M-learning about Tongan Food:

A concept of a culture-specific app for learning about Tongan food culture

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Abstract

This study discusses how an app can assist New Zealand-born and raised Tongans to continue learning about Tongan food culture. As Tongans have immigrated to overseas countries for a better life, the majority have settled in New Zealand. The Tongans in New Zealand have assimilated into New Zealand culture in order to fit into New Zealand's society. Through Tongans integrating and assimilating to New Zealand culture, the native culture is at risk of slowly deteriorating, thus affecting the cultural identity of New Zealand-born Tongans.

An app that is culture-specific to Tongan users, can assist in helping them to learn about Tongan food culture in New Zealand. The concept of a culture-specific app is made with features that cater to the user's learning style, such as observing and imitating actions and listening to family and community members' stories.

The research investigated both salient Tongan learning styles and the design criteria that became essential for the culture-specific app. The study presents a proof of concept of the design for the app, that was developed through a practice-based research approach.

Access the App

The practical component of this thesis can be accessed through the URL and QR code presented below.

URL: https://xd.adobe.com/view/c3abdd3a-46f0-4fcf-7646-a45c118f4f51-b59a/

QR code:

Table of Contents

List of Figures

List of Tables

Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Hulu-Tungua Tu'inukuafe

1 March 2019

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Date

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Intellectual Property Rights

All images and designs in this thesis were produced by the author, therefore there were no third party's images or designs included in this thesis.

Chapter 1: Introduction

1.1 Overview

A community-based learning app designed specifically for the learning style of the Tongan people can assist them in learning about Tongan food culture. This study inquires how an app might cater to Tongan people's learning style in order for Tongans overseas to continue learning about their food culture. As Tongans have migrated to New Zealand, Australia and the United States for a better life, it was noted that New Zealand holds the most Tongan emigrants (Unicef, 2013). The 2013 New Zealand census showed that sixty thousand Tongans were living in New Zealand, making Tongans the third largest Polynesian group to have migrated (Statistics New Zealand, n.d.). Since 1975, Tongan families have assimilated into the New Zealand culture in order to fit into society, therefore increasing the risk that Tongan practices could vanish over time. In order to learn and preserve the meaning and understanding of Tongan food, young Tongans in New Zealand might have to learn from indigenous Tongans who still hold the knowledge about Tongan culture. Learning and understanding about Tongan food culture from native people can enable learners to practice and actively participate in the food culture. Furthermore, helping in preserving the Tongan culture and the individual's identity. To assist in learning about Tongan food culture, an app could provide the ability for Tongans in New Zealand to engage, learn and communicate with indigenous Tongans. As part of this research, a concept for an app is developed and designed in order to facilitate the culture-specific learning and communication styles of the Tongan people.

The study consists of a literature review on the importance of preserving culture, the learning styles of the Tongan community and the design principles for designing a culture-specific user interface (UI).

The methodologies employed in this study are *talanoa* and practice-based research using user-centred design as a method to conceptualise and design an app. As the focus of this study is to investigate into and the development of a culture-specific design criteria, this study does not include participants or conduct user-testing.

As the researcher is a New Zealand-based Tongan digital media student, she uses her foreknowledge about the Tongan culture and design principles during the design process of the app.

1.2 Aims of the Study

The purpose of the study is to investigate a means to preserve traditional Tongan food culture among New Zealand born Tongans. New Zealand born Tongans have limited access to knowledge about traditional Tongan food practices. This research postulates that indigenous Tongans are likely to know the most regarding Tonga's food culture, therefore would be able to share and educate others. Thus, the research explores a mobile app as a means for New

Zealand-born Tongans to learn the cultural practices from indigenous Tongans. Social media has already demonstrated that it has the ability to connect people from across the world, bringing family and friends closer together. M-learning also provides people the ability to access educational content and learn through mobile devices in the user's own space, time and at their own pace. Therefore, this study attempts to leverage social media and m-learning as a means of connecting Tongans from different countries with the aim of strengthening New Zealand-born Tongans' understanding about traditional Tongan culture, with a specific focus on Tongan food.

1.2.1 Research Questions

1. *How can an app enable New Zealand-born and raised Tongans to learn about Tongan food culture?*

2. *How can an app be designed to cater for the traditional ways Tongans learn and interact?*

1.3 Significance of the Study

The study addresses the limited learning sources of Tongan cultural food practices for New Zealand-born Tongans. It provides an idea of how New Zealand-born Tongans could continue to learn about Tongan cultural food practices through using an app. The study might benefit New Zealand Tongans, indigenous Tongans and even Tongans around the world, as it could bring them together through continuing to learn about Tongan food culture. Furthermore, it could strengthen and expand the notion of community learning to an online platform that connects Tongans from around the world. The study also addresses the ability to build and strengthen the cultural identity of Tongans living overseas, which can preserve cultural traditions and the Tongan culture. As this study focuses on culture-specific design for the Tongan people, it adds to the scholarship which provides a Tongan perspective. Additionally, the study may be beneficial to mobile designers or developers who are looking for ways of preserving culture.

1.4 Thesis Structure

This thesis has seven chapters. Following this introduction is Chapter 2, the review of literature that is specific to the topic of this study. The first section of the literature review defines the importance of preserving culture. The second section explores the cultural food practices, which leads into the third section which deals with Tongan food culture. The fourth section discusses the use of m-learning and the cultural learning style of Tongan people. The fifth section is the review of literature on designing a user interface for a culture specific group.

Chapter 3 defines and discusses the methodological framework of the research, consisting of practice-based research, user-centred design and *talanoa*. The use of these methodological frameworks is justified in the research design which discusses the way the methodologies are used in this study.

Chapter 4 covers the culturally specific designs for a Tongan app. The design criteria for the app are discussed in this chapter.

The fifth chapter deals with the design process that consists of identifying the specific target audience, user journey maps, user stories, design concepts, a site map, wireframes and interactive wireframes of the app. The designer uses practical skills in designing the wireframes and interactive prototype.

The sixth chapter consists of reflection on and an evaluation of the app. The app is evaluated against the design criteria created in Chapter 4. Subsequently, there is a discussion on whether the design of the app meets the aims of the study.

Chapter 7 concludes the research by answering the research questions and discussing the limitations of the study. This chapter also outlines future studies which could be conducted on this topic.

Chapter 2: Literature Review

2.1 Introduction

This chapter reviews the importance of preserving culture, of the food which provides individuals with a cultural identity, Tongan food culture, and their traditional ways of learning and interacting with others. The review on the learning styles of the Tongan community, m-learning and social media covers the learning aspects of an app. The last section is on the user interface and culture-centred design, which reports on the way to design an interface for a specific culture. These broad topics together outline the conceptual frameworks which informed the study.

2.2 Preservation of Culture

Preserving indigenous culture is important as culture defines a person's personality and identity (Levy, 2000; Oladumiye & Blajoko, 2013). According to Borgman (1992), the concept of culture describes the race, ethnicity, customary behaviours, assumptions, values, patterns of thinking and the style of communication of an individual as part of a larger community. In addition to Borgman's (1992) definition, Levecq and Turner (1994) believed that a person is not genetically born into a culture but learns the behaviour of a culture through their living environment. Parents and members of a community influence an individual's identity by encouraging cultural conformity (Cox, 1987; Al-Momani, 2016). The cultural knowledge that is shared amongst members often creates a sense of belonging (Al-Momani, 2016). However, if the culture is not shared or practiced, the cultural identity of a person can be lost. In order for indigenous cultures and cultural heritage to be preserved, people have to practice and share the cultural knowledge in their everyday lives (Oladumiye & Bolajoko, 2013).

Indigenous cultures can be at risk of slow deterioration when natives emigrate and assimilate into the host country's culture (Voon & Pearson, 2011). Oxford Dictionary's (n.d.) definition of an immigrant is a person that moves to a new area or country to live there permanently. According to Berry's (1997) bidimensional model of acculturation, assimilation is to receive the host country's culture and discard the native culture. Berry (1997) explains that integration differs from assimilation as it is to receive the culture and retain the native culture. Lee (2007) stated that the reason for Tongans migrating to countries such as New Zealand, Australia and the United States of America was to improve the life of the family. Tongan families emigrate to provide the children a better education and find employment which can also help families back in Tonga. In Lee's (2007) study of second-generation Tongans in Australia, participants identified themselves as both Australian and Tongan. Regardless of the participants' desire to be identified as a Tongan, some feel that they are not acknowledged as such, due to Tongan Australians low engagement with their Tongan culture (Lee, 2007). Therefore, the Tongan Australians in Lee's (2007) study did not feel as strong a tie to the Tongan culture as did their parents. Another study conducted by Hansen (2004) on Tongan Americans living in Utah stated that there is a decrease in Tongan culture being passed down from Tongan American migrants

to their US-born and raised children. The reason for the decline in Tongan Americans teaching their children the Tongan way of life and culture was due to the parents assimilation into the American culture. Hansen (2004) stated that Tongans felt an expectation and pressure to conform to American culture in order to be part of that society. Speaking English, having a job and living amongst non-Tongan neighbours were common conditions of migrant Tongans. Thus, this lead the Tongan Americans to conform to American culture, leaving behind the traditional way of life. By compromising the Tongan culture, the younger generation of American born and raised Tongans are affected as it has contributed to the loss of their cultural identity (Hansen, 2004).

Speaking a native language is a form of maintaining an association with one's culture. As people speak their native language, individuals can gain a sense of belonging and identity (Phinney, Romero, Nava & Huang, 2001). Maintaining one's cultural language can also increase the pride of being part of a particular community (Phinney et al., 2001). The studies conducted by Lee (2007) and Hansen (2004) demonstrated that the immigrants assimilated to the host country's culture in order to be accepted and become successful. However, Levy (2000) argued that immigrants must continue to practice their native culture in order for the children to know who they are. Practicing a cultural language or consuming cultural foods contributes to keeping a culture alive (Glasgow, 2010). If their native culture is not practiced, the culture can become folklore (Levy, 2000). As a result, immigrants should continue practicing their native ethnic language and culture as it is their identity (Levy, 2000; Oladumiye & Blajoko, 2013). Furthermore, practicing the cultural language and traditions can prevent a culture from declining (Oladumiye & Blajoko, 2013). New Zealand implemented a way of strengthening the cultural identity of Tongan immigrants by creating a Tongan Language week in 2007 (Ministry of Pacific Peoples, n.d.). The purpose of the Tongan Language week was to encourage New Zealand born Tongans to learn, retain and use their native language (Ministry of Pacific Peoples, n.d.). The Ministry of Pacific People (n.d.) partnered with Te Papa Tongarewa to provide educational resources such as words and phrases, the correct pronunciation and the Tongan alphabet for people to learn and practice the Tongan language. Promotional posters were also supplied on the Ministry of Pacific People's website (n.d.) to promote Tongan language week in New Zealand communities.

The United Nations Educational, Scientific and Cultural Organisation (UNESCO) adopted the Convention for the Safeguarding of Intangible Cultural Heritage as an answer to protecting folk culture and traditions (Alivizatou, 2012; Kurin, 2004). The Convention of the Safeguarding of Intangible Cultural Heritage is a treaty signed by 120 countries agreeing to respect and acknowledge the importance of preserving indigenous cultural heritage (Kurin, 2004). Additionally, the convention is to acknowledge the role communities and practitioners have in preserving indigenous cultures (Aikawa, 2004). The act of preserving cultural heritage items such as buildings and artefacts, even oral expression, is to enable future generations to gain a sense of cultural identity (Alivizatou, 2012). Although, New Zealand has abstained from being part of the convention, it is supportive of the concept (Sullivan, 2010). New Zealand's Wellington

Museum Te Papa has taken part in preserving indigenous culture by accepting and including into its exhibits and archives indigenous communities' historical and traditional knowledge. Tongans, Samoans and Māori have provided information about their cultural history which has been integrated into the narrative of the cultural group's historical story in the museum (Alivizatou, 2012). UNESCO has provided a framework for countries to protect folk cultures and traditions, however, Levy (2000) still argued that paramount to preserving a culture is the willingness of its people to practice and protect their cultural heritage. Therefore, active participation in cultural everyday life by of those cultural communities is essential for a culture to be maintained (Alivizatou, 2012).

2.3 Identity through Food

A culture's food reaffirms the cultural identity of its individuals (Kittler & Sucher, 2000). Traditional cultural foods often have a significant meaning and connection to its cultural people, as it is a part and a representation of who they are (Fekete, 2014). Just by a whiff of cultural foods, emotions, desires and memories of 'home' can arise, providing individuals with a sense of belonging (Williams-Forson, 2014; D'Sylva & Beagan, 2011). In Williams-Forson's (2014) study on cultural food preservation conducted with Ghanaian people living in the United States, the Ghanaians considered 'real food' as food that has a culturally and socially significant meaning. Ghanaians are people from the Republic of Ghana, located in West Africa. However, the Ghanaians in Williams-Forson's (2014) study had emigrated to the US. Therefore, the Ghanaian food brought a sense of 'home' to the people; 'home' referring to their country of origin. Another study conducted by Fekete (2014) further demonstrated the cultural significance of food to a culture. A resident of Rochester, United States, Alex Tahou created a dish called the Garbage Plate in 1918. Since then, the meal has become an iconic dish and a part of the Rochester culture (Fekete, 2014). According to the Rochester people in Fekete's (2014) study, a true Rochesterian enjoys and consumes a Garbage Plate. The dish evokes childhood memories to many Rochester residents and is often the first meal they consume when returning back to Rochester (Fekete, 2014). These studies demonstrate that cultural foods have a sentimental and cultural meaning to the community, strengthening the identity and connections an individual has to the culture (Fekete, 2014). Furthermore, cultural foods have different meanings for cultural communities which could also provide an identity to an individual (Kittler & Sucher, 2000).

Food can create a sense of belonging to or, alternatively, of differentiation between ethnic and cultural communities (Lupton, 1994). People who have emigrated often integrate into the host country's culture to feel a sense of belonging and to be a part of that society (Lupton, 1994). Food and the consumption of food can create a social identity. Furthermore, it can create connections and relationships in communities (Kneale & Dwyer, 2003). In Lupton's (1994) study of immigrants in Australia, the participants consumed Australian food in order to be accepted into the society. For example, a participant in Lupton's (1994) study experienced differentiation when a friend of the participant stated that her cultural food was 'yuk'. The participant replaced her 'foreign' food with a vegemite sandwich (a staple Australian food) as a means to be

accepted. D'Sylva and Beagan's (2011) study on Goan immigrants in Canada demonstrated a differentiation of cultures through food. Goan immigrants in Canada are differentiated from the Canadian community because of the food the Goans consume. Goan people consider traditional Goan food as their identity and are proud of the food. These foods provide the Goan people a sense of belonging as they live in a country that predominantly practices a different culture (D'Sylva & Beagan, 2011). D'Sylva and Beagan's (2011) participants displayed a different attitude about the traditional native foods compared to Lupton's (1994) participants. D'Sylva and Beagan's (2011) participants embraced their foods while Lupton's (1994) participants disregarded their cultural foods and consumed the same foods as those of the host country. Both Lupton (1994) and D'Sylva and Beagan's (2011) studies demonstrate that immigrants either assimilate into the host country's food culture in order to be accepted as part of the community or they differentiate themselves by adhering to their traditional foods as a part of their identity.

According to D'Sylva and Beagan (2011), preserving and maintaining cultural foods is highly valued in the community. Community members who hold the knowledge and skills of traditional recipes are able to maintain the cultural food traditions, and therefore, are often seen as significant and valuable members of the community (D'Sylva & Beagan, 2011). The ingredients and preparation of the food are a symbol of ethnic identity and can signify a cultural meaning (Williams-Forson, 2014; Kittler & Sucher, 2000; Levy, 2000). The authors Ignatov and Smith (2006) concluded that food is more than just nutrients, as it is a symbol and representation of a specific culture, identity, people and traditions unique to the cultural location. As D'Sylva and Beagan (2011) stated, learning and continuing to make traditional dishes in the community can maintain the cultural identity of members, and thus, help preserve the cultural significance and meaning of each foodstuff.

2.4 Cultural Food Practices

Food has cultural and social meaning, and each food can display a different type of meaning in a community (Maslow, 1943; Kittler & Sucher, 2000). The meaning of food can range from social status, to nutrition or to a spiritual significance (Maslow, 1943; Kittler & Sucher, 2000). Kittler and Sucher (2000) adapted Maslow's (1943) theory of motivation to explain how a person's food habits can change from eating for nutrition to self-actualisation. Using Maslow's (1943) theory, Kittler and Sucher identified that the first need for food is nutrients, as food is consumed as a necessity in order to survive. The second stage in Maslow's (1943) theory is security, therefore once food is consumed, food for the future is also considered. An example is food being stored in the refrigerator. Kittler and Sucher (2000) indicated that food that is stored in a refrigerator is a form of security to consumers as it preserves food that can be eaten later. The act of preserving a meal demonstrates its importance and significance to the individual. The third aspect was that food creates a sense of belonging (Kittler & Sucher, 2000). Certain foods can bring comfort and happiness to individuals due to the association that the individual has with that food. An example is immigrants consuming their native cultural foods as an expression of belongingness to the culture and their cultural identity. Thus, food serves to represent the

group. The fourth stage from Maslow's (1943) theory is self-esteem. Kittler and Sucher (2000) defined this stage as food being a representation of an individuals' social status. Foods that are consumed by specific social groups can depict their hierarchical status in society. An example is caviar, which in some European cultures is considered a delicacy. Therefore, caviar is mostly consumed by the wealthy and is associated with high class. Kittler and Sucher (2000) identified Maslow's (1943) fifth stage of self-actualisation as self-realisation of personal preference. Kittler and Sucher (2000) stated that once an individual had gone through the initial four steps, a person's preference of the way food is consumed depicts the person's decision on the outlook of food and the level of importance food has to the individual.

Maslow's (1943) theory also applies to the food of cultural groups. Some groups like Native Americans consider food as sacred because they believe that food is "a gift from the realm" (Kittler & Sucher, 2000, p.79). Asian Indian societies also regard food with great respect. Food in Indian cultures is complex due to the reasons why, when and how food is eaten, prepared and served (Kittler & Sucher, 2000). Some foods in Hinduism are considered pure, such as milk. Other foods that are fried are considered purer than baked, boiled and steamed foods, especially food that is fried in ghee (a traditional butterfat). Traditionally, members of the Hindu religion who cook and serve food to other members, must belong to an equal or superior caste. Foods that are not eaten are often given to people of a lower class, but are never given to someone of higher standing (Kittler & Sucher, 2000). The studies demonstrate that food can have multiple meanings and be complex within different cultures, and therefore, they illustrate the significance of food to people as part of their respective cultures. Tongan foods also have various meanings as some are more esteemed than others.

2.5 Tongan Food Culture

Polynesian food is more than just a meal; it is a social occasion that brings people together (Haden, 2009). Food is the centrepiece of communal occasions such as birthdays, marriages, the celebration of achievements and funerals (Pollock, 1992; Kittler, Sucher & Nahikian-Nelms, 2017; Haden, 2009). Special guests who have a position in the community are served food and dishes that are considered important and significant (Haden, 2009; Lyon & Wells, 2012). A food that is particularly reserved for special occasions and presented to special guests is *puaka* (pork). *Puaka* (pork) is an important part of a feast as it represents wealth and prestige (Treagus, 2010). In Tonga, meals are often cooked in a pit called an umu (ground oven). The umu consists of stones lining a pit which is built over a fire (Kittler, Sucher & Nahikian-Nelms, 2017). Taro, yam and sweet potatoes are covered in taro leaves then steamed for hours in the umu, while the *puaka* is roasted over a fire pit (Kittler, Sucher & Nahikian-Nelms, 2017). Traditionally, men are responsible for preparing the meat and root vegetables to be cooked in the umu (Treagus, 2010). Sharing food is a large part of the Tongan culture as perishable foods do not last very long due to the climate (Treagus, 2010). Therefore, food is traditionally shared in the community so that it does not go to waste. Treagus (2010), Pollock (1992) Kittler, Sucher and Nahikian-Nelms (2017), and Haden (2009) demonstrated that food brings Tongan people

together during celebrations and is shared out to the community, as evidence that food is communal.

2.5.1 Ranking of Tongan Food

Tonga is a class-conscious country that has a social hierarchy. Social status and hierarchy in the community is part of Tongan culture, as is also evident in the food (Oliver, Berno & Ram, 2010; Haden, 2009). Traditional Tongan food is ranked from the most prestigious to the everyday lower-class dish (Haden, 2009). The ranking of food traces back 200 years ago, when the royal family were the only people permitted to consume what was called 'royal food' (Oliver et al., 2010). Royal foods were *puaka* (pork), *ufi* (yam) and seafoods that were difficult to gather. Commoners were not permitted to consume or harvest any of the royal foods, unless it was for the royal family (Oliver et al., 2010). In 1875, King George Tupou I abolished the class system, declaring constitutional rights to the Tongan people. As a result, all people of Tonga were allowed to grow and consume royal foods (Mageo, 2001; Oliver et al., 2010). The tradition of royal foods, however, continues in Tongan society today, where they are only cooked on special occasions, such as celebratory feasts. Furthermore, the esteem of royal foods can be seen in the Tongan practice of presenting honoured guests with the royal foods as a representation of respect (Haden, 2009).

2.5.2 Royal Food

*Ufi (*yam) is a royal food and is considered the most esteemed root vegetable in Tonga (Johnston, Felise & Sheck, 1996). *Ufi*'s esteem can be attributed to its delicious taste and its cultural and spiritual significance. Tongan men would compete for prestige by attempting to grow the largest *ufi* and present it to the *tui tonga* (head chief) (Pollock, 1992). The *tui tonga* would offer the *ufi* to the Gods, asking for protection and the wellbeing of Tonga (Pollock, 1992; Johnston et al., 1996).

Talo (taro) is another root vegetable that is held in high regard in Tonga, second only to the *ufi*. *Talo* is expensive to grow and purchase, so therefore holds esteem for monetary reasons (Haden, 2009). The most valued meat in Tongan culture is the *puaka. Puaka* is expensive and its size marks the wealth and prestige of the host (Treagus, 2010). These particular traditional Tongan foods are often reserved for honoured guests participating in the celebration, such as royalty, nobility, priests or an individual of high status in the community (Lyon & Wells, 2012). These Tongan royal foods, *ufi, talo* and *puaka* have a reason for being prestigious in the Tongan community, because providing such prized foods often involves financial sacrifices by the host due to the expense of the food (Haden, 2009).

2.6 Learning a Culture

According to Yamazaki (2005), each ethnicity has a particular learning style. A learning style is the way an individual behaves, feels, receives and retains information in their learning environment (Gündüz & Özcan, 2010; Smith 1982). Authors Gündüz and Özcan (2010) stated

that, overall, there are eight different learning styles. These learning styles are active and reflective, sensing and intuitive, visual and verbal and sequential and global. An active learner discusses, tests and explains information in his or her external environment, whereas a reflective learner intellectually examines and manipulates information (Gündüz & Özcan, 2010). A sensing learner observes and gathers data using his or her five senses, while an intuitive learner speculates and follows hunches. Visual learners retain information through images, diagrams and demonstration. Verbal learners listen and speak to others to gain an understanding of what is taught (Gündüz & Özcan, 2010). Sequential learners follow logical step-by-step linear processes. Whereas global learners retain information in random order but are still able to make sense of it all (Gündüz & Özcan, 2010). Hofstede (1997) argued that the social experiences of an individual are shaped by the ethnicity of the group's culture, which then also determines an individual's preferred style of learning (Hofstede, 1997). Each culture's learning style varies based on the culture's values, traditions and forms of interactions. Therefore, understanding an individual's culture can assist in knowing the preferred learning style of an individual (Yamazaki, 2005).

