personal communication, October 5, 2021)

Tor, a committee member of Baan Saan market, was also invited to test the prototype at Pin's coffee shop. He had thought about the *Por Tor* festival 普渡 (Hokkien Chinese: *Por Tor*; Mandarin Chinese: *Pu Du*) which is usually conducted on the second floor of the market. The ceremony was complicated since there had been various sweets used to venerate *Por-tor-kong*, the main deity of the festival.

> I think this could be good for the *Por Tor* festival because there are many kinds of sweets in the ceremony. People can taste the real sweets and get the information from the media system. They can eat, then try to use this hardware. (Tor, personal communication, October 5, 2021)

The prototype therefore was developed into the next version. After gathering the opinions from community members, designers, and engineers, the researchers then discussed about the potential technology, pinpointing problem solving of how the prototype can categorize various kinds of sweets and display different information. The designers decided to add a color sensor because it could detect the HSL value (hue, saturation, and lightness) of the object (Figure 5). Then the color paper was placed under the sweet container. When the

container is placed on the sensor, the value of color will be read and sent to the media system. In this way, the media system can detect what information should be exhibited.

Figure 5: The Color Sensor Interpreting the HSL Value[8]

The second version prototype was tested after that. Pannee, a 70-year-old consultant of the community and local historian, was invited to use the system. She was interested in the content of the video which revealed the story of the object in focus. Pannee said, "It can show invisible things. The media can include many stories such as the deities, ghosts, and cultures and beliefs of local people."

Pin asserted that the media system, which was lightweight, could also be used in other public places.

> Pin: What is the maximum distance between the sensor and the display?
>
> Researcher: The distance is unlimited since we use the Internet for the communication between the sensors.
>
> Pin: That is good. Can we create an exhibition in the temple? We can also conduct an event in the community and invite people to participate. They can learn the culture and receive rewards as a result. We may conduct this event in many locations in the community like the Chinese shrine, the Buddhist temple, and *kunsiang* shop [an old shop selling paraphernalia for Chinese ceremonies]. Then, we can change the community into a museum. (Pin and Pannee, personal communication, October 10, 2021)

The projection mapping technique was introduced to the other museums by the advisers of the community. A document containing the concept of a home museum was submitted by the community members to the government for funding. It showed that the cooperation between the lab and the community extended the boundaries of this project. The members needed to find an appropriate solution for the project management which must work with various agents—local government, house owners, and educational institutions.

5.3.3 Exhibition as the learning space

This section describes the data gathered from the temporary exhibition from April 15 to April 30, 2022. The exhibition displayed IoT prototypes which showed information about six Phuket foods—*ang gu*, *ew pueng*, *kopi*, *porpia*, *siao boa*, and *Hokkien mee*. The aim was to communicate with participants who did not know Phuket culture, and evaluate the results after attending the exhibition.

By the suggestions of Baan Saan community members, the prototypes were further developed into three types: first, the color sensors with IoT equipment which were mentioned in the previous section (Figures 6 and 7); second, the small computer with a sensor which pronounces the name of foods in Phuket dialect when audiences place a color card on the sensor (Figure 8); third, the IoT with voice receiver which can suggest the audience cook *porpia*, one of the Phuket food items. Subsequently, the 10 volunteers were invited to participate in the exhibition. There were display boards introducing the concepts and stories of the exhibition at the entrance (Figure 9). The volunteers had approximately 30 minutes to read the display boards and interact with the IoT prototypes.

[8] The sensor receives RGB color at first. Thereafter, the RGB color code will be calculated into HSL value by using the algorithm installed in the IoT equipment.