2.6.1 Learning Styles of the Tongan People

MacIntyre (2008) suggested that mothers have a significant role in teaching children about cultural values, beliefs and practices. Additionally, extended family members and friends also teach children about new skills and knowledge regarding the Tongan way of life (MacIntyre, 2008). Thaman (1993) stated that he learnt about Tongan etiquette, especially regarding how to conduct oneself in front of royalty by observing his aunt's actions. Thaman (1993) imitated his aunt's behaviour and actions by observing her movement and behaviour when addressing honoured guests. He also learnt the different crops in the field during time spent with his grand-uncle. It was by observing and imitating his grand-uncle that Thaman learnt how to grow crops. O'Neill, Forster, MacIntyre, Rona and Tui'mana's (2017) study on Tongan children's learning in everyday settings demonstrated that Tongan children learn from family and community members with whom they interact. Thus, demonstrating that the studies by Thaman (1993) and O'Neill et al. (2017) indicate that the people of Tonga learn by observing and imitating actions. Therefore, based on Gündüz & Özcan's (2010) learning styles, Tongans are visual learners as they observe family and community members in order to learn about the Tongan way of life and culture.

Pacific cultures traditionally transfer knowledge from teachers to learners through oral communication (Duncker, 2002). O'Neill et al. (2017) stated that relatives who visit, and share meals and stories, are another way children can learn about the Tongan way of life and culture. Oral traditions in the Pacific Island nations consist of aesthetic and functionally significant meaning as they preserve, nurture and transfer ideas, symbols and beliefs of the culture (Wagner, Roundell, & Vargas, 2003; Finnegan, 2012; Inamara & Thomas, 2017). Therefore, storytelling is an art form (Crowl, 2003). O'Neill et al., (2017) and Finnegan and Orbell (1995), demonstrated that Tongans are also verbal learners as they learn about their culture by listening to stories.

According to Brown, Tower and Taplin (2005), Tongans prefer to communicate orally face-to-face. Face-to-face communication is favoured over other forms of communication, as it is consistent with the traditional *talanoa* (Prescott, 2009). *Talanoa* means communicating formally or informally with another person face-to-face (Vaioleti, 2006). Cultural knowledge and information were passed through engagement of spoken word from person-to-person, group-to-group, and generation-to-generation within families, teaching and sharing Tongan culture and history (Crowl, 2003). Inamara and Thomas (2017) argued that oral traditions exist as an alternative to text-based literacy. The authors believed that oral traditions in Pacific Island nations present innovative ways of illustrating life. Prescott (2009) stated the use of the internet has extended the realm for oral communication. Stories told on digital media platforms can increase the voice and participation of communities (Meredith, 2018). Lundby (2009) defines stories that are told on digital media platforms as digital storytelling. Digital storytelling is sharing personal stories in a form using digital media resources (Lundby, 2009). Digital storytelling can occur by sharing a lived experience or describing a moment or a series of moments in time (Lambert & Hessler, 2018). Prescott (2009), and Brown et al. (2005), demonstrated that Tongans are storytellers and share cultural information through stories. This is significant to this study as the app should facilitate the preferred learning styles of Tongan users such as the ability to share stories and communicate face-to-face.

2.6.2 Smartphone and Internet Usage in Tonga

As there are Tongan families living overseas, Facebook has become a popular form of communication for Tongans, as they are able to post about their lives and message family members (Latapu et al., 2018). According to Katafono (2017), there has been a sharp increase in the availability of the internet in the Pacific Islands. Since Tonga was connected to the submarine fibre optic cable in August 2013, the data of internet users and mobile cellular devices has increased (Sopu, Chisak & Usagawai, 2014). The increase of the supply of broadband was due to the demand of internet, entertainment and communication as the Tongan people gained interest in surfing the web and social networks (Katafono, 2017). The government in Tonga is one of the most technologically advanced in the Pacific Islands, along with Fiji, as the government uses e-government systems, e-services, the internet and web technologies for government services and operations. Thus, demonstrating that access to the internet is fast and has progressed in Tonga (Katafono, 2017).

According to the International Telecommunication Union (2010), smartphones are the first choice in accessing online resources as online content and social networks can be opened with just a touch on the smartphone (Wong, 2012). Experts demonstrated that smartphones are likely to overtake PCs because there are more wireless internet smartphone users than fixed internet users (Wong, 2010). As stated by the International Telecommunication Union's Report (2018), 3.9 billion people around the world use the internet. Islam, Islam & Mazumder (2010) noted that apps were designed to enable smartphone users to access the specific internet platforms to search content and to communicate with the other users.

Smartphone apps are software applications that have been developed and designed to run on smartphones to perform certain tasks (Islam et al., 2010). There are a variety of apps that cater to the various needs of a user, such as productivity tools (alarms, notes, calendar), shopping apps (e.g. Amazon), games and music apps (Bomhold, 2013). Mobile apps are downloadable applications from the app store and installed into the user's mobile device (Wong, 2012). Apps can be a branding opportunity as they can promote the image of the business. Furthermore, they can encourage the use of the app (Wong, 2012). A mobile website is different from an app because the mobile website is a mobile version of the internet (Wong, 2012). Mobile websites are responsive websites – the website adjusts the size and content accordingly to the size of the screen of the mobile device. Mobile websites can be accessed through pre-installed browsers such as Google and Safari (Wong, 2012). Wong (2012) mentioned that users are more likely to enjoy the use of mobile apps over mobile websites as apps provide users the one-click option, whereas mobile websites can take several clicks before accessing the desired screen.

According to We Are Social's (2018) Digital Oceania report, 106,900 of the 108,500 people in Tonga own a smartphone. This amounts to 98.5 per cent smartphone-enabled indigenous Tongans. Of the 106,900 smartphone owners 54,000 are active internet users, using their smartphones to communicate with others on social media platforms, such as Facebook ("We Are Social," 2018). Since January 2017 there has been a 21 per cent increase in Facebook users in Tonga and 95 per cent of Facebook users in Tonga access Facebook through their smartphones ("We Are Social," 2018). According to Ulfa (2013), smartphones are cheaper than other digital devices in Tonga, with good access to affordable mobile phone rates. As We Are Social's (2018) report demonstrated the availability and use of smartphones in Tonga, the smartphones can be utilised for educational purposes.

2.6.3 M-Learning

M-learning (short for mobile learning) is the use of portable devices such as smartphones and tablet computers for educational purposes (Oxford Dictionary, n.d.). According to Traxler (2010) and Mottiwalla (2007) m-learning enables students to access educational content through smartphones in a context aware, authentic and significant environment to the learner. Brasher and Taylor (2004) defined m-learning as an opportunity for students to learn without being restrained in a fixed position. Reddy, Reddy, Sharma and Reddy's (2016) study on South Pacific students demonstrated the successful use of smartphones for academic purposes. The smartphones used for educational purposes provided a more flexible and convenient way for the student to learn at their own pace, and in their own space and time (Reddy et al., 2016). The internet can make smartphones more useful, allowing learners to continue their learning with online peers through social media channels.

2.6.4 Social Media as a Learning tool

According to Casey and Wells (2015), social media encourages students to learn and interact with peers in an online context. Social media channels via internet connectivity are platforms designed to allow members to communicate with each other (Gikas & Grant, 2013). Students who participate in discussions on social media platforms can become independent thinkers, leading to conducting their own research on the topic (Wong, Chai & Aw, 2017; Jonassen, 2013). In the study of Sopu et al. (2014), the authors discovered that Tongan high school students performed significantly better using Facebook as a learning tool where it was used for educational purposes. The teachers found that the online content helped in teaching the students and has become a useful way of providing more content. Therefore, the response to the use of Facebook was positive (Sopu et al., 2014). The teachers expressed an interest in using e-learning and social media sites such as Facebook for future learning purposes due to the success rate of the students (Sopu et al., 2014). Casey and Well (2015) and Witten and Bainbridge (2003) suggested that social media channels can enable students to participate more in class discussions and become independent learners. Furthermore, Facebook can provide the students an enjoyable learning environment, which increases the student's learning ability (Casey & Well, 2015).

Social media tools can further assist in a user's learning by providing a personalised and authentic learning experience for the student (Archambault, Wetzel, Foulger & Williams, 2010). Social media apps on smartphones provide the user with social media tools that can be used to create content, such as videos, audio, photographs, and sending and receiving messages (Vavoula, Sharples, Rudman, Meek & Lonsdale, 2009).

Social media platforms can allow users to share, teach and support each other, leading to a collaboration of ideas (Dron & Anderson, 2014). Gikas and Grant (2013) explained that social media enables users to create user-generated content such as wikis and blogs. User-generated content is what Levy (2001) called 'collective intelligence', as online users combine their knowledge to report to and share with others. By actively learning with and from other online members, people are able to construct, reconstruct thoughts and ideas and see the world differently and through multiple perspectives. Therefore, new skills and ideas can be formed (Dron & Anderson, 2014). As Archambault et al. (2010) stated, social media tools can be used to assist students in learning and creating content related to the topic. However, without structure, the social media tools can negatively impact and distract the learner (Gikas & Grant, 2013). Reddy et al. (2016) believed that m-learning through smartphones could be useful for South Pacific students, as they would be able to conduct their own learning in their own time and preferred environment, and at their own pace. If users are provided with a structure on the use of the tools, they can be an effective mode of learning and thus, provide social media users the ability to learn valuable information from one another (Gikas & Grant, 2013).

2.7 Cultural UI design

An app's user interface (UI) may contribute to a user's learning (Jung, 2017). UI facilitates the interaction between the user and the computer system (Oxford Dictionary, n.d.; Galitz, 2002). A computer system is the hardware and software components working together receiving input and communicating output to the user in order to perform the task requested (Stone, Jarrett, Woodroffe & Mincho, 2005). According to Stone et al. (2005), the UI is a crucial part of the computer system and it is important that the development of the UI is user-centred. Understanding the user, the tasks the user would like to accomplish, and the environment in which the end user would interact with the interface, can assist in designing the UI. Because of its centrality in the interaction between a system and a user, UI design is informed by a range of disciplines such as computer science, cognitive psychology and graphic design (Stone et al., 2005). A good UI is important for the various users to be able to achieve the tasks they plan to do with ease (Stone et al., 2005).

UI designs that are simple and familiar to the user can lead to a quick and effective use of the app (Ji, Park, & Yun, 2006). Depending on whether a UI is good, bad or poor typically depends on the usability of the UI (Stone et al., 2005). Usability is how effective, efficient and satisfactory the use of a UI is when a user is attempting a task. An effective UI defines the accuracy with which the user can complete the task in a given environment (Stone et al., 2005). Efficiency is how quickly the user can perform and complete the task accurately. A dissatisfactory UI determines how comfortable and accessible the user is with the system and how accessible the system's features and functions are (Stone et al., 2005).

Yumiao, Jiang and Zhongliag (2010) noted that different cultures perceive and think differently about the world, therefore each person's perspectives and thoughts can affect the usability of a UI. According to the authors Yumaio et al. (2010), usability is a cultural phenomenon. A person's beliefs, practices and social relationships can determine the way members of a respective culture tend to interact with an interface (Yumaio et al., 2010). Furthermore, cultural values can strongly influence a person's preference on the appearance of an interface (Reinecke & Bernstein, 2011). Heimgärtner (2014) believed that as a child, cultural rules, norms and values that were taught can influence an individual's behaviour and interaction with a computer system. Therefore, tailoring the design of an interface for a particular cultural group can help the user engage in the app. Furthermore, the interface can contribute to the user having a higher satisfactory experience (Reinecke & Bernstein, 2011). The user experience (UX) refers to the experience a user has when interacting with a digital product or service (Garrett, 2010). The user has a positive experience when the user can complete the task without any problems or confusion (Garrett, 2010).

Nam, Kim, Smith-Jackson & Scales (2005), who conducted a study on African-American and European-American students' preference of learning information on a web-based tutorial, found that there was a difference in the content the African-American students preferred compared to the European-American students. The African-American students were satisfied with the

detailed explanation but preferred to have more visual graphics and audio than text-based information, whereas the European-American students preferred detailed text-based explanation (Nam et al., 2005). Nam et al. (2005) believed that in order for African-American students to succeed in using the system and learning the information, the resources should cater to the student's cultural learning preference of video and audio content. Hence, the importance of the designer considering the user's culture when designing the interface. Oh and Moon (2013) recommended a culture-centred design approach for designing interfaces specifically for indigenous groups. The authors argued that a good interface design originates in a culture-centric perspective (Oh & Moon, 2013). Trillo (1999) stated that in order to achieve a successful user interface design for a cultural group, an in-depth knowledge of the user's needs, environment and cultural conventions is required. Marzano (1995) suggested that user interfaces should have form, function and content that is meaningful to the user. Hence, an understanding of how to make the interfaces more culturally compatible to the users is key in UI design. Therefore, during the design process, the design iteration should analyse each design based on the target user's cultural appropriateness, semiotics, relevance, functionality and usability (Shen, Woolley, Prior, 2006). In considering the user's cultural background during the design process, the needs of the users can be met with the interface design (Oh & Moon, 2013; Fernandes, 1995).

2.8 Summary

The information in the literature review demonstrated the importance of Tongan food and how it relates to the Tongan culture. The preservation of culture is important because it is how people identify themselves (Levy, 2000; Oladumiye & Blajoko, 2013). Cultural food and practices are also a representation of an individual's culture. Tongan food is significant to the Tongan people as it is part of the social identity of the community (Haden, 2009; Lyon & Wells, 2012). The review also regarded the learning style of the Tongan people, demonstrating Tongans as visual and verbal learners. As visual and verbal learners, the social media tools, such as the ability to create and share videos, could assist Tongans in learning about Tongan food culture from other users. Furthermore, the UI should be designed according to the user's culture (Reinecke and Bernstein, 2011). The culture of a person can determine their understanding and interactions with an interface (Yumaio et al., 2010). Therefore, the review states it is crucial to understand the target audiences' culture in order to design the interface to the needs of the audience.

Chapter 3: Methodology

3.1 Introduction

This chapter discusses the methodological design of this study. The methodologies employed in this study are *talanoa* and practice-based research using user-centred design as a method. *Talanoa* is the Pacific art of communicating and exchanging information with another (Vaioleti, 2006). *Talanoa* is an important methodology to this study as it provides cultural Pacific values (Vaioleti, 2006). The researcher uses *talanoa* as a guideline of the ways Tongans communicate and interact with each other. Practice-based research is an approach that enables the researcher to undertake a practical investigation, aimed at answering the research questions that cannot be responded to with entirely conceptual or theoretical models (Candy & Edmonds, 2018). This methodology is relevant to the study as the study requires a practical component in order to answer the research questions. The practical component involves the culture-specific design of an app. User-centred design (UCD) is a design process that includes the end users' needs, which influences the design of the product (Abras, Maloney-Krichmar & Preece, 2004). UCD is relevant to this study as it accounts for Tongan users' requirements and their preferred learning style.

3.2 Talanoa

This study is informed by *talanoa*, the Tongan way of interacting with each other. Using *talanoa* as a methodology makes it suitable for studies on and for Pacific Island people. The significance of *talanoa* is the Pacific cultural values that enable the researcher to understand the use of verbal and body language that is culturally appropriate (Vaioleti, 2006). Furthermore, the cultural values can be used to understand the Tongan people and the culture. Using the principles of *talanoa* will assist the designer in ensuring that the app is culturally appropriate for Tongan people's needs.

Vaioleti (2006), a Tongan academic, developed the cultural value system of *talanoa* into a research approach. Vaioleti (2006) believed that using *talanoa* as a methodology could assist researchers in communicating with Pacific communities. Vaioleti (2006) provided ethnical protocols that consist of Pacific cultural values that the researcher could use. The first protocol Vaioleti (2006) suggested is *faka'apa'apa*. *Faka'apa'apa* means to be respectful, humble and considerate. A researcher is advised to be respectful and behave accordingly. Furthermore, researchers should not dominate a conversation or display a higher status than a participant. Dominating conversations can make participants feel intimidated by the researcher, thus be reluctant in the *talanoa* (Vaioleti, 2006). Authors Linnekin and Poyer (1990) further stated, pretentious and social climbing behaviour can socially isolate a person. This study uses *faka'apa'apa* to understand Tongan people's behaviour in order to design the proposed app with culturally appropriate features that can cater to the user's behaviour. Additionally, *faka'apa'apa* assists the researcher in comprehending the way Tongan people communicate with each other.

Vaioleti (2006) also demonstrated the importance of culturally appropriate communication such as body language and appropriate clothing. Body language can present a certain perception by the way a person stands, sits or looks. Therefore, a researcher should consider relevant body language when speaking to participants (Vaioleti, 2006). As this study has no direct participants but instead works for a specific and clearly defined target audience, the culturally appropriate communication protocols from *talanoa* guide the features and interaction modes of the app.

Anga lelei is another research protocol suitable for Pacific Island studies. *Anga lelei* means to be kind, generous and helpful (Vaioleti, 2006). Vaioleti (2006) explained that a researcher should observe participants actions, to learn and act appropriately in a situation. Vaioleti (2006) argued that a researcher who joins in tasks with participants can learn and observe the behaviour of the participants, gaining a deeper understanding of their culture (Violeti, 2006). Specific to this study, the app must therefore encourage its users to be kind, generous and helpful; that is, to practice *anga lelei*.

3.3 Practice-Based Research

As the study aims to conceptualise and prototype a culture-sensitive app for Tongan people, a practical component is a necessary part of the research. Practice-based research is an approach that enables the researcher to undertake a practical, creative investigation with the intent of uncovering new knowledge through the process of practice and the outcome of that practice (Candy & Edmonds, 2018). Practice-based research is relevant to this study, which intends to create a smartphone app to answer this study's research question. It is through the design of the app that new knowledge can be attained.

Scrivener (2000) elucidated that practice-based research is based on reflection and iteration. Schön (1982) explained reflection in what he termed reflection-in-action and reflection-on-action. Reflection-in-action is reflecting immediately on one's work during the process of engaging with the work. The knowledge and strategy used during the creative process are reflected upon, to test and evaluate the design, and/or to identify possible errors (Schön, 1983; Scrivener, 2000).

Reflection-on-action is reflecting on the overall research process, analysing and critiquing the researcher's work in order to improve it (Schön, 1983). It is informed and constructed by the reflection-in-action process. Therefore, reflection-on-action is the practitioner contemplating on the reflection-in-action experience (Schön, 1983; Scrivener, 2000).

As a practitioner reflexively reviews the ideas and the construction of the design from the beginning, the direction of the research can change leading to new ideas. Numerous iterations lead to adjustments and improvements to the design (Schön, 1983). Iterations during the design process are important as it helps the concept improve each time (Scrivener, 2000).

Schivener (2000) argued that there is no standard approach to practice-based research. Instead, practice-based research commonly draws on methods otherwise used by practitioners. In the given case, this study draws on user-centred design as a practical toolkit within the framework of practice-based research. The practice in this study is informed by the cultural values of *talanoa* and utilises user-centred design processes as a toolset.

3.4 User-Centred Design

User-centred design (UCD) can assist in designing an interface for a specific target audience. UCD is a design process that includes the end users' needs, which influences the design of the product (Abras et al., 2004).

Norman (1988) created the UCD concept using four approaches. The four approaches help the designer create a successful UI for the end user (Abras et al., 2004). A successful user interface allows a user to complete a task quickly and effectively without extensive instructions (Abras et al., 2004). Norman's (1988) first approach to UCD was to make the design easy for the user to identify any actions that can be performed. The second approach was to make all the actions, alternative actions and the result of the actions visible to the user. By making the actions visible, the user can identify any engagements that have taken place (Abras et al., 2014). The third approach was to make the current state of a system easy for the user to evaluate. This helps the user know what is happening and what the user is doing or should do next (Abras et al., 2014). The last approach Norman (1988) stated, was to follow the natural directions regarding the user's intentions and required actions, actions and the result of the actions, and the visible information and the interpretation of the system (Norman 1988). Following the natural directions of the users' interactions will help the usability of the interface design. The design and usability of the interface will therefore be a smooth flow of actions and thus, the user should be able to complete the task without any trouble (Abras et al., 2004). UCD is an essential part of this study, as it provides the designer the ability to identify the needs of the users and ensuring that the end user's needs are met.

The usability of the app significantly affects a user's learning; therefore, the UI design can determine the user's ability to learn quickly and effectively (Jung, 2017; Ji et al., 2006). As Abras et al. (2004) stated, the designer's role is to simplify the task for the user. The user should be able to complete the task with minimal effort in learning how to navigate through it. This is significant to this study as Abras et al. (2004) claimed the design of the app should be simple and accommodate the user's needs.

Galitz (2007) explained the UI design process as steps in creating a graphical system, starting from knowing who the users are and evaluating the product. Galitz's (2007) steps are stated as follows:

- Understand the user and their tasks

  The system should be designed for the user's needs and the system goals. By setting performance and preference goals, the interface can be measured against the success rate of the time the task takes and the user's satisfaction when conducting the task.

- Design appropriate concept ideas

  Identifying all the possible issues a user may encounter while using the system, can assist the designer in creating numerous user interfaces. Galitz (2007) advised that the interface designer ought to create several alternative user interfaces before deciding on the best design to go through the next phase of iterations.

- Create prototypes

  By designing prototypes, usability issues can be identified allowing the designer to solve any problems before the final design is made. By encountering all the problems in the beginning stage of designing the prototype, the issues can be fixed so the users would have a positive association with the design of the system during the first interaction.

- Modify and iterate the designs

  The design process includes numerous iterations as it is based on the usability of the prototype. The prototype is fine-tuned till all the goals of the usability design have been completed and the final design is chosen.

In summary, the methodology of this study consists of *talanoa* and practice-based research. *Talanoa* assists the study as the design of the smartphone app is for Tongan people, therefore the values in *talanoa* can be used to understand the way Tongan people communicate with one another. The study is a practice-based research and uses user-centred design as a method to conduct the study in designing the app for the users.

3.5 Research Design

In this practice-based study, user-centred design is used as a method for developing the design of the mobile app. The user-centred design process is listed below in a diagram demonstrating the steps the study takes in designing the proposed app. Figure 1 gives an overview of the research design employed by this study. Reflection-in-action and reflection-on-action takes place during the entire design process as numerous iterations are made, till the final design is chosen.

T A L A N O A

UCD   Toolkit/method

D E S I G N   P R O C E S S

| Initial Research Question |
| Design Criteria |
| |
| Target Audience |
| |
| User Journey Maps |
| |
| User Stories |
| |
| Design Concepts |
| |
| Site Maps |
| |
| Wireframes |
| |
| Interactive Wireframes |

Figure 1 A diagram outlining the structure of the research design. Source: author's own.

Figure 1 illustrates *talanoa* as the overarching methodology of this study. *Talanoa* is the main methodology of this study as the practitioner uses *talanoa* as a lens to understand the Tongan people. By understanding Tongan people, the cultural values and learning behaviours of the Tongan community can be included into the design of the app. Therefore, *talanoa* is used throughout the whole process and informs the study.

As this study is a practical investigation, UCD is used as a method to design the app for Tongan users. UCD provides steps on how to design for a particular audience, in this case the Tongan community. UCD and Galitz' (2007) UI design processes are similar as they include the end user throughout the design process to warrant that the design meets the needs of the users.

The first phase of the design process is to scope the potential purpose of the app intended by this study. This includes the initial research questions and the design criteria. The design criteria

of the app are a list of essential aspects that need to be included – this is located in Chapter 4.3. By creating a design criterion, the design of the app can be consistent with the purpose and initial idea for the app. Therefore, the design remains within the parameters of being an educational app for Tongan people using culture-specific features that support their learning styles.

The target audience (see Section 5.4) is identified to focus the study on a group of people whom the app is made for. In this study, the target audience are Tongans who are interested in learning about their food culture and enjoy sharing information about Tonga. The target audience can be defined by listing the audience's interests, location or environment and characteristics to define the type of end user. The description of the target audience assists the designer during the design process and ensures that the target audience's needs are met. By defining the target audience of this study, the design of this study's proposed app can be designed specifically towards the needs of the users.

User journey maps are the possible actions a user may have to undertake to achieve a task (Martin & Hanington, 2012). The stories address the negative aspects of a user's journey and presents ideas that could be integrated into the design, targeting the negative challenges a user may come across (Martin & Hanington, 2012). In Section 5.3, user journey maps demonstrate the target audiences' actions when trying to discover and understand traditional Tongan food culture. The user journey map assists this study as it identifies problems for the designer to solve in order to ensure that the user is able to achieve the goal of finding the desired information.

User stories are a user centric approach that assists the designer in identifying the users' needs and desires (Milicic, Perdikakis, Kadiri, Kiritsis & Ivanov, 2012). User stories are part of the design process and relevant to this study as they assist in identifying the user's goals in order to achieve a task. User stories differentiate from user journeys as user stories are clear statements that define the end user and their goal in order to achieve a task. User stories can be created with the help of user journey maps as they identify the potential struggles and goals of the user.

A design concept outlines the design ideas (Oxford Dictionary, n.d.) such as features and the functionality for the proposed app of this study. The formed design ideas are based on the previous design steps such as the design criteria, user stories and user journey maps. The design concepts are written ideas which include the aspects needed in the app, the features that support those aspects, how the features work and what the features can produce. The design concepts of this study are located in Section 5.5.

A site map gives a visual overview of the app's information and navigational structure (Martin & Hanington, 2012). The site map, located in Chapter 5.6, organises the different design ideas into categories providing a structure that users would be able to navigate through. A site map is created to make the user's navigation simple and easy when using the app. Through a site

map, a designer is able to design the app according to the information architecture that enables the usability of the app to be understandable and easy for the end user.

Once a site map is created, wireframes are drawn using pen and paper (Martin & Hanington, 2012). Wireframes are concept drawings of the app that can be seen in Chapter 5.7. The reason why designs are drawn with pen on paper is to enable the designer to easily elaborate or dispense with the ideas as necessary (Martin & Hanington, 2012). Simple drawn concepts are encouraged so numerous iterations are created, therefore the designs may improve each time according to the design criteria. The final design is chosen once the design consists of all the design criteria aspects and meets the user's needs as depicted from the user stories.

Reflecting on the designs are a part of the design process, to ensure that the designs match the criteria and purpose of the app. As this study is about designing a mobile app for Tongan people, reflecting on the designs are a key part of the process to ensure that the final design meets the criteria and needs of the users.

Interactive wireframes are created to provide a visual demonstration of the look and feel of the proposed app (Martin & Hanington, 2012). The interactive wireframes are located in Chapter 5.8, with visual images of the designs and written explanations regarding the reasoning behind the chosen features and aspects of the designs.

3.6 Summary

This chapter discussed the methodologies and the research design of this study. The relevance of *talanoa,* practice-based research and user-centred design are determined in this chapter. *Talanoa* provides the designer an understanding of the Tongan style of communication, thus enabling the designer to integrate the cultural communication styles into the app. Practice-based research allows for exploration of ideas in practical ways such as creating an app. User-centred design is an approach in designing a product for the end user's needs. Therefore, UCD is used to identify the Tongan user's learning needs. The research design demonstrated the structure of this study, displaying how *talanoa* and user-centred design are used along with the design process. The next chapter begins the implementation of the research design by establishing the criteria for the app proposed by this study.

Chapter 4: Culture Specific App Development: Design Criteria

4.1 Introduction

Chapter 4 discusses the culture-specific design for a Tongan food app and how this translates into the criteria for the app that this study proposes. Cultural values and the learning styles of the Tongan community are identified and categorised in order to inform the design criteria. The cultural aspects refer to the cultural features that need to be considered in the app. The Tongan communities' cultural aspects are discussed as 'user experiences' in this study. The 'experiences' enable the designer to identify the features that can represent or display the cultural aspects in the app. The feature that best represents or displays the cultural aspects is video. This chapter discusses how videos can provide the user with the ability to continue using their cultural practices and values while operating the app. With the app features identified, a design criterion is listed to ensure the design of the app meets the Tongan target audience's learning and communication style.

4.2 Culture-specific design for Tongan app

The following table (Table 1) maps the cultural aspects to the app features that are suitable for Tongan people, assisting in determining the aspects that guide the design of the app. The first column of Table 1 is the *Cultural Aspect*. This column refers to the identified cultural aspects that need to be considered for the app. The *Experience* column refers to how the respective cultural aspects are traditionally experienced. The traditional experiences of the cultural aspects are matched with *Possible Features* that can be present in the app. The fourth column identifies the *App Feature(s)* that best facilitate the respective cultural aspects. The final column is the *Narrative* describing the content that could be captured, which demonstrates how the cultural aspects can be seen.

Table 1

App features that can cater to Tongan cultural aspects

Cultural Aspect	Experience	Possible Features	App Features	Narrative
Learning by observing and imitating	Observing and imitating • Observing people's actions • The language that is used • The way people interact with others • Culturally appropriate behaviour	Video • Speech and body language are seen • Culturally appropriate dress Images • Step-by-step visual images of what is happening/what to do	Videos can capture the way people behave around others during ceremonial functions. The interactions and language people use when communicating with others can demonstrate to the viewer the Tongan customs and way of communicating with others. Additionally, the viewer can learn the Tongan way of behaving in front of different people with different statuses.	Follow a girl who is greeting and serving food to the honoured guests. The style of following is inspired by the *Man vs. Wild* documentary (tracking) with a cameraman following and capturing the main character's actions. A wide shot can capture people eating, dancing and singing at the celebration.
Sharing information/ Storytelling	Face-to-face oral communication • Visually see facial expressions • Body language can show the person's feelings during the storytelling	Audio • Listen to the story being told Video • Watch facial expressions • Watch the body language used • Listen to the verbal language used Images • Show context of the story	Videos can capture the way a person tells the story verbally and visually. Facial expressions and the voice of the storyteller can provide a visual experience to the listener/viewer. Video provides users an alternative asynchronous face-to-face communication style of listening to stories.	A person begins the video by introducing themselves and beginning to share the story of *ufi*. The person discusses how chiefs would present the *ufi* to the Gods, and the meaning it had. The person could film themselves using the front-facing camera to tell the story, capturing their facial expressions.
Faka'apa'apa (Respect)	Attentive listening • showing respect to what they are saying • acknowledging the speaker and taking in the information shared Speaking in a calm voice	Audio • Can listen to the person speak • Can speak to the other person Video	Videos can capture the way people show respect towards other users. *Faka'apa'apa* can be seen during synchronised videos such as a video conference. As people are talking in the video conference,	A man begins a video conference by inviting his friends to discuss about *talo* and the different types of *talo* there are. The men introduce themselves and talk about the different *talos*, sharing

	• Communication is clear • Not interrupting or speaking over each other	• Can show that a person is listening attentively • Nodding of the head can be seen as acknowledging what the person is saying • Can visually see when the person has stopped talking so interruptions are less likely to occur	each speaker would show respect by letting each person speak during their turn.	information that may not be known to other Tongans.
Anga lelei	Good behaviour • Acts appropriately to the situation • Offers to help another person • Friendly • Treats people well • Welcoming	Video • Can show good behaviour • Allows people to see the kind of person an individual is during interactions Images • Can show body language and dress code (appropriate clothing)	Videos can demonstrate *anga lelei* by the way people behave and treat others. The video component can visually show the actions and the language that is used enabling viewers to understand the Tongan way of *anga lelei*	*Anga lelei* can be seen in someone who is helping out in the kitchen, setting up the dining area before the guests arrive, greeting the guests and serving the food during the communal feast. Anga lelei can also be seen while men are talking about *talo* (taro) and its importance in the Tongan culture in a synchronous video conference.
Cultural identity	Relating to people • Sharing same interests • Similar upbringing • Enjoy the same food • Behave in similar manner Cultural connection with food • Remembrance of home • Have a stronger connection to Tongan food due to culture	Video • Talking about interest and similarities with other people • Could connect with people who enjoy the same foods • A satisfying feeling when eating the food Images • Shows a person enjoying the food • Shows activities that Tongan people enjoy	The videos and images can bring people together as they bond over food interests such as the meaning of *talo*. Talking and learning about the history and meaning of *talo* through synchronous video conferences can bring people together as they bond over learning about *talo*. People who think and have similar thoughts could build a connection, which can lead to friendship. Learning about *talo* can lead to having a connection	A person sharing a story about the way they assisted in the growing of *talo* could connect with another user. The style of growing the *talo* could build the connection into a user identifying themselves with another user, which could lead to gaining a sense of cultural identity with the Tongan culture.

			with the Tongan culture. Connecting with other app users can also lead the users to feel part of the group, thus leading to users having a sense of cultural identity.	
Community and friendship	Participate • Discussions • Activities/events • Interactions Conversations • Asking a question • Answering a question • Sharing information • Group discussions • Sharing about events, activities and food	Images • Showing participation in events and activities • Tagging each other Videos • Conference call • Replying and responding • Answering questions • Sharing more information • Send and leave a message Text • Replying or answering questions • Adding more information • Sharing personal information to build a friendship Audio • Call • Send and leave a message	Images can contribute to cultural communication as images are used to show the places people are interacting with other Tongans in functions that include Tongan food and culture. Videos can also contribute to cultural communication as it demonstrates and shares how the Tongan people interact with others. Traditional Tongan behaviour can be visually seen and heard through the video format, showing culturally acceptable behaviour. Text can demonstrate appropriate language that is seen as culturally appropriate, such as greeting and asking how a person is before starting the intentions of the conversation.	A girl creates a video asking about the difference between *ufi* and *kape*. A lady films her responses to the question explaining to the girl the difference. A man also responds to the girl's question by explaining the differences, and showing the girl the vegetables and the different textures and shapes. As users communicate and respond to each other, a sense of community may be built.

Note. Source: author's own.

4.2.1 Learning by Observing and Imitating

As observation and imitation are learning styles of the Tongan people (Section 2.6.1), videos can be used to observe a person in action. As Thaman (1993) and MacIntyre (2008) noted, an individual can learn about the culture and way of life by observing people in the environment. Videos and images were identified as possible features that might allow a person to observe and imitate another person.

Videos could capture the verbal language and body language of a person, providing the viewer an opportunity to observe and imitate. Therefore, the viewer could learn to conduct themselves in a culturally appropriate manner. *Faka'apa'apa* (see Section 3.4) and *anga lelei* (see Section 3.4) can be learnt by observing the actions of a Tongan person through a video.

Actions can be observed through synchronous and asynchronous videos. Synchronous is defined as occurring at the same time and asynchronous is defined as not occurring at the same time (Oxford Dictionary, n.d.). Hrastinski (2008) declared that asynchronous e-learning is the ability to learn at any time, allowing the learner to comprehend the content at their own pace, as an immediate response is not required. Therefore, asynchronous videos can provide viewers the ability to watch the video and learn in their own time. Videos that users could learn from by observing and imitating are Tongan peoples' interactions at events such as birthday celebrations. The Tongan birthday celebrations would consist of traditional practices such as having a table full of the best foods which would seat the honoured guests at the birthday. The way the honoured guests are greeted, seated and served can demonstrate *faka'apa'apa* and *anga lelei* which are part of the Tongan culture. The food that is present on the honoured guests' tables would demonstrate the Tongan food and culture. The food that is placed on the honoured guests' table is the most esteemed, therefore a video capturing the food and the way the foods are presented on the tables could present Tongan food culture to the viewer.

There are different ways that a video can facilitate observation and imitation learning styles. The first way that videos can enable observation and imitation is by following (or tailing) a person. An example is the *Man vs. Wild* documentary series (Shearman & White, 2011). The tracking shot is the cinematic style of *Man vs. Wild* (Shearman & White, 2011) as the camera follows the main character Bear Grylls as he is stranded in regions with no civilisation. The tracking shot demonstrates how Grylls survives in conditions such as those in a jungle. The tracking shot captures the actions and interactions of a person and this is used as a visual learning style. Therefore, the tracking shot can be used in the app to enable users to learn by observing the actions and interactions of a person during communal celebrations. The actions and interactions of a person can demonstrate the culturally appropriate way to behave in a certain social environment. As the camera tails a person during a celebration such as a birthday, the user watching the video can observe the actions of a person and gain an insight into the Tongan way of greeting people. The user can also learn how to serve meals to honoured guests and the most esteemed foods at the birthday celebration. The way the person behaves and conducts

themselves as the camera follows them can provide the user an outlook of how to be *faka'apa'apa* and *anga lelei* during ceremonies.

Another video style is a wide shot of the environment and people. A wide shot can provide the user an opportunity to observe all the actions and behaviour of all the people in the celebration. As a camera is placed from an angle and captures a wide shot of the venue, the user can observe the Tongan traditions and the way foods are presented and served.

For users to know how to film a learning video, the label of the learning video feature would have to be clear for the users to understand. Phrases such as 'Capture what is happening' could be the label which demonstrates to the user how the particular feature works. Prompts on the screen such as 'Follow and capture the actions of a person' could encourage and provide the users an idea of how to film what is happening. Different prompts on the screen can appear each time the user wants to capture what is happening, i.e. 'Set the camera at a corner and capture the entire entertainment' for users to capture wide angle shots.

4.2.2 Storytelling

Tongans traditionally share information orally through storytelling (see section 2.6.1). Stories can provide an understanding of Tongan values and beliefs (Brown et al., 2005; Duncker, 2002). The internet has extended the use of oral communication, therefore the audio function of the video feature of an app can provide users the ability to communicate orally with one another (Prescott, 2009). Inamara and Thomas (2017) stated that videos could capture facial expressions and the body language of a person as they tell a story, which can present an innovative way of illustrating Tongan life. Moreover, the video feature can provide a greater understanding and context of the Tongan culture, as it can transfer ideas and cultural beliefs through the body language and storytelling of a person (Wagner et al., 2003; Finnegan, 2012; Inamara & Thomas, 2017).

Stories that are recorded and made into videos about *ufi*, for example, can capture the storyteller's facial reactions and body language. The emotional connection and the way the storyteller shares the story can provide the user a visual imagination of the story being told. Asynchronous videos that are recorded and posted for other users to watch in their own time is a convenient way the app user can learn about the meaning and history of *ufi*.

The video format captures visual and audio parts of a person telling a story, which is a greater advantage to the user compared to simply listening to an audio or reading a text that explains the history and the importance of *ufi*. The user viewing the video can gain knowledge and understanding about *ufi* through the video's audio and visual features that enable storytelling.

The content of the videos for storytelling could begin with the user introducing themselves and then talking about a food topic such as why *ufi* is the most esteemed root vegetable in Tongan culture. The user could discuss the way the *ufi* is grown and the length and width of the *ufi* that

makes it revered. Furthermore, the user could also discuss the history behind the importance of the vegetable which was traditionally presented to the Gods (see section 2.5.2).

The storytelling videos can be filmed in two ways; through the rear-end camera and the front-facing camera. The rear-end camera can be used to film another person telling the story of Tongan food, capturing the essence of sitting and listening to a story amongst people. Filming through the rear-end camera is to provide the sense of participating in listening to the story.

The front-facing camera enables users to view themselves while filming, through the mobile screen. Front-facing videos can be used to provide the user the ability to listen and learn from the teacher as if they are listening and learning in a face-to-face conversation. As Violeti (2006) stated, the body language is a part of the communication. Therefore, the front-facing camera can be used to ensure that the user is able to capture their facial expressions and body language when sharing a story. Capturing the facial expressions and body language through videos can add more context to the story, providing a more visual and emotional understanding.

It was identified in Table 1 that images could also add context to the story. Therefore, the ability to add images to the video could strengthen the story by providing the user with visual examples. The more information the user gains from the story, the more knowledge of Tongan culture and understanding of Tongan food culture can occur.

4.2.3 Faka'apa'apa

In Tongan culture, *faka'apa'apa* (see Section 3.4) is an essential behaviour when interacting with other people. Showing respect, whether it is face-to-face or online is important in the Tongan culture. Therefore, the features in the app would need to function in a way that could promote and facilitate *faka'apa'apa. Faka'apa'apa* could be achieved by the language which is used to address another person; such language as greeting others with a hello or *malo e lelei* and asking how the person is before asking any questions about the Tongan food culture. By beginning the conversation by introducing oneself, it can encourage users to set the tone and boundaries in communicating respectfully with one another.

Faka'apa'apa can also be represented through videos by people listening attentively and speaking clearly and calmly to another person. *Faka'apa'apa* is traditionally in the form of face-to-face communication, however, as this study intends in the use and creation of an app, *faka'apa'apa* will need to be mediated. Video and video conferences could provide a means to mediate and follow Tongan practices of *faka'apa'apa*. Video conferences are synchronous forms of communication, whereas videos are asynchronous. Hrastinski (2008) stated that synchronous e-learning such as video conferencing can make the learners feel psychologically motivated as video conferencing is a close resemblance to face-to-face communication. Synchronous communication provides users the ability to view the receiver's reaction, which makes the communicators committed and motivated to join in the conversation (Hrastinski, 2008). The clothing and body language are ways of being *faka'apa'apa* towards others (Violeti,

2006). As Violeti (2006) stated, appropriate clothing such as clothes that are not too tight or revealing should be worn when conversing with other Tongans. The dress code can represent the respect that is shown to others.

Videos could capture a person's personality and attitude when talking to the camera or other users. It is through synchronous video such as video conferences that can illustrate a user's personality and attitude. The conversations and the way the users speak to each other, can communicate the user's personality. A user who asserts dominance over others and boasts about themselves can also demonstrate the kind of person the user is.

The kind of content that could capture a user being *faka'apa'apa* is that displayed during a synchronous video conference when discussing Tongan food, e.g. *talo*. The video conference could begin with four men introducing themselves and greeting each other, before discussing the different *talos* that are grown and eaten in the Tongan culture. It is through the synchronous video conference that the men would practice *faka'apa'apa* as they would have to listen, acknowledge and respect each person's input and take turns speaking about *talo*.

4.2.4 Anga Lelei

Anga lelei (see Section 3.4) is a core value that is important in the Tongan culture. *Anga lelei* is to present oneself appropriately with the relevant body language and clothing (Vaioleti, 2006). *Anga lelei* could be integrated into the app allowing users to observe the way Tongan people talk and address each other. Through observing other users' interactions, users could learn the culturally appropriate manner of speaking by imitating the actions and language used. App features that could promote and facilitate *anga lelei* are images and videos. Images could show and present the body language and the dress code of an individual. However, videos could capture and display a person's interactions, where the body language and dress code are visible and can be learnt through observation.

To observe is to watch carefully and register something being significant. In order for people to observe *anga lelei* through videos, the video should be filmed with an emphasis on tasks that a person is performing, such as greeting a guest as they arrive. Video content that demonstrates *anga lelei* can be seen in actions such as listening to elders who are asking a younger person to do chores and serving food to guests seated at the tables – this can help users learn how to behave in social environments.

Discussions with other people are ways in which *anga lelei* can be practiced and identified. Live video discussions or synchronous video communication, such as video conferencing could allow users to communicate face-to-face and view people's behaviour and attitude. Through the face-to-face synchronous video discussions, the behaviour can be watched, learnt and practiced.

Anga lelei could be seen in the app through video content such as synchronous video conferences and video responses as users communicate with each other. Similar to *faka'apa'apa, anga lelei* can be seen through synchronous video conferences as users are able to practice *anga lelei* while communicating with others. As users discuss the importance of *talo* and take turns sharing the information, the behaviour that is presented can demonstrate their *anga* (behaviour). Video is a suitable feature that can be used in the app that includes *anga lelei* as the video feature can capture the action and verbal Tongan behaviour and attitude of users.

4.2.5 Cultural Identity

People can gain a sense of cultural identity by relating to other people and having a cultural connection to food (see Section 2.3). As an individual begins to gain knowledge about the cultural importance of Tongan food, they could build a connection with the Tongan culture (Vaioleti, 2006; Haden, 2009; Kittler & Sucher, 2000). As the individual communicates with other Tongans about their food culture, they could build a connection with the Tongan people. This could lead to an individual identifying themselves with other Tongans and building a sense of belongingness to the group, which could lead to creating an online Tongan community (Al-Momani, 2016). The *Experience* column for cultural identity covers how people can relate to others by sharing the same interests, enjoying the same food, having the same upbringing or similar manners (Section 4.3.1). Users who are familiar with the cultural foods could further gain a cultural connection to the food, as it might remind the users of their native homeland. This would therefore lead users to gain a connection to their homeland and through the online Tongan community.

The possible features that were noted in Table 1 that might assist the users in gaining a sense of cultural identity, were videos and images. Through videos, individuals would be able to talk about interests and similarities with others, and furthermore, form a connection with people who enjoy the same foods (see Section 2.3). Asynchronous videos can capture users discussing the different foods and sharing the information with other users, thus, allowing them to learn and gain a sense of Tongan culture. Images can also show people participating in activities and enjoying the food. The images and videos could bring users a sense of belonging to the Tongan culture as they interact and connect with users who enjoy the same activities and foods; this potentially enables users in gaining a sense of cultural identity.

Videos and images can be used to capture food and the cultural environment which the user can learn from. Videos of a Tongan cultural event can provide the user a sense of participation in the community. The interactions of Tongan people displayed in the video could provide an understanding of Tongan culture and behaviours. Through the interactions in the video, it could offer the user a sense of identity as they could create an emotional connection with the Tongan culture. Additionally, seeing food and people could remind individuals of their cultural heritage, creating a sense of cultural identity through the culture and food. This could create a sense of identity and belonging to the Tongan culture (see Section 2.3).

Videos of people sharing stories can also give users a sense of cultural identity. As people film themselves sharing stories, a user could connect with the story and identify with the culture. Images inserted into the video that provide a visual context to the story, can further create a connection with a user. This could thus lead to a sense of cultural identity (Section 2.6.1). As the videos would be used by Tongan people the stories could be told in the Tongan language. Therefore, an English translation such as subtitles on videos would be useful for those who are unable to understand the Tongan language or vice versa. Videos and images were both identified as suitable features that could enable a person to have a connection and gain a sense of cultural identity.

The type of content that can connect users to the Tongan culture and could possibly provide users a cultural identity are stories. Users could build a connection with other Tongans by listening to the history of *talo*, for example. The users could identify themselves as having similar interests with the storytellers. Understanding the different *talos* that are grown and the cultural meanings could bring the user the feeling of being closer to the Tongan culture. Therefore, watching a video about Tongan food could create a connection to Tongan culture, which could lead the user to gain a sense of belonging, as they identify and acknowledge the food as part of the Tongan culture.

4.2.6 Community and Friendships

In order to be part of an online community or create friendships, participation in and beginning conversations with others are crucial (Romm, Pliskin & Clarke, 1997). Participation in discussions, interactions, activities or events were noted in the *Experience* column as a way people can create a community and build friendships online (Romm et al., 1997). A user can relate to another user by having similar interests or perspectives, which can lead to a user identifying themselves with another user or group of users. Building a friendship with another user or multiple users can lead to a sense of belonging to a group such as a Tongan online community on the app. Starting conversations by asking or answering questions or sharing information can help build friendships and an online community (Romm et al., 1997). Features (see Table 1) that could possibly help build friendships and create a community are images, videos, text and audio.

Images could be used to share users participating in events. Sharing images with others can encourage individuals to also take part in the activities and events they are participating in which can lead to building a stronger community. Images that capture people at events and participating in cultural celebrations can provide users an understanding of Tongan culture. Wide shot images can give the users an understanding of the entire event, as it captures the setting, thus, providing context to the celebration. Long or mid-shot images of peoples' body language and clothing can display the atmosphere and the environment. These images can create a sense of community as users connect with the peoples' feelings. The images can also create a sense of community as people bond over celebrations and the enjoyment of viewing and participating in events.