Figure 6: As Part of the Testing Process, a Paper Model of *Ew Pueng* Is Placed on the IoT Equipment (a Red Box) to Play the Cooking Process Video

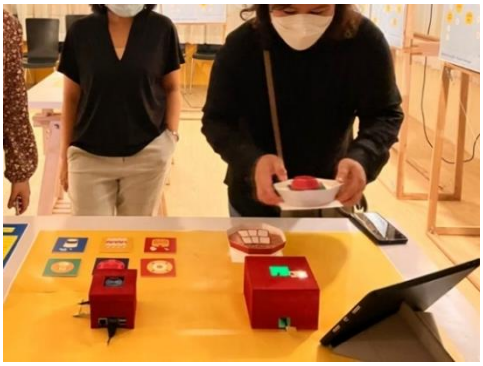

Figure 7: An Audience Member Interacts with the Prototype in the Exhibition

Figure 8: The IoT System Prototype that Pronounces the Name of Foods in Phuket Dialect when a Colored Card Is Placed on the Sensor

Figure 9: Food Paper Models Are Exhibited in the Center of the Temporary Food Exhibition Room with the IoT Equipment Visible in the Background

After attending the exhibition, the volunteers started to share their ideas about food culture related to the exhibition. The volunteers could extend the experience in the exhibition with their cultural backgrounds, and reflected their knowledge through the conversation. They communicated their ideas about food culture by describing tastes, ingredients, recipes, and their memories about foods. An, a 36-year-old Muslim woman from Pattani province in Thailand, said:

> I am thinking about food culture in my hometown. We eat *porpia* as well, but the filling is different. It is made from cassava, fried with curry soup, wrapped in dough, and is deep fried. It is like a samosa, but wrapped in a cylindrical form, not a pyramidal form. For *ew pueng*, people in my hometown also eat desserts made from sticky rice, but they are only available at some festivals. (An, personal communication, April 19, 2022)

Jane, a female 43-year-old informant from Nakhon Si Thammarat province in the south of Thailand, shared her opinion about the exhibition:

> After attending the exhibition, I feel more appreciative of Phuket foods, because there are lots of aspects that I didn't know before. I am interested in *Kopi* and can understand more how it relates to other foods and modern cafés. Speaking of *porpia*, it is common among Southeast Asian people. We can eat *porpia* everywhere, but with different tastes. It is part of the beauty of Asia. This concept of foods is interesting. I can think about other subjects interrelated with foods. (Jane, personal communication, April 26, 2022)

The media—interactive equipment, videos, and audios—links the objects in the exhibition with other subjects such as the cooking process, food history, the concepts of foods' identity, or even the application of technology. The media encourage the volunteers to perceive that the exhibition is dynamic, and it could be extended to include their other fields of interest:

> The voices make the exhibition fun. I think people from outside Phuket will be interested in how to pronounce the name of foods in Phuket dialect. They can use it in real life when ordering foods in the restaurant. For example, the pronunciation of *ew pueng* and *ang ku* cannot be written in Thai. They cannot be pronounced correctly when reading the names in menus. So, they can ask Phuketians to teach the Phuket dialect. It is fun. This prototype can be used with other subjects such as Chinese shrines, temples, or the pattern of local dresses. (Noy, a female 36-year-old informant from Krabi Province in the south of Thailand, personal communication, April 22, 2022)

> The videos help me understand the cooking process. I don't know what the ingredients of the foods are. When it is communicated through videos, I can see each step. This is helpful. (An, personal communication, April 19, 2022)

> I think the sensors could be useful for blind people. If it is embedded within a walking stick, it can say the names of the things it touches. So, the sensors can help protect blind people from danger. (Ming, a female 41-year-old informant from Phatthalung Province in the south of Thailand, personal communication, April 22, 2022)

Apparently, the interaction with materials stimulates audience members to think about their shared culture of foods. The audience members reminisce not only about their cultures, but also about their experiences when travelling and tasting the foods in various places. Moreover, the media technology reveals information that cannot be communicated merely by materials. It creates a multi-sensory interaction and supports the space of the exhibition as a learning space. Audiences likewise feedback their opinions towards both the food culture and the additional uses of technology in different settings. However, merely the materials and technology are not able to support the fabrication of social relations among audience members. In the exhibition, the insiders—the community members and designers who wanted to communicate the content of the exhibition—could be moderators, transferring their knowledge, sharing their cultures, and receiving feedback from outsiders.