An example of the kind of image content that may be on the app might be a birthday event, with people sitting together at a table, plates full of Tongan food and enjoying their meal. The image could demonstrate a sense of community and people coming together to celebrate a birthday and enjoying the food. As Haden (2009) stated, food is communal for Pacific Islanders such as Tongans.

Videos can also assist in building online communities as individuals capture the activities, stories and feelings about the culture (see Section 4.3). Friendships can be built through watching and connecting with a user through videos. Synchronous video communication can also build a strong friendship between users (see Section 2.6.1). Additionally, users can create an attachment to a user whom they feel a particular connection with. As users partake in the synchronous video conference, they could connect with fellow members while discussing Tongan food. Friends can be built through video conference calls as users can also communicate privately with another member, which can lead to friendships being built. Asking and answering questions can also connect people through topics of interest. Asking and answering questions related to Tongan food can be done through videos. As face-to-face communication is an important part of the Tongan culture, it can also create a greater bond between members during discussions. Members who participate could have a stronger connection and attachment to the culture, therefore, contributing to the individual's identity.

An example of the kind of video content that can be seen in the app is the difference between *ufi* and *kape* (giant taro) being discussed. The video captures a girl's face asking the question about *ufi* and *kape*. A user (lady) could reply using the front-facing camera by filming a video of herself talking to the camera and answering the question. Another user (male) could show the girl the difference between *ufi* and *talo* by using the rear-end camera showing the two different vegetables. The male user could point out the difference between the two vegetables, providing information and answering the girl's question. By users answering each other's questions understanding Tongan food, the users could learn from each other and create a bond together which could lead to friendship.

Text can be used to converse with other people, such as replying and answering questions, providing information and sharing personal information. Text can also contribute to people building friendships (Romm et al., 1997). Sending text messages privately to another person can build a friendship as individuals share personal details about themselves. Text can also be used to add more information such as providing more context to images or videos with a caption. As text is used to provide more context, users could gain more insight into the images and videos.

An example of how text can be used in the app is a New Zealand girl sending a message to a Tongan girl. The two girls connect over their love of *puaka* (pork) and what they like to eat it with. The girls continue to message each other about different ways they like to eat *puaka*,

sharing which vegetables they prefer and what other side dishes they recommend when eating it.

4.3 Design Criteria

The design criteria in this study is used to outline the elements and necessary features that should be included in the design of the app. A design criterion is a standard that can be judged against something (Oxford Dictionary, n.d.). Tongan learning styles are a crucial part of the app; therefore, they need to be included into the design criteria. During the design process of the app, the design criteria will ensure that Tongan learning styles and other crucial features are embedded. From the culture-specific design for a Tongan app (see Section 4.2), Tongan aspects were identified. Through the identification of the Tongan aspects that can be integrated into the app, a list of design criteria is created to ensure that the features related to the culture are implemented into the design.

The design criteria for the proposed app for this study are:
- Facilitate real-time conversations
- Ability to learn through observing and imitating
- Learn in their own time
- Facilitate face-to-face communication
- Encourage community-based learning
- The ability to make friends

4.4 Summary

Chapter 4 identified the key app features that would be suitable for the app. The features consider the Tongan target audience's behaviour and style of learning. The introduction of videos as an app feature were identified as the most culturally inclusive of Tongan learning and communication styles. Other features such as images and text could also contribute to the cultural appropriateness for Tongans to interact with each other through the app. The use of the features, videos, images and text, may impact users with knowledge about culturally appropriate behaviour in different environments. The features could also provide the users with the ability to bond with community members, leading to creating friendships and a sense of cultural identity. Identifying the features enabled the practitioner to create a design criteria that included the Tongan aspects, which can assist the designer in the creation of the app and ensure the designs match the purpose of the app.

Chapter 5: Design Process

5.1 Introduction

This chapter discusses the design process for this study. The chapter begins with a clear statement of who the target audience is: Tongans in New Zealand and indigenous Tongans. The second phase of the design process identifies the scenarios the user could encounter when trying to discover the answers. This is called user journey maps. The third phase is the identification of the users' wants and goals in achieving the task, which is called user stories. The fourth phase is the design concept. A design concept was based on the user journey maps and user stories. Following is a site map, an information architecture for the app, providing users an easy way of accessing all the information in a logical structure. The sixth phase is the design of the wireframes. The designer created numerous iterations of the designs using pen and paper, improving the designs each time till the desired outcome was achieved which consisted of all the crucial elements in the app. The last phase of the design process for this study is the creation of an interactive wireframe. The interactive wireframe is a visual demonstration of the way the proposed app could look and function.

5.2 Target Audience Profile

The app intends to reach and connect two audiences, (1) Tongans living in New Zealand and (2) indigenous Tongans residing in Tonga. The reason for two audiences is for indigenous Tongans to teach the Tongans living in New Zealand more about their native food culture. As indigenous Tongans live the Tongan way of life and would know the Tongan food culture, their cultural knowledge can be passed onto Tongans living in New Zealand who are interested in learning more about their own culture.

5.2.1 Tongans wanting to know the Tongan food culture

The app intends to cater to Tongans raised in New Zealand, who are curious or wish to learn about their traditional Tongan culture. Specifically, they want to know about the Tongan food culture. The audience possess a smartphone and often use social media apps such as Instagram, Snapchat, Facebook and Twitter. Their knowledge of the significance of Tongan food is limited due to living in New Zealand, so consequently they are unable to understand the issues regarding the food culture. Unfortunately, the audience is unable to fly to Tonga every time a question regarding traditional foods come to mind.

5.2.2 Tongans wanting to share the Tongan culture

Indigenous Tongans have first-hand experiential knowledge about Tongan culture. The app is targeted towards indigenous Tongans who have a smartphone and enjoy taking pictures and videos. Indigenous Tongans who enjoy posting videos and images on social media platforms such as Facebook, share what they are doing with friends and family to stay connected. The target audience enjoys sharing information about themselves and interacting with other

Facebook members on posts about Tonga. Knowledgeable about the Tongan food culture, history and traditions, the indigenous Tongans like to learn, share and teach others about Tonga.

5.3 User Journey Map

A user journey map is a story that captures a series of events a person experiences when interacting with a product or service (Martin & Hanington, 2012). The map can help a designer understand and identify a user's actions and perceptions during interacting with the product or service (Martin & Hanington, 2012).

Martin and Hanington (2012) argued that it is important that the user journey map truthfully represents the user's experience of frustration, confusion, delight and closure. Furthermore, the authors stated the importance of having more than one journey map for different users who have different aims. Therefore, two user journey maps are created for the two different target audience groups. One representing the Tongans living in New Zealand and the other representing the indigenous Tongans.

The table below represents the actions of a Tongan living in New Zealand (see Section 5.2.1). Table 2 identifies the actions, questions, happy and painful moments a person may have trying to discover answers regarding Tongan food culture. The last row, *Opportunities* displays possible solutions for the user.

Table 2

User journey map of Tongans wanting to know about Tongan food culture

Tongans in New Zealand	Discovering	Researching	Found Information	Understanding information	Found Answer
Action	Typing on Google to find information about Tongan food culture	Searching for specific Tongan food and its significance (i.e. pork)	Reading about the information online and in books Watching someone talk about the topic via videos Talking to someone about the topic	Discussing it with other people Noticing the role food plays in Tongan society	Wanting to continue searching, learning and talking to other people about Tongan food and the culture
Question	How do I find the information? Where do I go to find the information? What do I have to type to get accurate information? Is there a website that has this information, or can I only get it by talking to Tongan people?	Is there information online about this? Where can I find information about pork within the Tongan culture? Must I talk to people to find the information? If so, who do I talk to? Are there books on this? Where can I find these books? How much are the books?	What makes pork so significant in the Tongan culture? Why do Tongans continue the traditions today? Is this what I'm really looking for? How do I ask this of a person?	Do I understand the reasoning behind the significance of Tongan food?	Where can I go to find more information about Tongan food culture? Will the same people know the answers to my questions? Will the same books and websites have the information that I'm wanting to know?

Happy Moment	Discovering the information	Found information online Got the answer from a person Read about it in a book	Receiving the correct information	Being able to talk about it with others Showing that they understand it	Understanding and wanting to learn about more Tongan foods Able to continue learning
Painful Moment	Not finding any information	Can't find any information online People don't know the answer Don't know who to talk to, to get the information Haven't found any books on the information of pork and its significance in Tongan culture	Not the information I was looking for Still looking for the information Does not answer my question Only discovered part of my question	Still haven't found the information that I was looking for Still not able to understand why pork is so important	Was not able to find the answer to the initial question
Opportunities	Place that allows user to easily locate information about Tongan food culture	An online platform that allows Tongan people to share their knowledge and information about the significance of Tongan food such as pork	Ability to ask anyone the question Anyone who knows the answer can answer the question	Can be easily explained to someone who is not familiar with the information Learn the information in an entertaining way	An online platform that has all the information a person needs to know about Tongan food culture Encourages the person to learn more about other Tongan foods to gain a deeper understanding of the culture

Note. Source: author's own.

An online platform with information about Tongan food culture was identified in the *Opportunities* column of Table 2 as a way that users can discover all the information and answers regarding the topic. The online platform could provide Tongan users the ability to ask questions and read information about Tongan food culture. By containing all the information of the Tongan food culture on one online platform, individuals would know where to go if they are in need of answers. Additionally, the users of the online platform would be able to communicate with each other and encourage each other's learning. This therefore demonstrates an app that provides the user with a central place to communicate and learn from Tongans who hold information about their food culture.

Table 3 represents the actions indigenous Tongans may come across when wanting to share information about their culture.

Table 3

User journey map of Tongans wanting to share Tongan culture

Indigenous Tongans	Discover	Research	Providing Answers
Actions	Discovered that people are wanting to learn about Tongan food culture	Talking to the people about what they want to learn about Tongan food culture	Sharing the information that answers the question Talking about the answer to the questions
Questions	Who are those people that want to learn about Tongan food culture? Why do they want to learn about Tongan food culture?	What are they wanting to know about Tongan food culture? Why is it important for them to know? Will I know the answer to the question? If I don't know the answer, do I know someone else who can answer the question?	Do they understand what I have told them? Have I explained it well to them? What other questions do they have? Can I answer all the questions about the topic?
Happy Moments	Found the people who are wanting to learn about Tongan food culture	Knows the answer to the question Is able to answer the question Can share the answer with others	Is able to answer the question Question was answered The person understands the information shared The person can explain the information clearly
Painful Moments	Cannot find the people who are wanting to know about Tongan culture	Does not know the answer to the question Does not know anyone else that can answer the question	Cannot answer the question(s) Cannot find another person that can answer the question(s)

Opportunities	An online platform of people wanting to know more about Tongan culture	More than one person is able to answer the question	An online platform where people can share their knowledge about Tongan culture Multiple people are able to answer questions providing the learner with a lot of information

Note. Source: author's own.

Table 3 outlines the journey map of indigenous Tongans (see Section 5.2.2) who would be interested in sharing their knowledge about Tongan food culture. The possibility of an online platform was also identified in the *Opportunities* row as a way indigenous Tongans could communicate with the Tongans in New Zealand. As the online platform would provide a place for all the Tongans to communicate, multiple users would be able to answer the questions a user may have. Thus, proving that the app can be a platform useful for Tongans to learn from one another.

Table 2 and Table 3 also demonstrates the proposed app of this study as being a useful platform that could unite Tongan users who are interested in learning or sharing knowledge regarding Tongan food culture.

5.4 User Stories

As identified in the user journey maps, an online platform could enable Tongans to learn about Tongan food culture. The online platform's content consists of Tongan food and cultural practices, thus demonstrating that the app this study proposes can be a useful tool in assisting Tongans in learning about their food culture. User stories can assist in understanding what the user wants to do in order to complete a task. They take a user-centric approach that integrates the ideas from *Opportunities* (in Table 2 and Table 3) and defines the user's wants along with some scenarios (Milicic et al., 2012). The authors Milicic et al. (2012), recommended user stories to follow the structure of "As <user> I want to <feature> so that <value>" (p.62).

Tongans wanting to learn about the Tongan Food Culture User Stories

As a *Tongan interested in learning about Tongan culture*, I want to *know where I can find information about Tongan food* so that *I can gain more knowledge about traditional Tongan food.*

As a *Tongan interested in learning about Tongan culture*, I want to *search information about Tongan food* so that *I can understand the Tongan culture.*

As a *Tongan interested in learning about Tongan culture*, I want to *ask questions about Tongan food* so that *I can understand the cultural aspect and importance of Tongan food.*

As a *Tongan interested in learning about Tongan culture*, I want to *understand the information about Tongan food and culture* so that *I can talk about it with others.*

As a *Tongan interested in learning about Tongan culture*, I want to *share the information that I know with others about Tongan food* so that *they too can learn about Tongan culture.*

Tongans knowledgeable about the Tongan Food Culture User Stories

As an *indigenous Tongan who knows about Tongan food culture*, I want to *know who the people are that want to know more information about the Tongan food culture* so that *I can share my knowledge with them.*

As an *indigenous Tongan who knows about Tongan food culture*, I want to *know why they are wanting to learn about Tongan food culture* so that *I can answer their questions appropriately.*

As an *indigenous Tongan who knows about Tongan food culture*, I want to *know if they understand the information that was shared* so that *they do not misinterpret the meaning and significance of Tongan food culture.*

As an *indigenous Tongan who knows about Tongan food culture*, I want to *know if they understand the information that was shared* so that *I know I have taught them well.*

These user stories assisted the designer on the user's desires in completing a task, therefore, helping the designer focus on the important sections that need to be included into the design of the app.

5.5 Design Concept

The diagrams below illustrate the designer's thought process in how the app could facilitate certain functions. The designer identified all the possible solutions to creating a platform that would allow the users to utilise their learning styles.

Learning by observing and imitating

1. Observing and Imitating

2. Content
- Video
- Images

3. Camera

4. Edit
- Video: cut, add text, add images
- Image: crop, add text and draw

5. Label Video
- Add a title
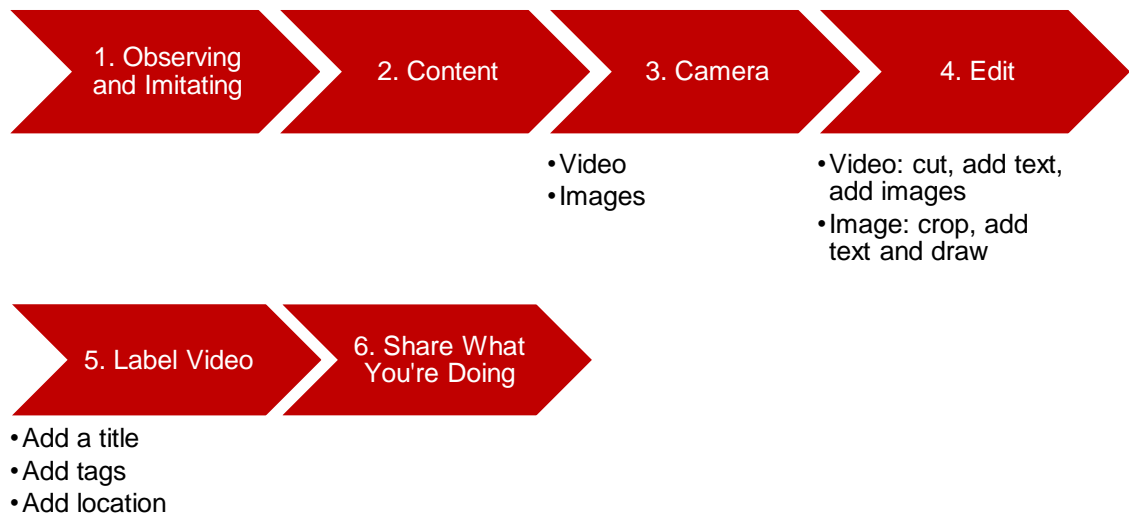- Add tags
- Add location

6. Share What You're Doing

Figure 2 How teachers can share information with learners in the app. Source: author's own.

As observation and imitation are some of the predominant learning styles of Tongan people, videos and images were identified in Chapter 4 as the features that could assist in providing these learning styles. Providing users with the ability to edit their videos and images before it is posted onto the app can add more context to the topic. As the videos or images are ready to be

posted, a title, tag and location is added to provide other users context to the post. The name of this feature is *Share What You're Doing*. The reason *Share What You're Doing* is the name given to this feature is because 'Share What You're Doing' can give the user the impression that the feature is to film or take pictures of their environment or activities. Thus, illustrating that it is an appropriate name that users would be able to identify with and understand the function of the feature. It is through this feature users could learn the culturally appropriate behaviour by observing and imitating the actions of people in the videos.

Edit Videos and Images

Tupou (2018) believes that Tongans are creative people. By providing tools that enable the Tongan users to be creative with their content, Tongans can further explore and expand their creativity (Tupou, 2018). Editing tools such as cropping, cutting, adding text, images or additional videos can give the content more context. The ability to add additional context may help learners understand what is happening in the videos or images.

Storytelling

1. Storytelling	2. Face to Face Communication	3. Create a Video	4. Edit the Video
		• Using the front-facing camera	• Add text • Add images • Add videos • Cut the video

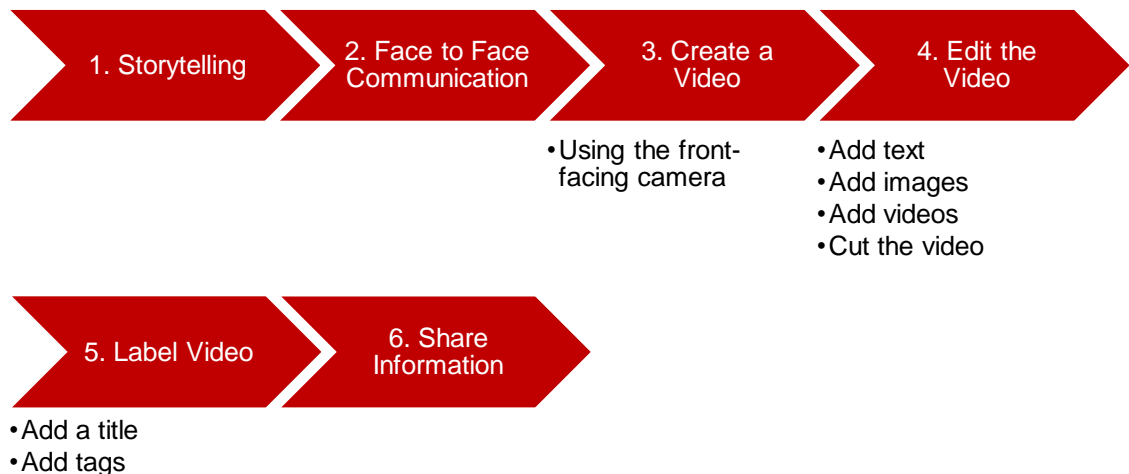| 5. Label Video	6. Share Information
• Add a title • Add tags	

Figure 3 Structure of how teachers could share a story in the app. Source: author's own.

Storytelling in the Tongan culture is sharing of information face-to-face. While an app cannot provide a face-to-face conversation, it can mediate one. Videos can both provide synchronous conversations such as a live video chat and asynchronous conversations through recording for others to watch and engage with (see Chapter 4.3). *Share Information* can illustrate to the user that this particular feature is for sharing information, as the title states.

Faka'apa'apa **and** ***Anga lelei***

1. Faka'apa'apa and Anga Lelei	2. Face to Face Communication	3. Create a Video	4. Live Chat
		• Video Conference	• Multiple people can join • Maximum of four people • Others join the queue

Figure 4 Structure of how *faka'apa'apa* and *anga lelei* can be integrated into the app. Source: author's own.

As *faka'apa'apa* (see Section 3.4) is to be respectful, the cultural value could be used and seen during video conferences (Section 4.3). In order for users to identify that the video conferences are synchronous, it is labelled *Live Video Chat*. The *Live Video Chat* is a familiar term to smartphone users as the term is already used in other social media apps such as Facebook with the respective 'Facebook Live.' As identified in the target audience profiles, the users of this proposed app would be Facebook users, therefore would be familiar with the term, thus *Live Video Chat*. As mentioned by We Are Social (2018) the number of indigenous Tongans using the Facebook app is 54,000 people. Furthermore, the English words are terms that Facebook users would identify with.

As *anga lelei* (see Section 3.4) is to behave appropriately with manners around people, the best way *anga lelei* can be seen and used within the app is through videos (see Section 4.3). Similar to *faka'apa'apa, anga lelei* can be seen during video conferences, therefore would also be part of the *Live Chat*.

Community and friendship

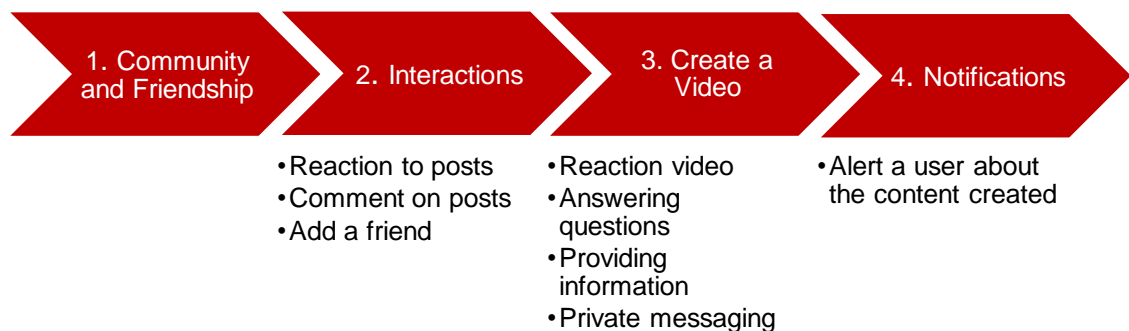| 1. Community and Friendship	2. Interactions	3. Create a Video	4. Notifications
	• Reaction to posts • Comment on posts • Add a friend	• Reaction video • Answering questions • Providing information • Private messaging	• Alert a user about the content created

Figure 5 Structure of how to build a sense of community and friendships through the app. Source: author's own.

Videos, images and text were all identified as ways that can assist in creating friendships and building a sense of online community (see Section 4.3). Interactions can create connections and

a bond between users. Some interactions such as adding friends, reacting and commenting on posts were identified as possible solutions to creating friendships. All the interactions would consist of using videos, images or text to interact with another user.

Videos are used to enhance the Tongan users' learning styles of communication by providing a synchronous and asynchronous video learning style. As face-to-face is the preferred learning style of Tongans, the alternative that can compensate for the learning style is synchronous video conferences (Hrastinski, 2008). Asynchronous video conferences are available for users who would prefer to learn in their own time.

A sense of community could be built through users communicating through the use of images. As Tongans are visual learners, images are a way that Tongans can communicate with each other to learn about the different Tongan foods. Images could also provide a sense of community as photos can be sent privately through messages for users to continue conversations. Images could assist users in learning more about Tongan food such as the difference between *talo* and *ufi*. By users sending images of *talo* and *ufi*, discussions about the differences could begin. Furthermore, users who communicate with each other could build a friendship, bringing each user together in their interest in Tongan food.

Text is an option for users to use when communicating with each other. It is a secondary form of communication as video is the primary one. Text is second to video as Tongans prefer to communicate orally than send written messages. Thus, the text options are limited in the app which are only used to add a title to videos and images, and is an option when users are privately messaging each other.

Reaction Video

Reacting to posts is a way of bonding and building friendships with other users. As Tongans are visual people, reaction videos can provide users the ability to show their feelings and thoughts. Reaction videos are recorded facial videos of a user's reaction to a post that has been created by another user. The reaction videos capture facial expressions and the replies users have to the video. Additionally, the reaction videos could be used to ask further questions or answer questions that are asked.

Answering Questions

The user stories (see Sections 5.3 and 5.4) illustrated the importance of answering questions. As the target audience have questions regarding Tongan food culture, answering the questions are an important part of sharing information for an individual's learning. Therefore, providing a feature that can allow users to answer questions is an essential part of the app. As videos can capture facial expressions, verbal and body language, it was identified as a suitable feature for answering questions (see Section 2.6.1).

Providing Information

Commenting on a post is a form of interacting with another user asynchronously. Aside from answering questions by commenting on posts, a user could also comment on a post by providing more information. Providing more information can educate more users. By providing more information by recording asynchronous videos, a user is able to learn in their own time, space and at their own pace.

Private Messaging

Adding a friend demonstrates that the user is wanting to interact with another, leading to users creating a friendship. As users become friends, the ability to communicate further is provided through private messaging. Videos, images and text can be sent to the friend as a way of bonding over similar interests and building a stronger friendship.

Notifications

As users interact with each other's posts, the creator of the post receives any notifications. Through notifications, users would be told when their posts have been interacted with, which can lead to users conversing and learning from each other. A bond with other users can be built as members converse and demonstrate an interest in the topic. Thus, aiding in the creation of friendships.

Ask a Question

1. Ask a Question	2. Content	3. Camera	4. Edit
	• Face-to-face communication • Food	• Video • Image	• Video: cut, add text, add images • Images: crop, add text and draw

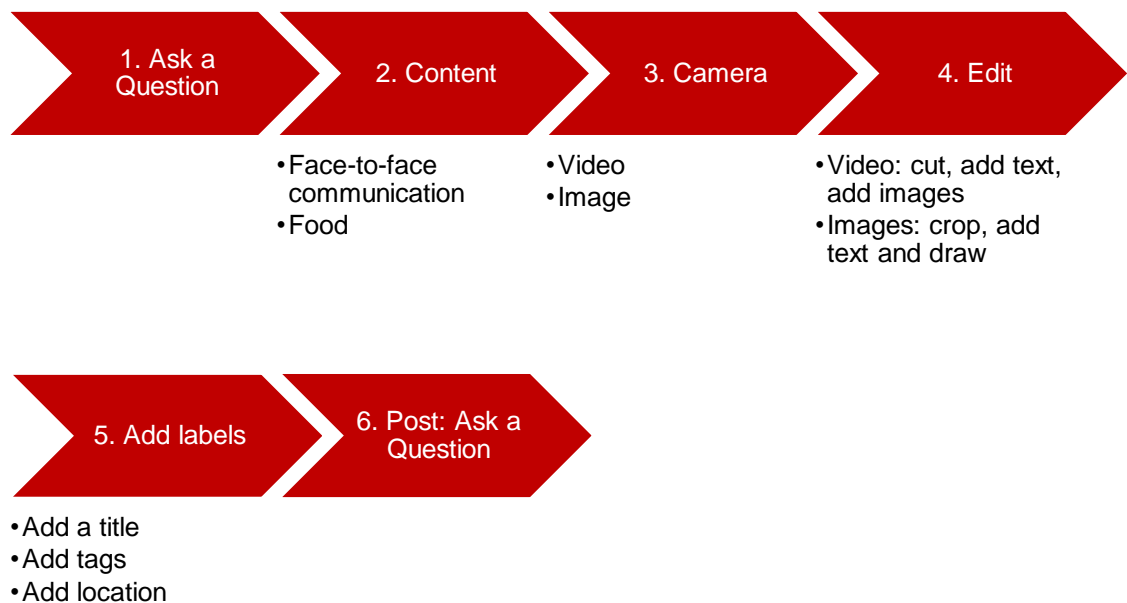| 5. Add labels	6. Post: Ask a Question
• Add a title • Add tags • Add location	

Figure 6 Structure of how a user can ask a question in the app. Source: author's own.

User stories demonstrated the importance of users being able to ask questions. Asking questions is an essential feature that should be integrated into the app. Videos and images are suitable for the target audience as videos can capture the person's facial expressions and body language. Capturing the facial expressions and body language of an individual could provide

the users the ability to further understand a user's question by reading the facial and body language of the user.

Images and text could also be used to ask a question. Taking a picture of the food and using text can be a way the user could ask a question. As Tongans are visual people (see Section 2.6.1), images and text also provide the users the ability to identify and understand the question that is being asked. Once the image has been taken, text can be added during the editing stage. Text can provide context to the question that is being asked, while the image provides the visual context to the question.

Searching for Information

1. Searching for Information	2. Search Text Bar	3. Search Categories

- Posts
- Tags
- People
- Locations

Figure 7 Structure of how a user can search information in the app. Source: author's own.

Searching information about Tongan food culture is a feature that is to be included in the app (see Section 5.4; User stories). Searching for information can allow the user to find material that could answer their questions. A search bar could allow users to enter a word and search through information specific to the word. The search function would be a useful feature in the app for the user. The search bar in the app would be labelled *Search* for users to easily identify that they are able to search for topics.

Login

1. Login	2. Profile	3. Profile Details

- Names
- Image
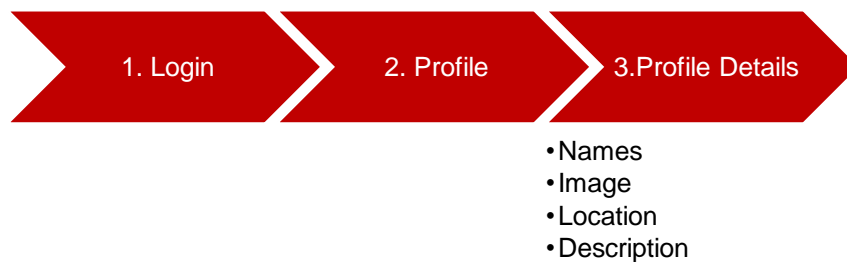- Location
- Description

Figure 8 A diagram showing the structure of the login process. Source: author's own.

Logging in is a part of the app that would allow users to enter their details, such as a name, location, an image for their profile and a profile description. These details are to create the profile of the user so when users are interacting with the posts, other members are able to identify who they are communicating with. Each time a user opens the app, the details of the user would have been saved since the previous time the app was used. By saving the details of

the user, the user would be able to create content or comment on other users' posts without having to re-enter their details every time they enter the app.

5.6 Site Map

The design features discussed in Sections 5.5 are placed into categories for a clear and easy to navigate order. A site map categorises the ideas of the design into groups and is placed into a structure the user can navigate through (Martin & Hanington, 2012). Creating a site map helps the designer know the information architecture before drawing the concept. The structure is partially responsible in determining the usability of the app (Martin & Hanington, 2012). Figure 9 is a site map of the app.
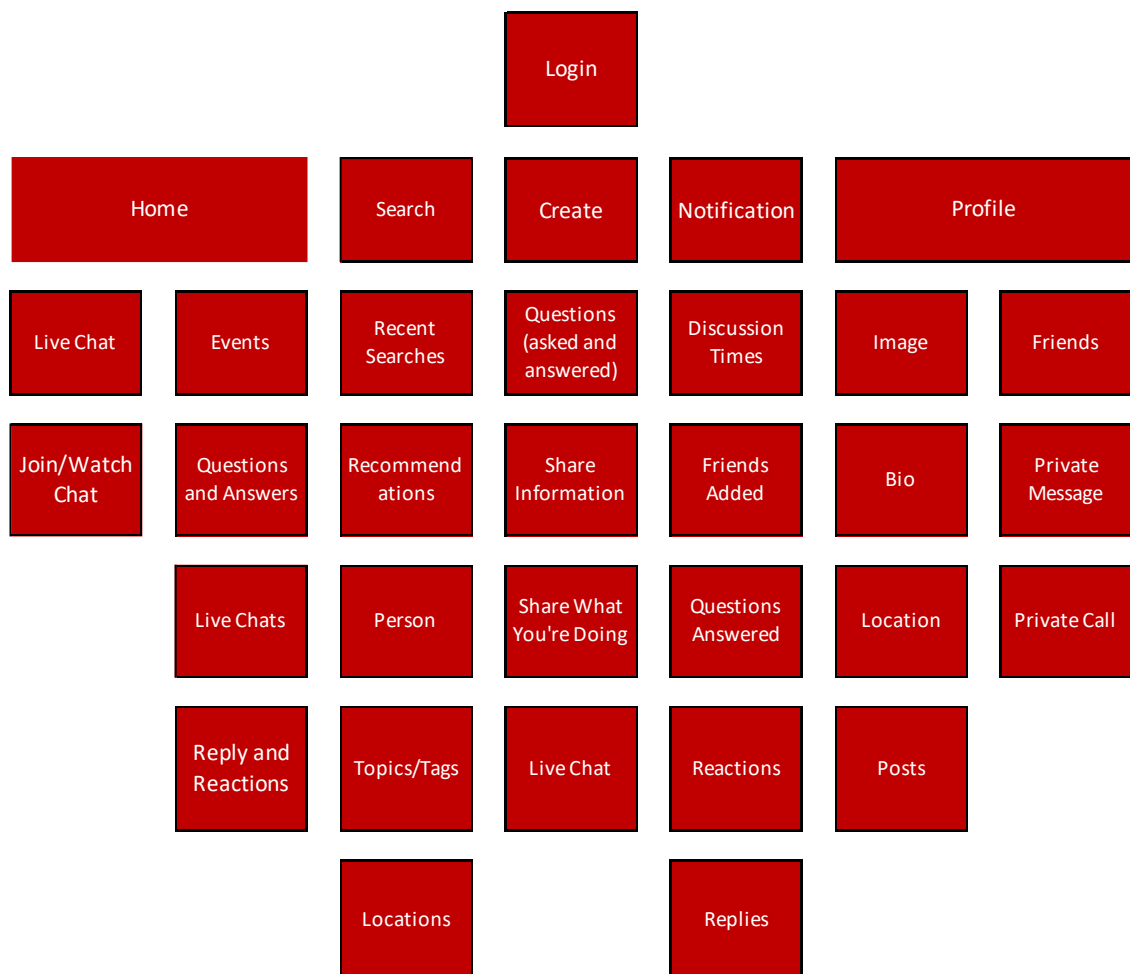
Figure 9 A diagram of a site map demonstrating the information architecture of the app. Source: author's own.

Login

The first screen the user will come face-to-face with when opening the application is the login screen. Logging into the app provides the user the ability to set up a profile and create user generated content, as well as communicating with other users of the app.

Home

The *Home* screen consists of all the posts users have created in the app. Videos and images of events, questions and reactions will be posted on the *Home* screen. Video reactions, replies and comments are also on the *Home* screen, but are attached to the original posts. *Live Chat* videos are also posted to the *Home* screen, so users can watch and participate in the conversation.

Search

A person can search a user's profile, locations or topics and tags on Tongan food culture. Within the search function, recent searches and recommendations will also appear as suggestions for the user.

Create

The *Create* page allows users to add user-generated content to the online community in the form of posts. The four different posts that a user can create are *Live Chat*, *Ask a Question*, *Share Information* or *Share What You're Doing*.

Notifications

All the interactions that are happening with a user's posts are sent to the user. Interactions such as replies, reactions and answers will appear as an alert. Other notifications such as friend requests are also sent to the user in the notifications screen.

Profile

The *Profile* screen consists of a profile image, a short description and the location of the user. The information on a user's profile are for other users to know who they are communicating with and who the users are on the platform. Friends are also listed on a user's profile, illustrating how many members a user has connected with. As friends are made, users are able to contact the friend through private messages.

5.7 Wireframes

Wireframes are concept sketches, usually designed with pen and paper (Martin & Hanington, 2012). This design process consists of numerous iterations, till the final design is chosen (Martin & Hanington, 2012). Wireframes are used in this study to draw quick concept sketches of the app. It is an easy way of quickly drawing ideas that can be elaborated or dispensed with (Martin & Hanington, 2012).
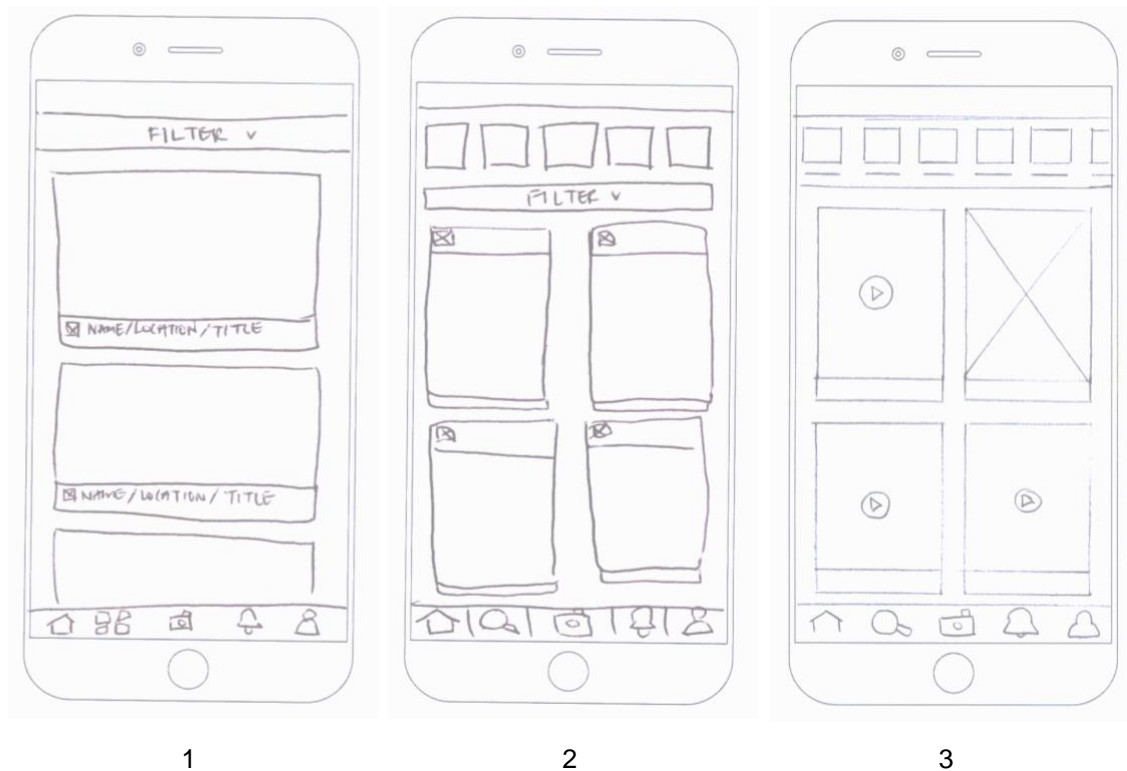
| 1 | 2 | 3 |

Figure 10 Three drawn Home screen wireframe iterations. Source: author's own.

Figure 10 are the wireframes of the *Home* screen. The first sketch is the initial layout idea for the *Home* screen. The filter bar in the first wireframe sketch, was to provide a way the users could filter the content of the *Home* screen. The posts were designed to be landscape, taking up the full width of the screen.

The layout of the posts in the second wireframe is portrait. Two portrait posts placed side-by-side were designed so the user would be able to scroll through multiple posts at a time. The user's name, profile and location sit above the content, providing the viewer the identity of the user who has uploaded the post. While the title of the post sits below the content. The square boxes at the top are the *Live Chat* videos. The design of the *Live Chat* videos placed at the top is for convenience for the users who would like to join in the live discussions. Below the *Live Chat* boxes is the filter bar for users to filter their *Home* screen content. However, the structure of the second iteration did not look appealing, leading the designer to create a third design.

After reviewing the second design, the third design of the home screen wireframe was created. Aspects from the second sketch was integrated into the third iteration, such as the *Live Chat* and the portrait posts. The changes made in the third wireframe was the name, image and location of the user in the user-generated content. As the user's profile details were on the top in the second design sketch, the user's profile was combined with the title of the content at the bottom. The decision to place both the user's profile details and the title of the post was for a neater look. The filter bar from the design sketch of number two was excluded as the designer thought the feature would not be used often. If users are looking for certain posts, the *Search* screen can filter and find the desired information.

Figures 10 demonstrates the iteration process for designing the app's *Home* screen. The different iterations ensured that the designs would improve and remove any problems that the user may encounter when using the app. All screens of the app were sketched up as wireframes, so quick and easy iterations could be made before designing the interactive wireframes.

5.8 Interactive Wireframes

Interactive wireframes are the designs of the product's look and feel (Martin & Hanington, 2012). The designs below are the different screens in the app with descriptions of the designs. The interactive wireframes are the design ideas for the proposed app of this study.

Links to view the interactive wireframes are listed below and can be found on Page 2.

URL: https://xd.adobe.com/view/c3abdd3a-46f0-4fcf-7646-a45c118f4f51-b59a/

QR Code:
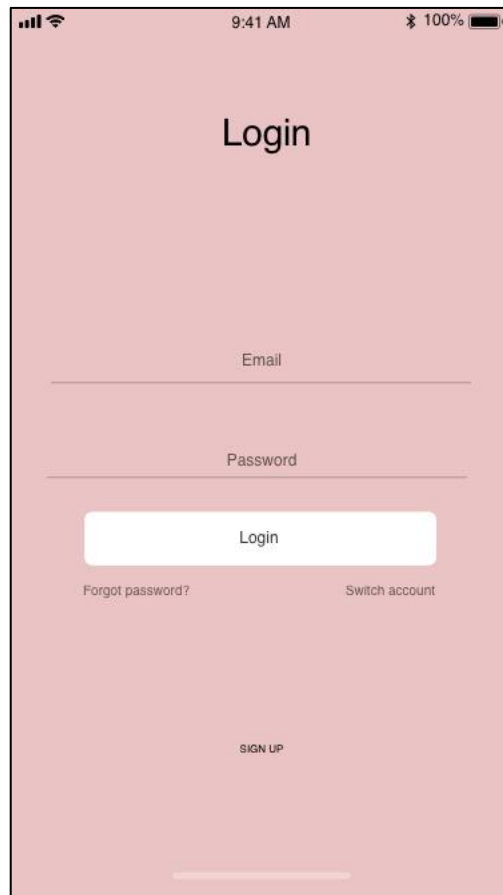
Figure 11 A wireframe of the Login screen. Source: author's own.

Login

The *Login* screen is simple with only the email and password field for the user to enter before logging into the app. Below the *Login* button is the prompt *Forgot password* and *Switch account*. These options are available for users who may have gotten their login detail or who are wanting to login using another user's account. A *Sign Up* button is at the bottom of the screen for first time users to login by setting up an account.
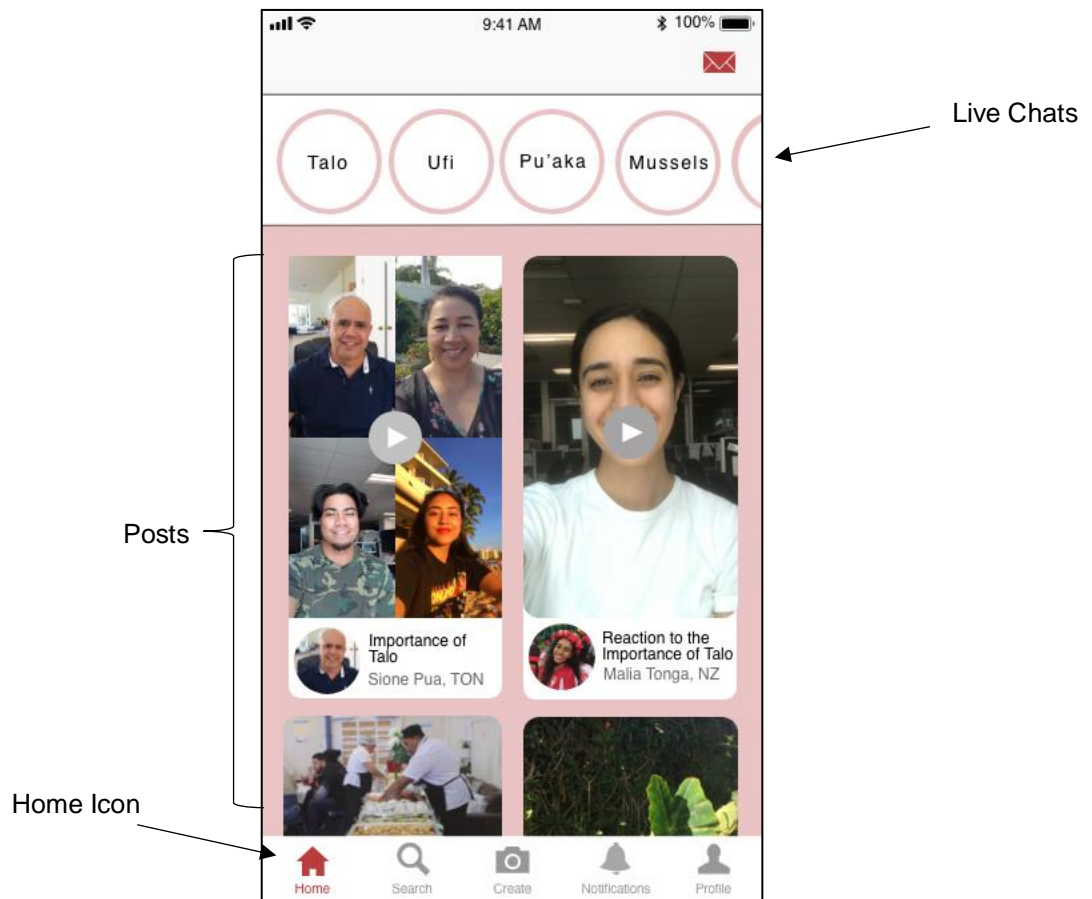
Figure 12 A wireframe of the Home screen. Source: author's own.

Home

The first icon on the tab bar is the *Home* icon. The *Home* screen contains all the user-generated content in one screen. The first row at the top of the screen are the *Live Chats*. All the videos and images that are posted on the app is the main content on the *Home* screen.
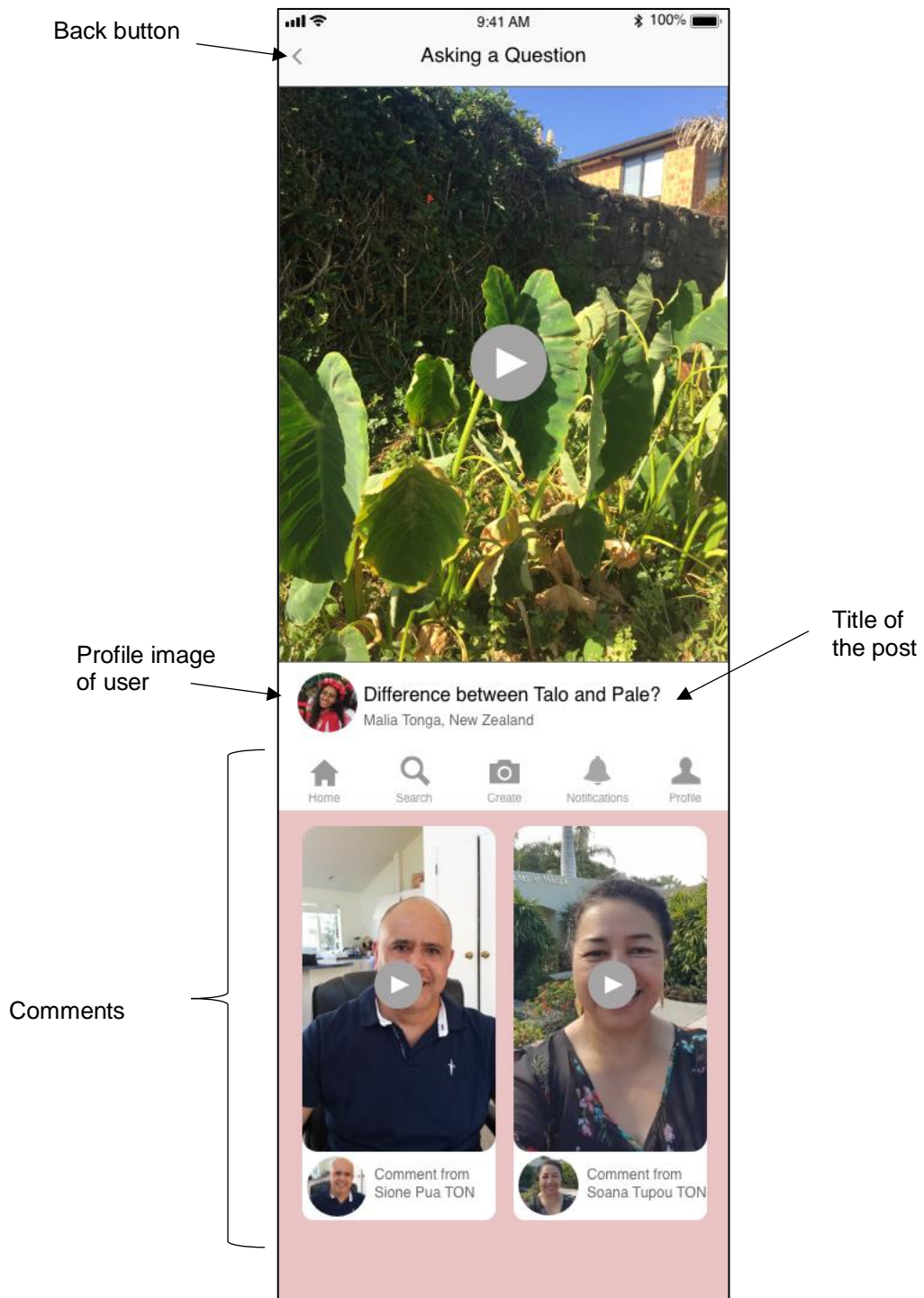
Figure 13 A wireframe of the Comment screen. Source: author's own.