6. CONCLUSION

Participants were interested in how to extend the function of the media system in accordance with their personal interests. Although some media technologies were rejected, the community members could create interrelated projects by utilizing such technology. In the case of projection mapping, the members

decided to cooperate with the elementary school to display the students' artwork on the exterior of a traditional old house. This means that the prototype has relayed the framework of technology (Figure 10) to the community members. The members therefore can design scenarios for using the technology by themselves. However, the support of the design team is still necessary when the members need to make their ideas valid. In the cooperative process, the design team may provide another developed prototype.

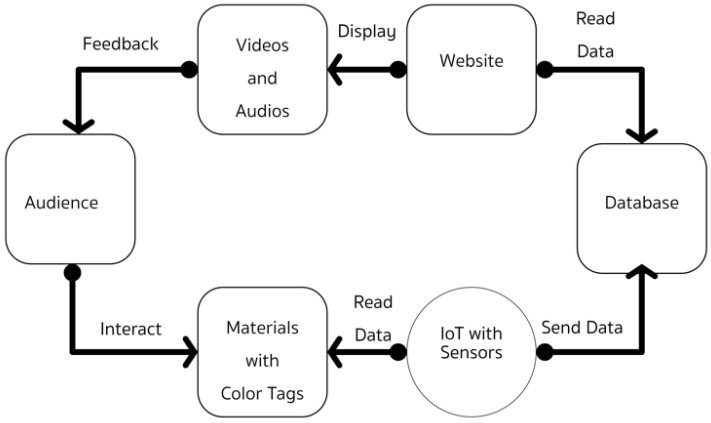

Figure 10: The Framework of Technology Used in the Exhibition

The prototype—media technology with sensors—played an intermediary role which supported the community members and the design team to spark ideas about how to utilize the space of the house and how to communicate the biography of the materials. The prototype was like a language which was used to communicate between participants. It initiated conversations which paved the way for development. Moreover, the designers also used the prototype to communicate among themselves. From sketch to prototype, the possibilities were evaluated step-by-step. The prototype might have been different to the sketch, yet the core concept could be maintained if the problem and solution were valid. Trial and error are subsequent to prototyping. The prototype also produces knowledge of multiple fields—design, engineering, and culture.

In the process of cooperative design, the materials which are known among community members should be prioritized. The members understood the interactive system effortlessly when designers added the technology to such materials. This is different from the personal projects of interactive designers, especially abstract artists, whose concepts might not follow strict cultural context conditions.

The authenticity of the sweets was a result of communication which portrayed how the materials were interrelated. The sensor technology made day-to-day materials communicable. The sensors created a connection between materials by communicating the biographies in which the historical background and social values of such materials were revealed. Humans as the actors in this communication process could perceive the interrelations between materials and themselves as a result. So to speak, the authenticity of materials was a process whereby humans were contextualized by the frame of the material network, and the media technology was potent to support such networking.

In conclusion, the lens of anthropology sheds light on the mechanism of materials and media technology as an agent to support the design process in two ways. First, the materials and media technology continue the design process although the exhibition has now ended. The conversation which exchanges ideas and opinions about materials has become a resource that makes the exhibition more dynamic and active. Likewise, the interaction among audiences, community members, and designers tends to initiate subsequent projects (Figure 11). However, the designers need to change role to be intermediators in the design process and support the sum of dialectical thoughts among participants. Second, the use of materials and media technology reifies the inclusive space where participants can share common interests, arguments, and agreements. The prototype, whose aim was to communicate local culture, stimulated both insiders and outsiders to exchange information. Through this process of exchange, the social relations among participants, especially between designers and community members, became closer. People who did not have much knowledge about this technology could learn about its potential, while the designers had a chance to gradually deepen their local knowledge.