Answering or Commenting on a Post

When clicked on a post from the *Home* screen, a person can view the responses made on the video or image. The profile image, name, and location of the person that posted the content sits below the image or video, along with the title of the post. Below the post, are the responses users have made about it. A person can respond to posts by clicking on the *Comment* section and begin filming themselves answering the question, asking a question.
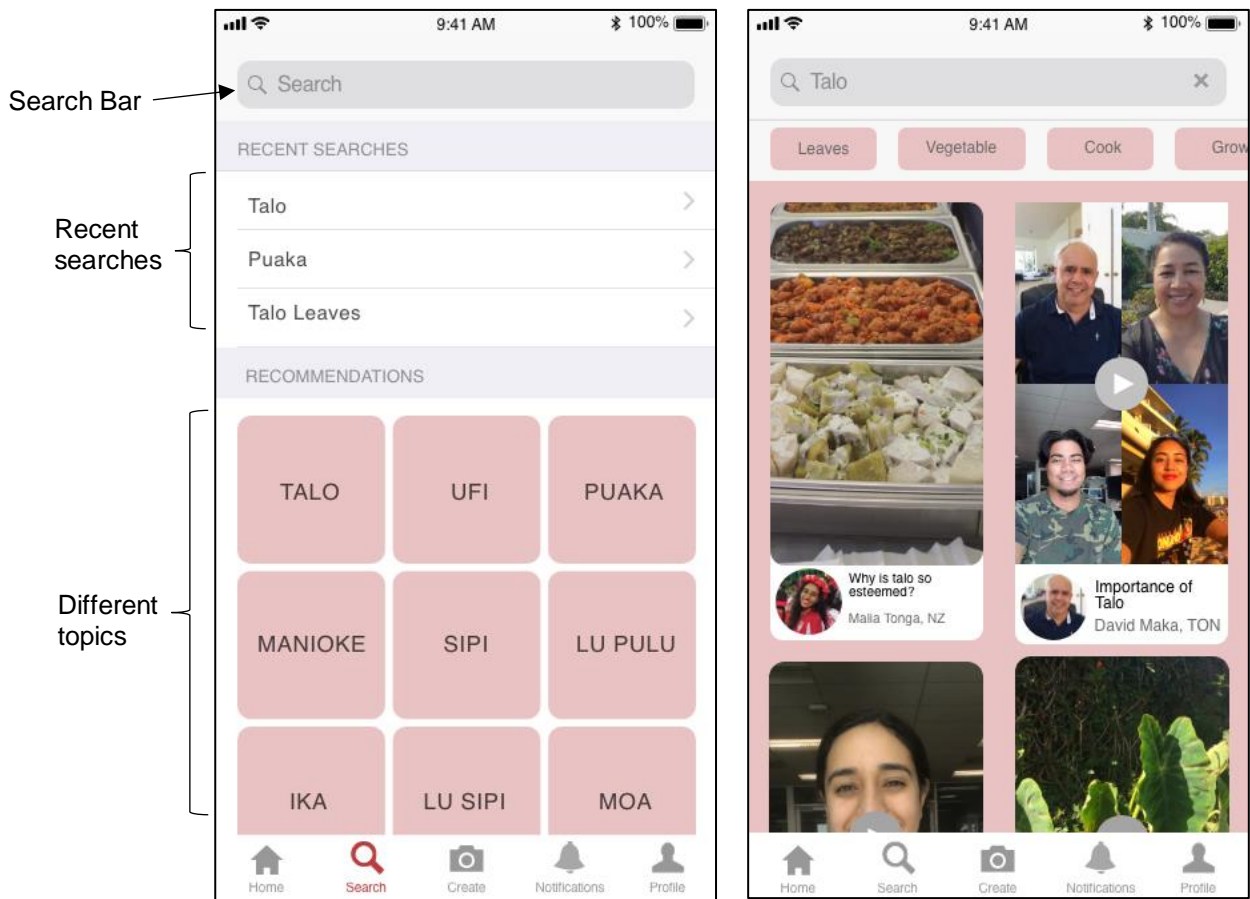
Search Bar

Recent searches

Different topics

Search Icon Page

Figure 14 Wireframes of the Search screens. Source: author's own.

Search

The second icon on the tab bar is the *Search* icon, which leads the user to the *Search* screen. The search bar is located at the top of the *Search* screen where users can type in what they are wanting to search. Below the search bar are recently searched and recommended searches. Other topics that might interest the user appears below as quick options. Providing different search topics as options gives the user an easy access to topics without having to type it in the search bar, thus, making it easier for the user.
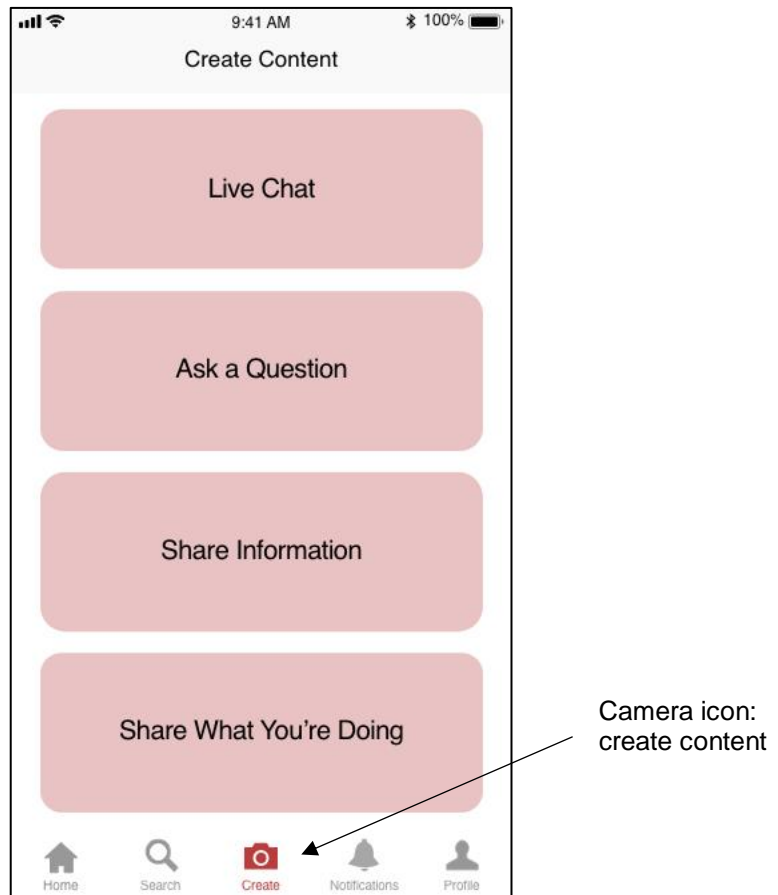
Figure 15 A wireframe of the Create screen. Source: author's own.

Create Content

The third icon on the tab bar is the *Create* icon which leads to the *Create* screen. To add
content to the app, the camera icon on the tab bar provides four different options for a user.
Four different types of videos can be created using the camera feature. The *Live Chat*, *Ask a
Question*, *Sharing Information* and *Share What You're Doing* are the four options. The videos
are sectioned into four different tabs, so the users would be able to differentiate and know how
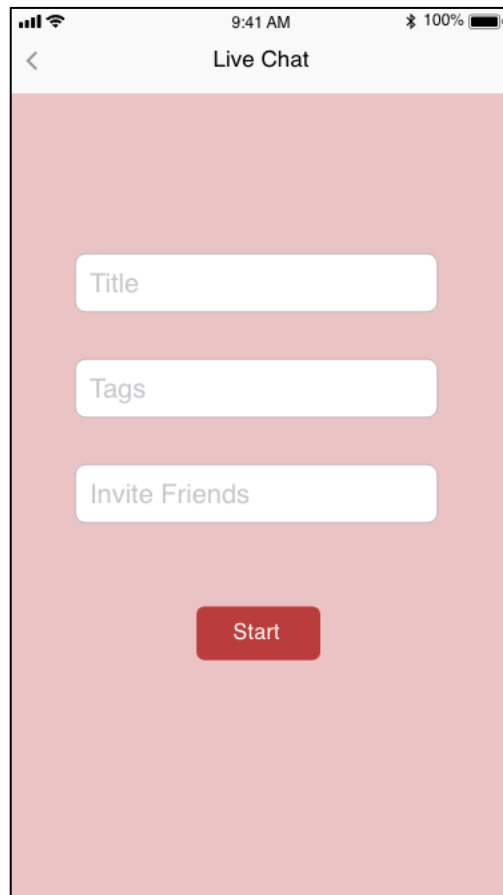to use the apps different features.

Figure 16 A wireframe of the Live Chat screen. Source: author's own.

Live Chat

The *Live Chat* feature is an online video chat for users to talk about a topic around food and the Tongan culture. Users will be able to label the video, add tags and invite other users to participate in the live video chat. Once the live chat has started, users would be able to join the discussion if they desire to.

Face-to-face discussions are an important aspect within the Tongan community (see Section 2.6.1), therefore the feature of the video chat is appropriate for the targeted audience. Discussions within the Tongan culture often begin with an introduction where people share information about themselves and find a common interest. Introducing themselves and sharing interests can build a bond between users.
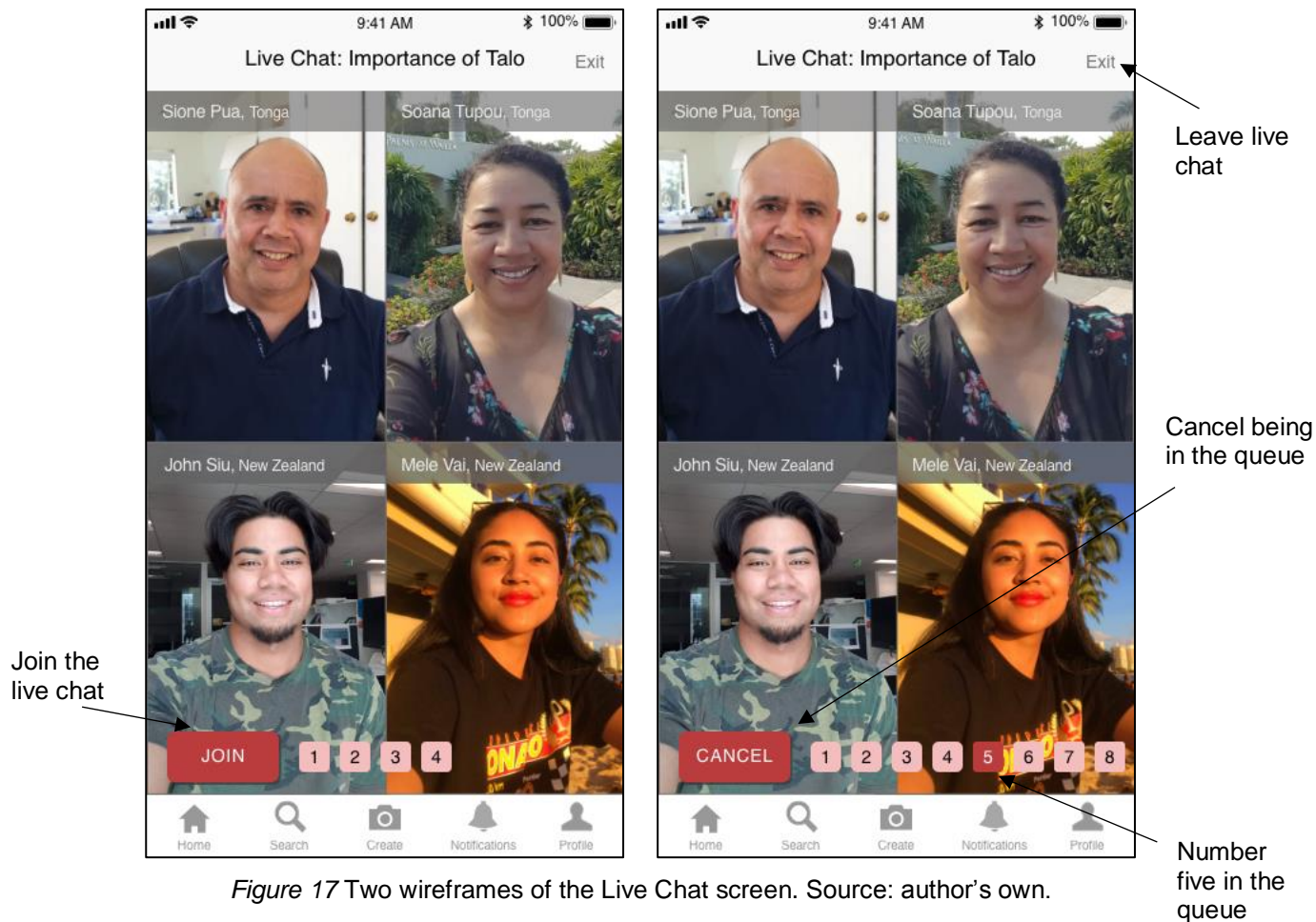
Leave live chat

Cancel being in the queue

Join the live chat

Number five in the queue

Figure 17 Two wireframes of the Live Chat screen. Source: author's own.

Each participant on the *Live Chat* has their name located at the top of their screen for other users to know who is participating in the discussion. The number of users who are able to partake in the live video chat is four. Four is a reasonable number of users that would fit into a smartphone screen where they will still be able to see facial expressions and body language (see Section 2.6.1) that are being used during the conversation.

Due to the maximum of four users in the *Live Chat*, there is a *Join* button that users who want to participate in the discussion can click to be in the line to join the conversation. Participants are added to the queue of users waiting to be part of the discussion. Each user in the queue is given a number. The number allows participants to know when they are the next user to join in the conversation. The *Live Chat* was designed to cater for users who desire to discuss a topic, where questions and answers can be discussed at that particular moment. Users within the *Live Chat* are able to close or leave the live chat by clicking on the *Exit* button.
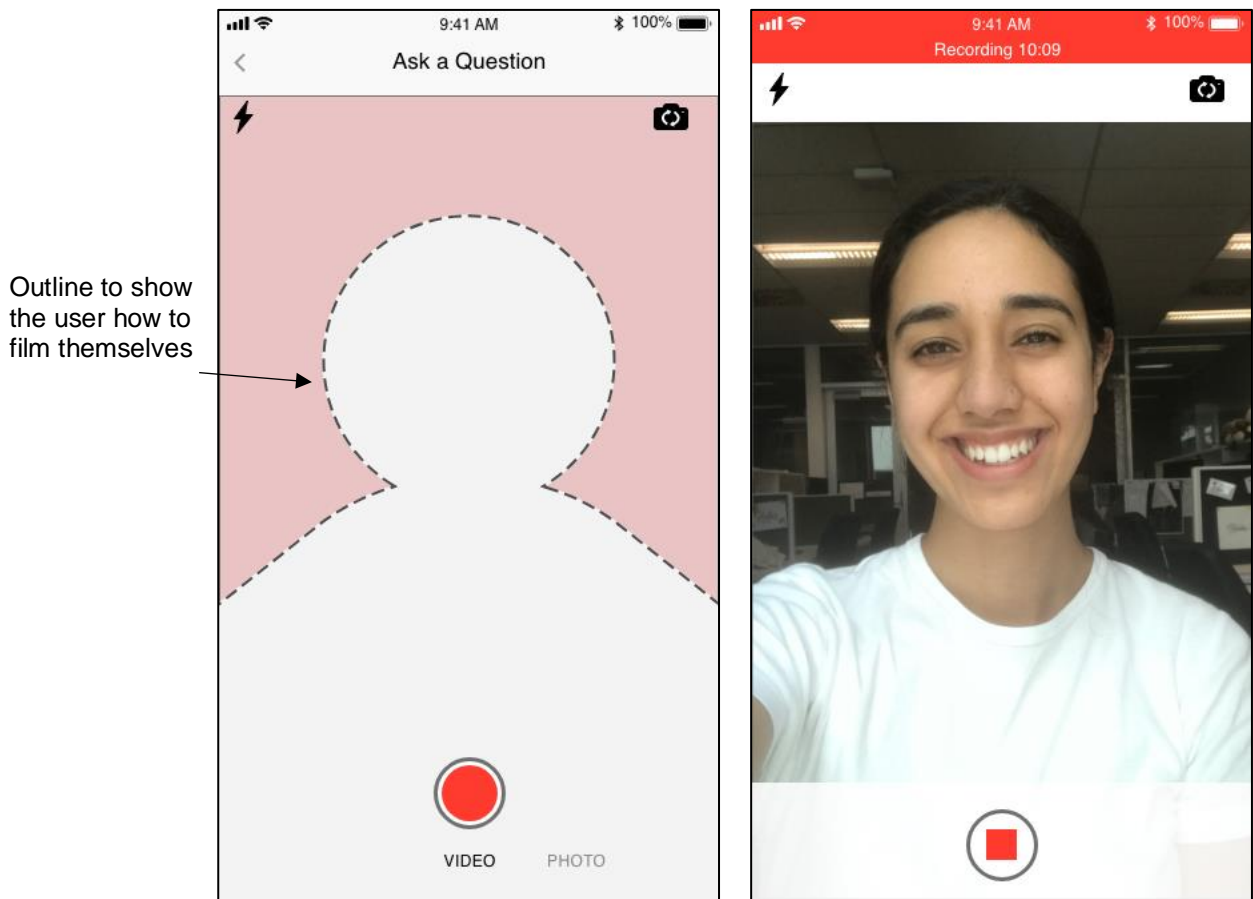
Figure 18 Two wireframes of the Asking a Question screen. Source: author's own.

Ask a Question

Asking a question was designed for users who are unsure or curious about certain foods. By providing a section of the app dedicated to asking questions, users would be able to ask a question that can be answered by any member of the app. The first screen of *Ask a Question* is an outline demonstrating to the user how they are to film themselves when using the front-facing camera. The second screen is a visual representation demonstration of what the screen would look like when a person is recording themselves and asking a question.
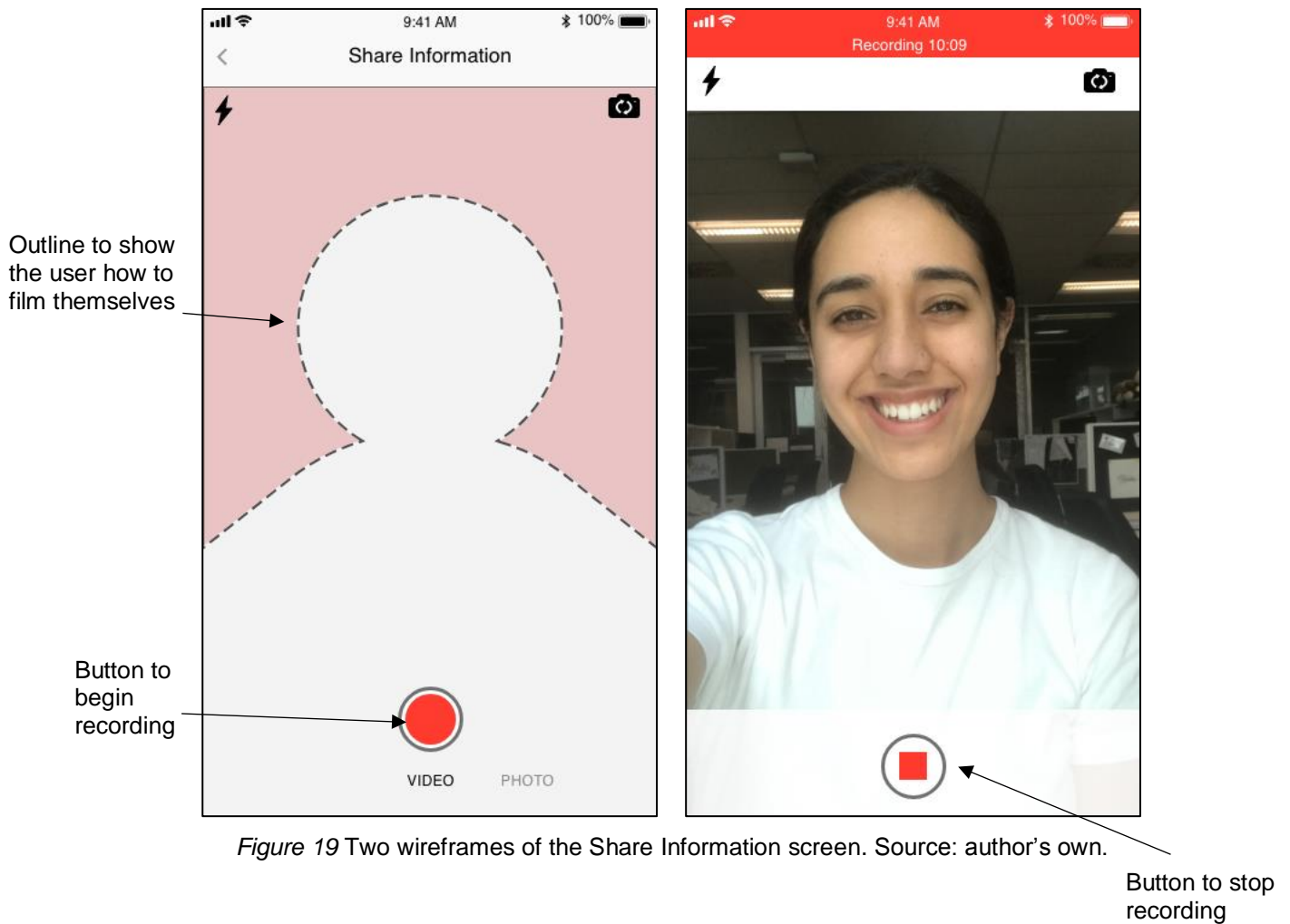
Outline to show the user how to film themselves

Button to begin recording

Button to stop recording

Figure 19 Two wireframes of the Share Information screen. Source: author's own.

Share Information

Sharing a story is another section of the *Create* page. Users who have information about Tongan food culture are able to share their stories with others. Sharing stories is how Tongans provide information. Stories provide context of a situation relating to the answer of a question (see Section 2.6.1). A story shares information that allows a user to visually imagine and gain understanding of the meaning behind the food culture. The outline of a person in the left wireframe is a guide to showing the user how to film themselves sharing information when using the front-facing camera. The outline is to ensure that the user is able to capture their facial expressions and body language.
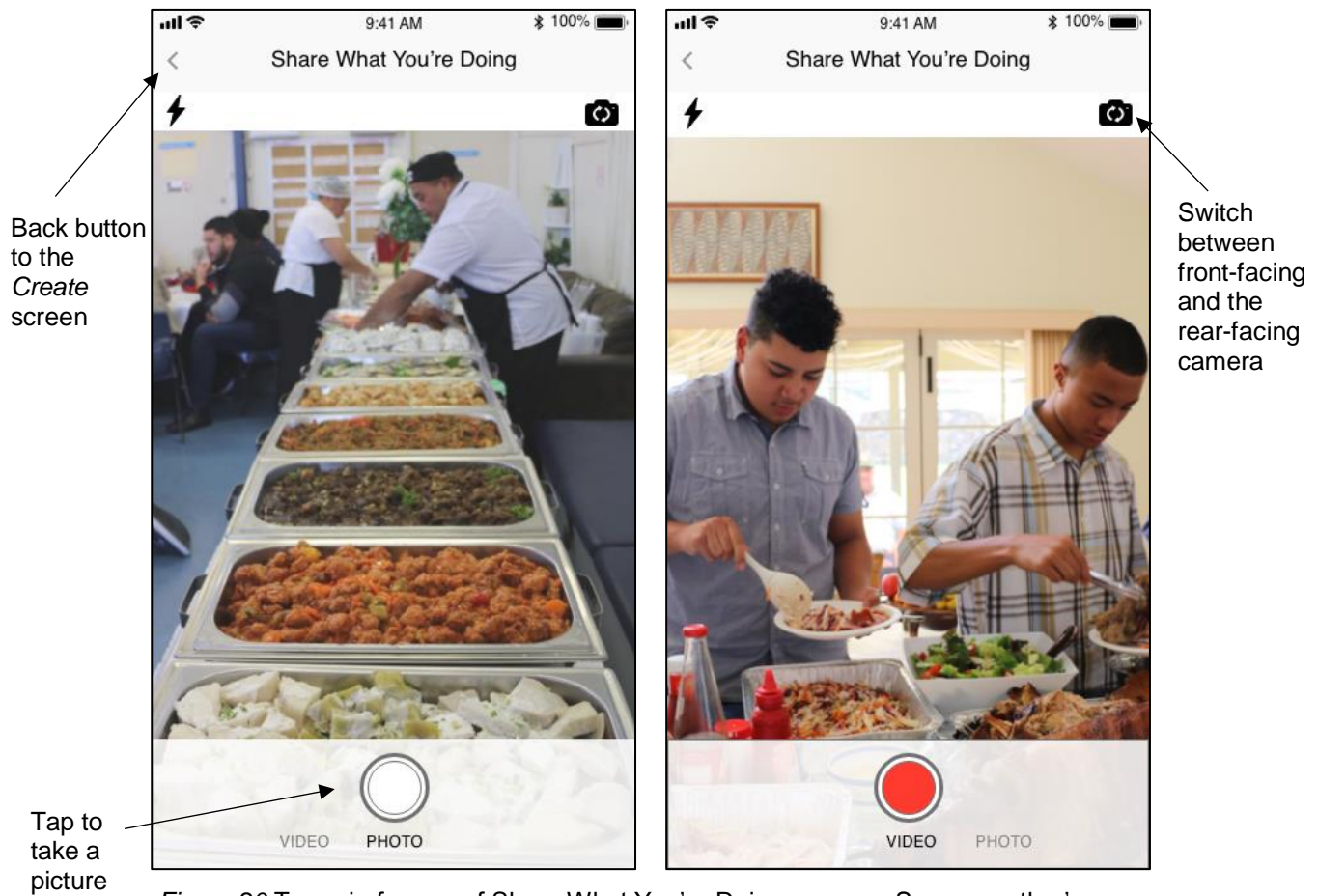
Back button
to the
Create
screen

Tap to
take a
picture

Switch
between
front-facing
and the
rear-facing
camera

Figure 20 Two wireframes of Share What You're Doing screens. Source: author's own.

Share What You're Doing

Observing and imitating is how Tongan people learn, therefore an observational piece can allow a user to understand the context and the importance of foods in the Tongan culture (see Section 2.6.1). Users can take pictures and videos of their environment by clicking the button at the bottom. Users have the ability to flip the camera from the rear-facing to front-facing camera, depending if the user is wanting to film other people or themselves.

Once the photo or video is posted onto the app, discussions on the post can allow users to share their knowledge and discuss the reasons traditional Tongan customs are performed a certain way. Additionally, the discussions can lead to understanding the importance of traditional Tongan food.
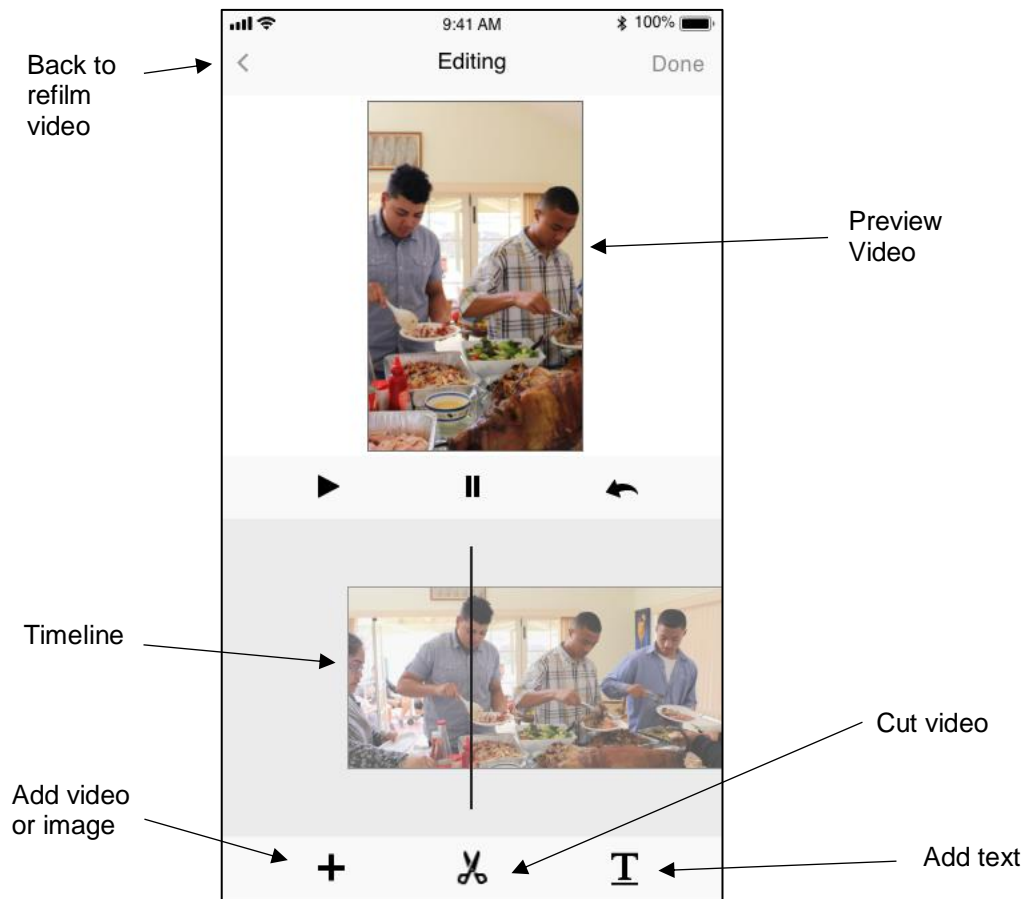
Figure 21 The wireframe screen for Editing videos. Source: author's own.

Editing

Allowing users to edit their videos and images within the app, provides users the freedom to be creative. The video editing tools provided in the app are adding images or video clips, cropping the video and adding text. The play, pause and undo buttons are also provided for the users during the editing process. Below these buttons is the timeline of the video. The bar line indicates where the video is according to the timeline. A preview of the video is in the top half of the screen, so users can see what their edited video looks like.
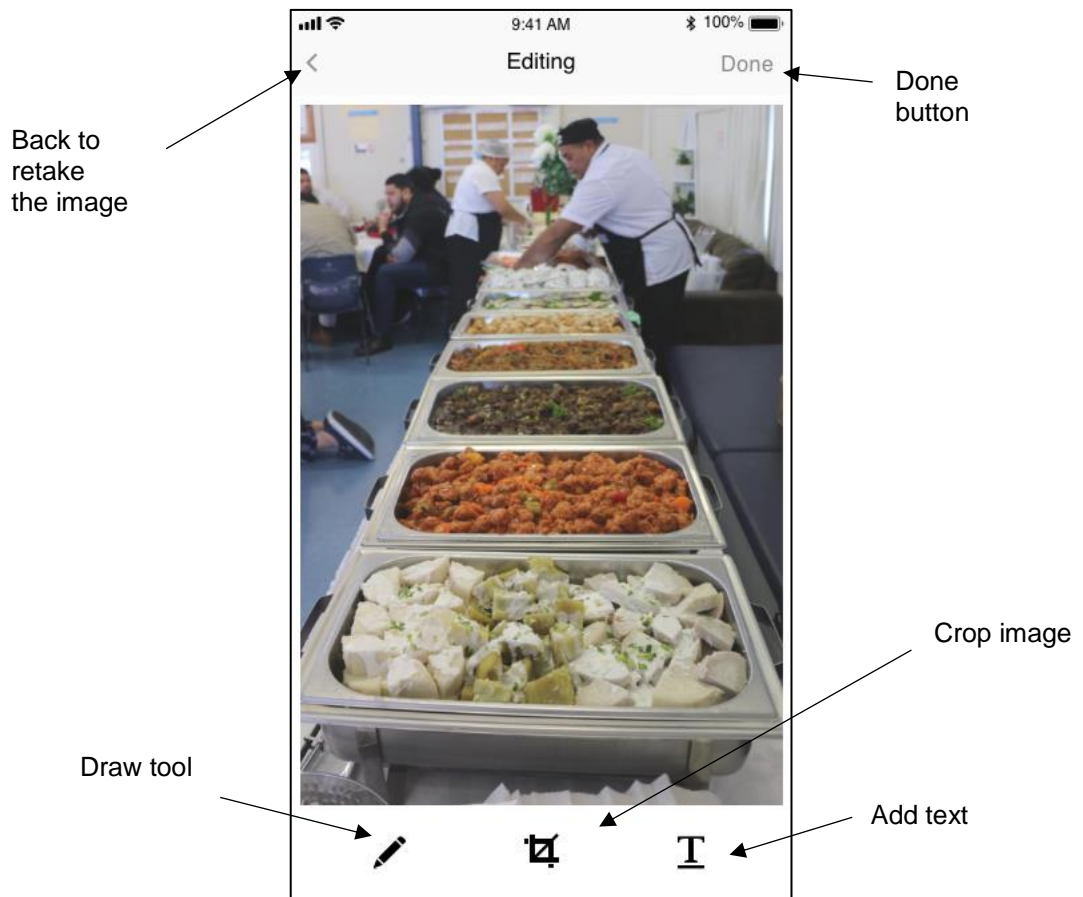
Figure 22 The wireframe screen for Editing images. Source: author's own.

A user can also edit their images by adding text, cropping and drawing on the image. Once the editing is done, the user can tap on the *Done* button at the top righthand corner to go to the next step.
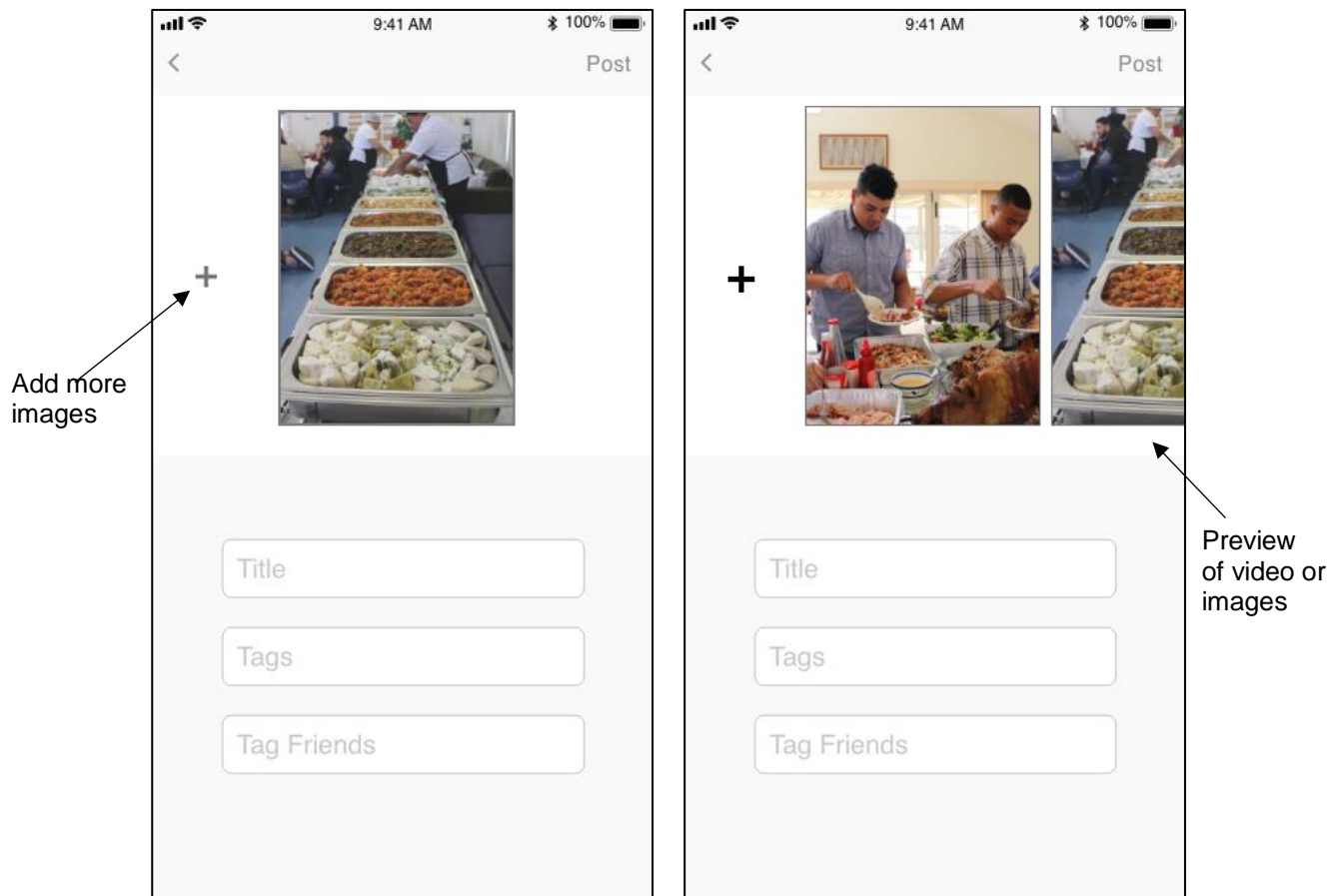
Add more
images

Preview
of video or
images

Figure 23 Wireframes of adding titles to the video and images. Source: author's own.

Adding a Title and Tags

Once the editing of a video or image is completed, the user enters in a title, location of the video and tags that categorises the video into a section. Categorising videos and images are for the benefit of the users. When a user wants to search for a topic, the posts can appear under the category. Once the boxes are filled, the user can select *Post* for the images or videos to be posted on the *Home* screen.

Another tagging feature that is provided in the app is the ability to tag another user in videos or images. By tagging another user, the content will show that both users were at the same event or location. Furthermore, tagging can also create a connection and friendship among users, helping to create an online community amongst themselves.

Currently recording reaction
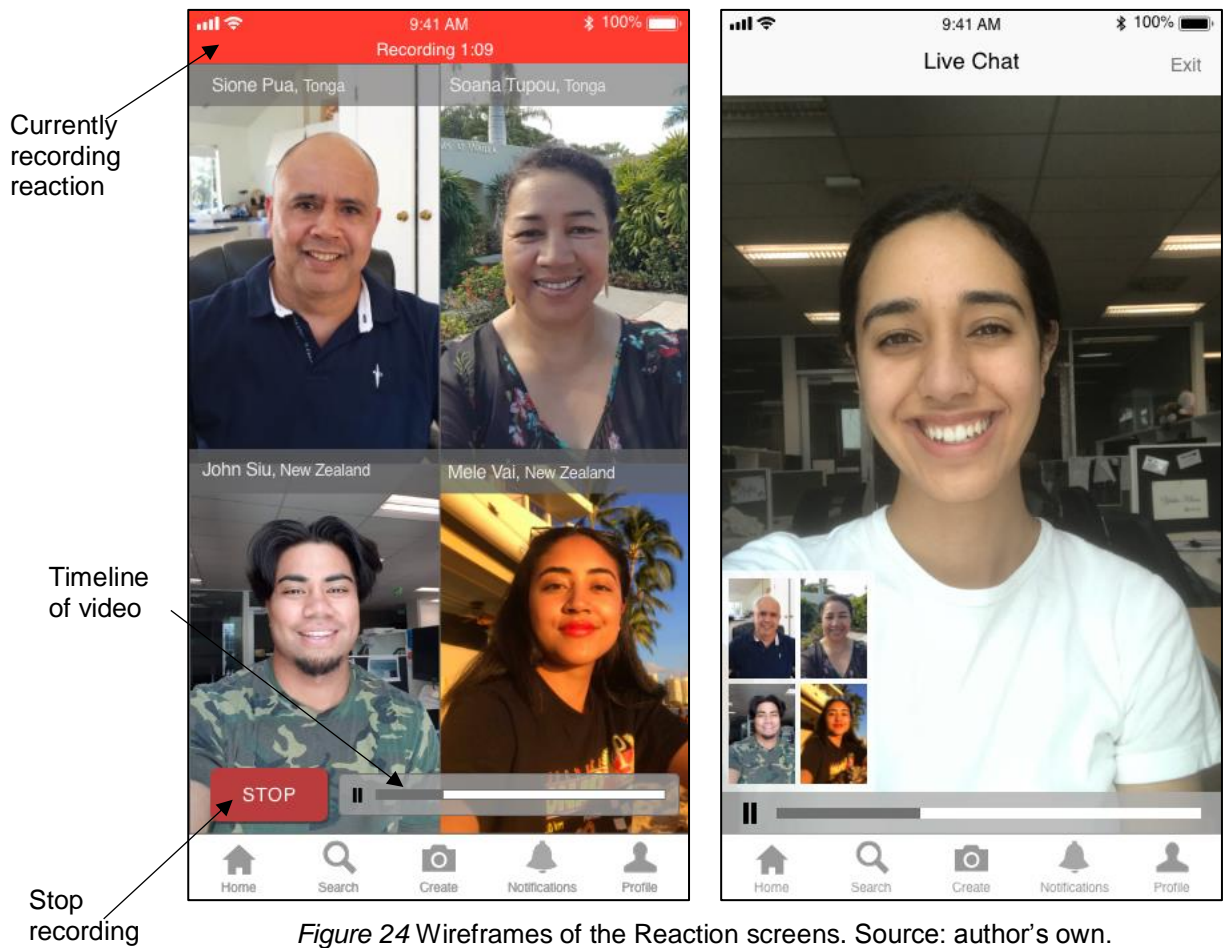
Timeline of video

Stop recording

Figure 24 Wireframes of the Reaction screens. Source: author's own.

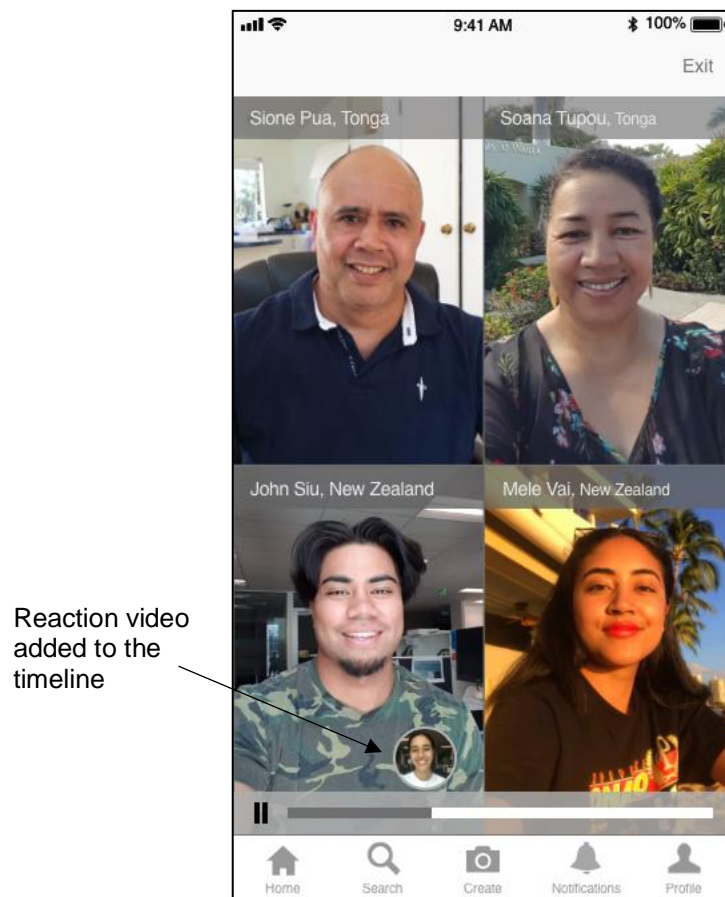Reaction video added to the timeline

Figure 25 Wireframe of the reaction video on the original video's timeline. Source: author's own.

Recording a Reaction

Reacting to a video that has been posted can allow a user to share their understanding or confusion about what is happening in the video. Once the reaction video is created and posted to the app, it is pinned onto the original video's timeline. The profile image of the user who created the reaction video will pop up on the original video's timeline; which users can click on to watch.
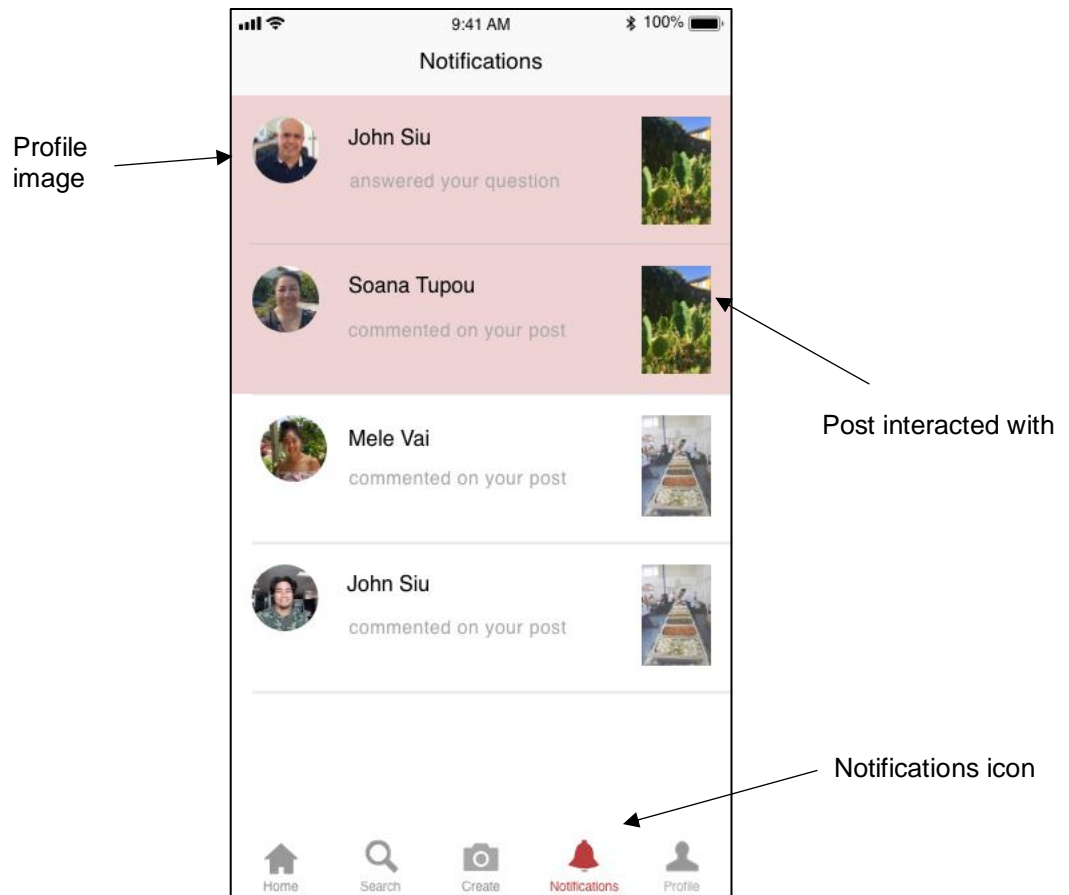
Figure 26 Wireframe of the Notification screen. Source: author's own.