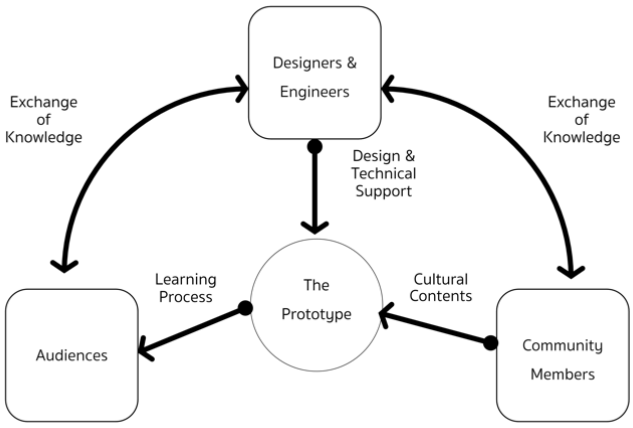

Figure 11: The Prototype Becomes Central to the Interaction among Participants

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REFERENCES

Aksu, H., Babun, L., Conti, M., Tolomei, G., & Uluagac, A. S. (2018). Advertising in the IoT era: Vision and challenges. *IEEE Communications Magazine, 56*(11), 138–144. https://doi.org/10.1109/MCOM.2017.1700871

Asakawa, S., Guerreiro, J., Sato, D., Takagi, H., Ahmetovic, D., Gonzalez, D., Kitani, K. M., & Asakawa, C. (2019). An independent and interactive museum experience for blind people. In *W4A '19: Proceedings of the 16th International Web for All Conference* (pp.1–9). Association for Computing Machinery (ACM). https://doi.org/10.1145/3315002.3317557

Clarke, A. J. (2021). The aesthetics of social aspiration. In D. Miller (Ed.), *Home possessions: Material culture behind closed doors* (pp. 21–45). Routledge.

Cobley, J. (2022). Why objects matter in higher education. *College & Research Libraries*, *83*(1), 75–90. https://doi.org/10.5860/crl.83.1.75

Coughlin, R. J. (2012). *Double identity: The Chinese in modern Thailand*. White Lotus.

Drazin, A. (2021). *Design anthropology in context: An introduction to design materiality and collaborative thinking*. Routledge.

Eglash, R. (2006). Technology as material culture. In C. Tilley, W. Keane, S. Küchler, M. Rowlands, & P. Spyer (Eds.), *Handbook of material culture* (pp. 329–340). SAGE.

Garzotto, F., Beccaluva, E., Gianotti, M., & Riccardi, F. (2020). Interactive multisensory environments for primary school children. In *CHI '20: Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–12). Association for Computing Machinery (ACM). https://doi.org/10.1145/3313831.3376343

Hardie, K. (2015). *Innovative pedagogies series: Wow: The power of objects in object-based learning and teaching*. Higher Education Academy.

Harrington, M. C. R. (2020). Connecting user experience to learning in an evaluation of an immersive, interactive, multimodal augmented reality virtual diorama in a natural history museum & the importance of story. In *Proceedings of the 6th International Conference of the Immersive Learning Research Network (iLRN)* (pp. 70–78). Institute of Electrical and Electronics Engineers (IEEE). https://doi.org/10.23919/iLRN47897.2020.9155202

Hebdige, D. (2002). *Hiding in the light: On images and things*. Routledge.

Ingold, T. (2007). Materials against materiality. *Archeological Dialogues*, *14*(1), 1–16. https://doi.org/10.1017/S1380203807002127

Jimbu, M., Yoshida, M., Bizen, H., & Kawai, Y. (2020, December 4–13). Creation of interactive dollhouse with projection mapping and measurement of distance and pressure sensors [Poster presentation]. *SIGGRAPH Asia 2020 Posters (SA '20). Association for Computing Machinery*. New York, NY, USA. https://doi.org/10.1145/3415264.3425461

Kopytoff, I. (1986). The cultural biography of things: Commoditization as process. In A. Appadurai (Ed.), *The Social life of things: Commodities in cultural perspective* (pp. 64–92). Cambridge University Press.