Notifications

Notifications is the fourth icon on the tab bar. *Notifications* is to alert a user when another user has reacted, replied or answered their question. Therefore, the user will be able to view the interactions. The profile image, name, location of the person that has reacted or replied to a user's post, appears on the *Notifications* screen along with the post on the right side of the screen.
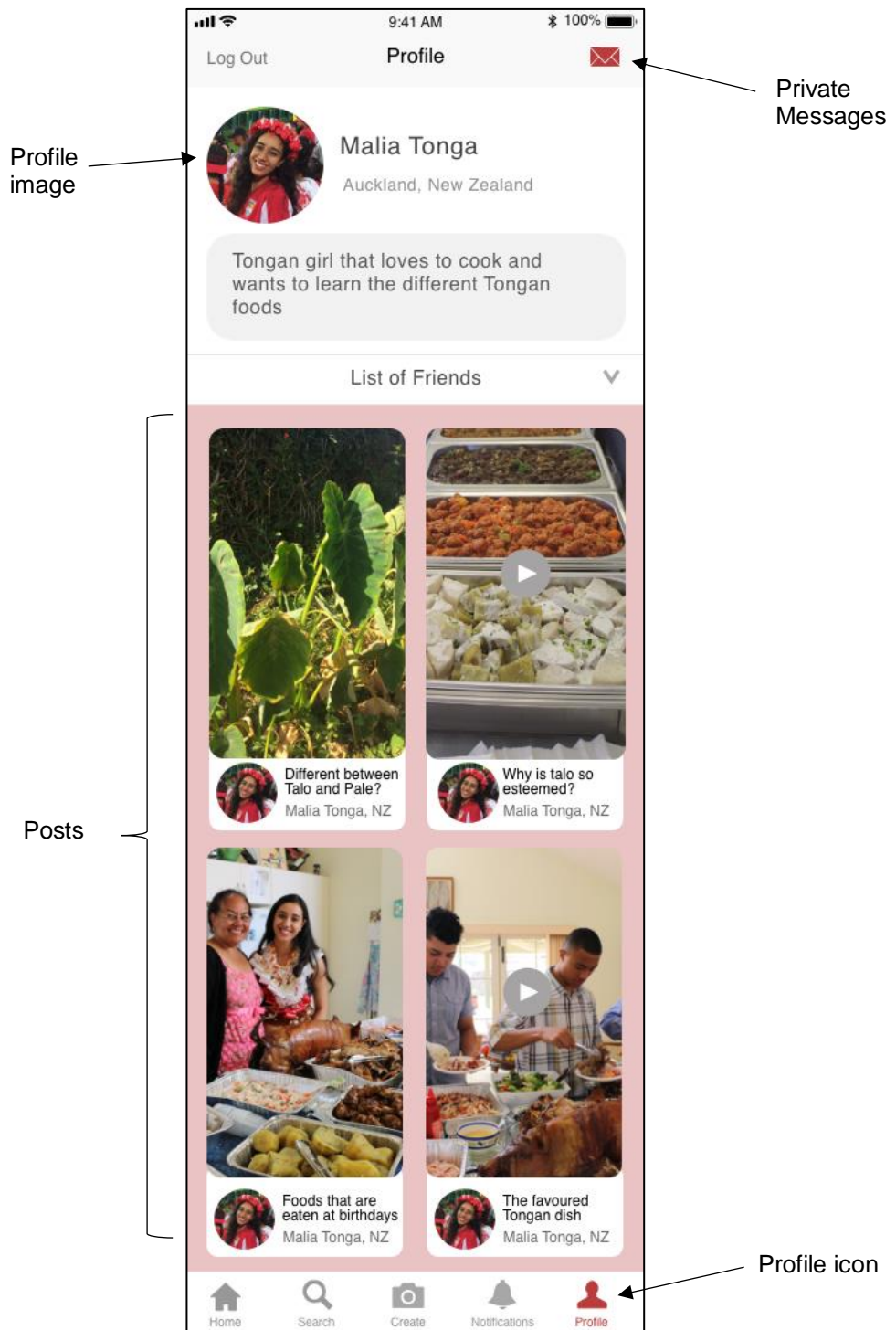
Figure 27 Wireframe of the Profile screen. Source: author's own.

Profile

Profile is the fifth icon on the tab bar. By having the *Profile* of the user on the tab bar, the user is able to access their *Profile* screen quickly and easily. A *Profile* displays an image, the location of the user, and a short description of the user for other members of the app to know who they are interacting with. Users are able to *Log Out* of their account at the top lefthand corner on their *Profile* page.

Back to
Profile Page

Profile
Images

Call

Message

Upload
Image(s)

Figure 28 Wireframes of the Private Messages screens. Source: author's own.

Private Messaging

The *Private Messaging* feature was designed to cater for users who want to have a private conversation with a friend. The first private messaging screen is a list of friends that have contacted and started a conversation with the user. The second screen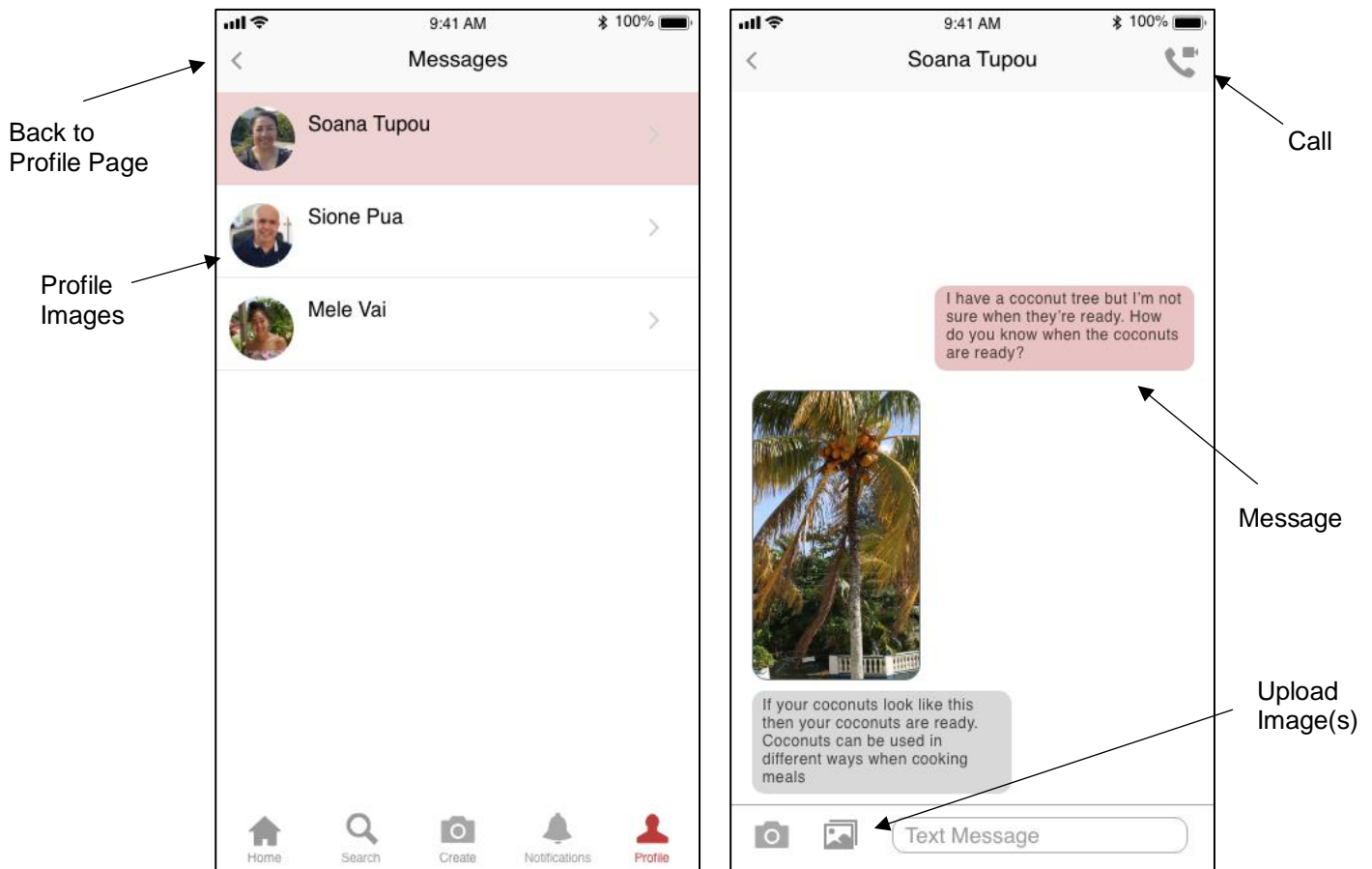 is the layout of the messages a person has with another user. On the righthand corner of the right wireframe is the phone call icon, providing the user the ability to call the person whom they are messaging. The three different tools users can use in the *Private Messaging* screen is video messaging, image messaging and text messaging. The three different options allow the user to send messages according to how they prefer to converse with the other user.

5.9 Summary

Chapter 5 discussed the design process for the app. The two types of target audiences were identified in the target audience profiles (see Section 5.2): Tongans living in New Zealand and indigenous Tongans. In the user journey maps, the actions of a user were identified during different stages of searching for information. From the user journey maps, it was clear that an online platform consisting of all the information about the Tongan food culture would fulfil the needs of the users. The user stories also highlighted the need for an online platform, as users looking for information about Tongan food culture could find it in one place, therefore

demonstrating the app as a useful tool that could connect Tongans living in New Zealand with indigenous Tongans, in learning about the Tongan food culture.

The information gathered from the user journey maps, user stories, design criteria and concepts, provided ideas for the app. The ideas that were noted were categorised into groups and drawn into a site map. The site map gave the designer an outline of the content that was to be in each section of the app. Wireframes were designed based on the site map's structure and content. During the designs of the wireframes, numerous iterations helped improve the design to a satisfactory app design, which led to the designs of the interactive wireframes. The interactive wireframes illustrate the way the app is to look, feel and function.

Chapter 6: Evaluation and Discussion

6.1 Introduction

Chapter 6 evaluates and discusses the app based on the design criteria laid out in Section 4.3. The chapter discusses and evaluates the features for learning by observing and imitating, storytelling, *faka'apa'apa* and *anga lelei*, cultural identity, community and friendships. Additionally, a discussion on what did not work in the app and what could have been designed that would improve the app is also discussed in this chapter.

6.2 Learning by Observing and Imitating

The *Share What You're Doing* screens have been designed for users to learn the Tongan way of behaviour, such as *faka'apa'apa* and *anga lelei*. Additionally, the viewers could learn the way foods are prepared and served to honoured guests at communal events. Asynchronous videos that can be created through the app meets the design criteria and provides users the ability to learn by observing and imitating the actions, and the verbal and body language. Through asynchronous videos, users are able to learn in their own time and environment, and at their own pace, thus, providing the user the ability to comprehend the information. As the app has editing features that enable users to edit the videos, they have the option to provide more information or select and emphasise the most important aspects of the video. Therefore, providing users a video with content that can be observed and imitated, such as appropriate behaviour when interacting with others, especially honoured guests. As this feature allows users to share their interactions with others, there is no specific way or demonstration of how the user can use this feature. Instructions or prompts on the mobile screen could have enhanced the use of the features, demonstrating to the user the different ways of filming an observational video. By providing instructions on the screen, different styles of observation and imitation could enable the users to learn using different styles.

The goal for this aspect was to incorporate asynchronous videos to enable users to learn the way food is prepared and served to guests, and the Tongan way of being *faka'apa'apa and anga lelei*. The goal has been met, thus, fulfilling the purpose of learning through observing and imitating actions and the behaviour of others. The design of the app meets the design criteria as asynchronous videos and editing footage was integrated into the app. The users viewing the video are able to learn by watching and observing the ways of the Tongan people. The users can learn how to present themselves the culturally appropriate way and the ways of preparing foods. It is also through the videos that the users can observe and learn the ways of being *faka'apa'apa* and *anga lelei*.

6.3 Storytelling

The app was designed to use the front-facing camera to enable the user to film themselves sharing a story. The features that worked well and according to the criteria was the ability to film

an asynchronous video. A bonus to the asynchronous videos is the ability to edit the video which is then posted on the app for other users to view in their own time. A feature that assists and can make the story more interesting is the ability to edit the video and add text or images to help tell the story. The editing feature enhances the story and is therefore an asset. Another aspect that is well integrated into the app was the guideline of how a person should film themselves. The guideline helps the user to place the camera in the appropriate position to film the user's facial expressions. The guideline adds to the aspects that make the storytelling feature more successful.

However, there are also aspects that did not work so well, such as the storytelling feature visually looking the same as *Ask a Question*. The design could be different so the users would know that the features are separate and can also be filmed differently, such as filming another person telling a story. The story does not necessarily have to be told by the user, as other Tongans who are not on the app may have a story about Tongan food and culture. The Tongans who are not part of the app but have stories to share about Tongan food culture could be filmed by the app user using the rear-facing camera. Furthermore, filming another person can provide the ability for more Tongans to teach and learn from other Tongans. The storytelling feature is limited to only making asynchronous videos, therefore users would not be able to create any other content for storytelling. This is limiting for users who may want to share a story and also get questions regarding the story which they can answer automatically in a synchronous video discussion. The only option for users to ask questions is to comment on the video, create a reaction video or create a live discussion to talk about the story. Regardless, the design of storytelling did meet the design criteria as asynchronous videos were designed for users to be able to film themselves talking to the camera. Furthermore, users are able to listen to the story and be able to see the storyteller's face. Therefore, the purpose and goal of the storytelling feature was achieved.

6.4 Faka'apa'apa and Anga Lelei

The *Live Chat* was designed for users to be able to communicate with each other and also use the Tongan values, *faka'apa'apa* and *anga lelei*. The use of synchronous videos meets the design criteria (see Section 4.3) of communicating face-to-face and in real-time, therefore making the *Live Chat* feature in the app a success. The synchronous videos cater to the Tongan's preferred style of communicating face-to-face, as Hrastinski (2008) stated, video conferences resemble face-to-face communication. An additional feature that makes the *Live Chat* successful is the ability to join the conversation simply by joining the queue. This provides users the option to join the conversation aids in their learning, therefore participating in the teaching of the food culture. One of the features of the app provides the option for all users to join the conversation– this meets the design criteria of creating a community-based learning app.

Aspects that did not work or could have been improved is the ability to schedule *Live Chat*. Scheduling live chats would have enabled users to know what the discussion would be about

and when the chats were taking place, so users that are interested in the discussion can participate. Overall, the ability for Tongan users to communicate in real time, including face-to-face cultural behaviours such as *faka'apa'apa* and *anga lelei*, achieves the purpose and goal of the app.

6.5 Cultural Identity

The goal of this project was to enable users to connect with each other and gain a sense of cultural identity through images and videos. The app was designed for the users to post content related to Tongan food, so they have control over the types of posts they would like to create and interact with. As users interact with each other's content, (whether they are merely interested or they can actually relate to the posts), they are connecting with each other based on their interests. By users connecting on each other's posts, users are able to gain a sense of connection to the culture and gain a sense of cultural identity.

Nevertheless, there are aspects that could be improved. That is in the ability to provide users a sense of cultural identity. One example is providing users the ability to form groups that are interested in a specific topic. A page that could host groups could bring users closer together as it would provide a sense of community. Users could build a connection with a whole group that have the same interests in learning about a particular food culture. The group could create a greater sense of cultural identity as they have similar thoughts and feelings about a certain food or particular traditions regarding Tongan foods.

6.6 Community and Friendships

The aspects that worked well and assisted in helping users create a sense of community is the user-generated content. The user-generated content has been created to provide users the ability to connect with each other and the Tongan culture. As the content consists of visuals such as videos of Tongan people gathered together enjoying food, the videos capture a sense of community which can be transferred onto the app. As users watch the videos, a sense of connection to the culture and to the other users can create a sense of community.

Additionally, the various options users can use to communicate and make friends, enhances the ability to create an online community. The ability to reply to users by sending videos, images and text as forms of communication, gives users different options of how they would like to communicate with one another. Furthermore, the user-generated content has the ability to carry conversations as users share stories, discuss Tongan food culture in live chats, and ask questions. This consequently leads users to befriend each other and connect over certain topics of food. As synchronous and asynchronous videos were designed to be the main user-generated content, text and images were only limited for users to use in private messages. The goal of creating friendships and a sense of community was achieved as users would be able to comment, react and message each other, which can lead to potential friendships. Additionally,

providing users the ability to participate in discussions such as the *Live Chat* are ways in which a sense of community can be built.

Overall, the app is a community-based learning app that facilitates the ability to makes friends and connect with Tongan culture through food.

6.7 Summary

In summary, the design criteria developed for the app, is largely met in the final design. By repeatedly going back to that criteria during the design process, the practitioner was able to continuously create iterations and ensure that the design stayed consistent with the purpose of the app. The app integrating all relevant cultural aspects, such as observing and imitating actions and behaviours, the ability to tell stories, practice and learn *faka'apa'apa* and *anga lelei*, creates a sense of cultural identity and building a community and friendships. These cultural aspects were identified as crucial to creating a culture-specific app. However, it was through the design criteria that ensured that these culture-specific features were integrated into the app.

Chapter 7: Conclusion

7.1 Introduction

Chapter 7 concludes the study by summarising the research outcomes and providing answers to the research questions. The chapter also outlines some of the limitations of the study and makes recommendations for future research.

7.2 Answering the Research Questions

1. How can an app enable Tongans to learn about Tongan food culture?
The app this study proposed can assist Tongans in learning about their food culture through user-generated content specific to Tongan food. Videos can display the ways Tongan people prepare foods, interact and behave in social environments enabling users to learn about the Tongan way of life. Videos can also capture Tongans sharing stories about the history of Tongan food and the reasons why foods such as *ufi* and *puaka* are the most esteemed in Tongan culture. It is through synchronous and asynchronous videos that provide users the ability to learn in different ways. Synchronous videos provide users the ability to communicate in real-time. It is through synchronous videos that the users are able to feel a part of the community as they participate and learn information during the discussion. Synchronous videos require quick and continuous replies to keep the conversation going. Alternatively, asynchronous videos provide the users the ability to acquire information at their own pace and in their own time. Therefore, they are able to comprehend the information more than in synchronous videos.

2. How can an app be designed to cater for the traditional ways Tongans learn and interact?
Through the literature review, it was identified that Tongans are visual and verbal learners who learn by observing and imitating and listening to stories being told (Thaman, 1993; Prescott, 2009; Duncker, 2002). The use of UCD during the design process was to assist in the creation of the app. UCD was used to ensure that the cultural aspects specific to the Tongan culture and audience were included. *Talanoa* was also used as a lens for conducting this study, along with the Tongan cultural values such as *faka'apa'apa* and *anga'lelei* in understanding the way Tongans communicate with one another. Since *talanoa* is a face-to-face oral communication, synchronous videos are a way the users can communicate face-to-face. As Hrastinski (2008) stated, video conferences can resemble the face-to-face style of communicating. It is through asynchronous videos that the users can also learn how to prepare and serve Tongan food for special occasions and guests. Therefore, the users would be able to learn by observing and imitating the actions of Tongans and thus, learn about Tongan food culture and their way of life. Since Tongans learn from their family and community members, the app is designed to provide the same feeling of community learning. The app has a user-generated content learning style, therefore, the app provides users an online learning community that supports and encourages the learning and understanding of the Tongan food culture.

7.3 Limitations of the Study

It might be considered a limitation of this study, and consequently of its findings, that the design process and the reflections were informed by the researcher's tacit knowledge and the relevant literature. As the study did not aim at involving participants or conducting user-testing, the study significantly relied on the researcher's professional knowledge as a media designer and on her background knowledge as an ethnic Tongan. The decision to exclude participants during analysis of the app was based on the uniqueness and novelty of the app's purpose. The researcher did not foresee participant interviews on the culture-centred Tongan food app as productive, because the use of cultural values and habits often go unnoticed by members of the culture. User testing was not included in the study because this step would have warranted a more comprehensive development of the app. Instead, the main focus of this study resided with the investigation into and the development of a culture-specific design criteria.

Another limitation of the study is the functionality of the interactive wireframes. The interactive wireframes represent merely a concept of the app design. While this study has made every effort to explore the preproduction stages, there is no way of measuring the effectiveness of the app until a live app is produced and populated with an active community. Producing a live version of the app was beyond the budget and timeframe of this study.

7.4 Recommendations for Future Research

In the following development stages, the study would need to include participants from the two audience groups for user-testing. Through user-testing, an evaluation could be conducted on the rate of success and usefulness to the Tongan users in learning about Tongan food culture. Therefore, building the app to a working condition would be an essential future project. Additionally, discovering whether the learning style of Tongan users matches up with the app's features such as videos needs to be measured to determine the success rate of the app's design. Furthermore, user-testing can assist in measuring the usability, efficiency and effectiveness of the overall app. These stages of development will need to occur past and beyond the scope of this study.

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Glossary

Definitions of terms and abbreviations used in this thesis.

Term	Definition
Anga lelei	A Tongan word meaning well behaved and good natured.
App	An app is a software application that has been developed and designed to run on mobile devices to perform a certain purpose.
Asynchronous	Asynchronous is defined as not occurring at the same time.
Faka'apa'apa	A Tongan word meaning respect.
Kape	A giant taro.
Puaka	Tongan translation for pork.
Real-time	The actual time during which a process or event occurs.
Smartphone	A mobile device that functions as a portable phone and computer, typically with a touchscreen that can access the internet and download apps.
Synchronous	Synchronous is defined as occurring at the same time.
Talanoa	A Tongan word meaning to communicate formally or informally with another person.
Talo	Tongan translation for taro.
Tui Tonga	Tongan word meaning head chief.
Ufi	Tongan translation for yam.
Umu	An underground oven where meals are cooked in a pit consisting of stones built over a fire.
User	A person who uses or operates something such as a smartphone app.
User-centred design (UCD)	A practice-based design process that includes the end users' needs, influencing the design of the product.
User interface (UI)	The interaction between the user and the computer system. The computer system's hardware and software components work together receiving input and communicating output to the user in order to perform the task requested.
User experience (UX)	The experience a user has when interacting with a digital product or service.