Kreps, C. (2015). University museums as laboratories for experiential learning and engaged practice. *Museum Anthropology, 38*(2), 96–111. https://doi.org/10.1111/muan.12086

Lee, R., Chen, A., Chiang, C., Chen, Y. A., & Liu, C. (2016). A preliminary design and implementation of location-based mobile advertising schemes with plot placement animation over a cyber-physical system. In *Proceedings of the 2016 International Conference on Networking and Network Applications* (pp. 196–201). Institute of Electrical and Electronics Engineers (IEEE). https://doi.org/10.1109/NaNA.2016.89

Ligthart, M. E. U., Neerincx, M. A., & Hindriks, K. V. (2020). Design patterns for an interactive storytelling robot to support children's engagement and agency. In *HRI '20: Proceedings of the 2020 ACM/IEEE International Conference on Human-Robot Interaction* (pp. 409–418). Association for Computing Machinery (ACM). https://doi.org/10.1145/3319502.3374826

Mackay, C. R. (2012). *A history of Phuket and the surrounding region*. White Lotus.

Maurer, B. (2006). In the matter of Marxism. In C. Tilley, W. Keane, S. Kuechler, M. Rowlands, & P. Spyer (Eds.), *Handbook of material culture* (pp. 13–28). SAGE.

Miller, D. (2008). *The comfort of things*. Polity Press.

Moorhouse, N., tom Dieck, M. C., & Jung, T. (2019). An experiential view to children learning in museums with augmented reality. *Museum Management and Curatorship*, *34*(4), 402–418. https://doi.org/10.1080/09647775.2019.1578991

Nazari Shirehjini, A. A., & Semsar, A. (2017). Human interaction with IoT-based smart environments. *Multimedia Tools and Applications*, *76*(11), 13343–13365. https://doi.org/10.1007/s11042-016-3697-3

Ocepek, U., Bosnić, Z., Šerbec, I. N., & Rugelj, J. (2013). Exploring the relation between learning style models and preferred multimedia types. *Computers & Education*, *69*, 343–355. https://doi.org/10.1016/j.compedu.2013.07.029

Rao, A. S., Sharma, A. V., & Narayan, C. (2017). A context aware system for an IoT-based smart museum. In *Proceedings of the 2017 2nd International Multidisciplinary Conference on Computer and Energy Science* (pp. 1–5). Institute of Electrical and Electronics Engineers (IEEE). https://ieeexplore.ieee.org/document/8019241

Schultz, L. (2018). Object-based learning, or learning from objects in the anthropology museum. *Review of Education, Pedagogy, and Cultural Studies*, *40*(4), 282–304.

Skinner, G. W. (1957). *Chinese society in Thailand: An analytical history*. Cornell University Press.

Tilley, C. (2007). Materiality in materials. *Archeological Dialogues*, *14*(1), 16–20. https://doi.org/10.1017/S1380203807002139

Voit, A., Mayer, S., Schwind, V., & Henze, N. (2019). Online, VR, AR, lab, and In-Situ: Comparison of research methods to evaluate smart artifacts. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems (CHI '19)* (pp. 1–12). Association for Computing Machinery (ACM). https://doi.org/10.1145/3290605.3300737

Yousefi, M., Zarmehr, P., Targhi, A. T., & Dehshibi, M. M. (2015). Art gallery in hand: Towards creating a mobile application for retrieving painting information. In *Proceedings of the 2015 Tenth International Conference on Digital Information Management (ICDIM)* (pp. 256–259). Institute of Electrical and Electronics Engineers (IEEE). https://doi.org/10.1109/ICDIM.2015.7381894