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Aesthetic Nostalgia-driven Design Framework for
Mediated Long Distance Relationship

Keio University
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Abstract of Doctoral Dissertation of Academic Year 2022

Aesthetic Nostalgia-driven Design Framework for Mediated Long Distance Relationship

Category: Design

Summary

Long-distance relationships (LDRs) have become increasingly prevalent in today's society for reasons such as educational demands, career pursuits, military duty and emigration. As a result, digital technology is playing an increasingly central role in mediating LDRs. However, mainstream communication tools and social networking platforms only support a limited range of interaction behaviours. These communication channels focus on a wide range of end-users and the transmission of explicit information, which neglects the emotional communication necessary in close relationships.

Researchers in the field of technology-mediated communication have been exploring methods to create emotional connection and relatedness via novel system designs and strategies. It is clear that relatedness is important for relationship bonding. However, creating relatedness does not necessarily mean reducing distance or that physical proximity is always preferable. Emotional feelings in close relationships are both dynamic and tacit, especially in LDRs. Perhaps more often than not, we experience longing internally. Therefore, it is necessary for designers to think more richly about the concept. This includes asking basic questions, such as what it means to be "at a distance", and broadening our thoughts on LDR design.

In this project, I understand nostalgia as not only a love of the past that halts progress, but also as a psychological resource to repair relationships and cultivate meaningful social bonding. Accordingly, I have explored how the technology-mediated design space for LDRs can expand notions of nostalgia and nostalgia

design. Instead of a focus on the past or memory, I start from an aesthetic perspective, expanding the meaning of nostalgia to redefine the potential of nostalgia-mediated LDR design.

The exploration of conceptual dimensions of LDR nostalgia design in this dissertation aims to inspire, inform and enrich designers' and design researchers' thinking on this topic, thus inspiring more creative, inclusive and humanistic designs for connection.

Keywords:

Nostalgia Design, LDR Design, Mediated Communication, Subtle Emotion, Aesthetic Interaction, Emotional Communication

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Chapter 1

Introduction

1.1. The Calling to Me

As R.M. Ballantyne writes, "to part is the lot of all mankind. The world is a scene of constant leave-taking."(Ballantyne 1884) We all have to experience transitions and farewells in life, like graduation, job changes or studying abroad. These changes force us to leave our hometowns and loved ones.

I have been living abroad for almost 10 years. During this long period of wandering, I have become unusually well-acquainted with the emotion of nostalgia. I have a lot of personal experience dealing with goodbyes and the feelings caused by transitions. I have noticed that these emotions occur in distinct stages: there is a time to immerse oneself in memories, a time to accept the absence, a time to sense the other one's importance, a time to feel the pleasure of reunion and, finally, a time for the bitter realisation that meeting is the beginning of parting.

The last decade has seen rapid developments in technology, and I am lucky to be part of this technology-mediated era. I remember that the first time I went to the United Kingdom in 2013, I used a laptop to video chat with my family. We were constantly nervous that the low-resolution video connection might freeze or break at any time. Later, WeChat (an instant messaging mobile application in China) and its phone call and video chat functions became widely used. My communication with my family and friends became more frequent, and we could almost forget that we were over 6,700 miles away. Today, with 5G, remote technologies and a variety of social media platforms that offer up-to-date and reliable connections, we can stay in touch almost anytime and anywhere. Sometimes, I have the strange feeling that I never left home. However, at the same time, I have never been truly present with my friends and family. I have seen every photo of their gatherings, trips and celebrations, but I have never been

in any event by their side.

Technology has changed – and will continue to change – the way we deal with relationships and interact with each other over distance. It redefines the meaning of parting and the perception of togetherness.

Before the smartphone was born, we had to text or make phone calls to others who lived far away. There were limitations on how long we could connect and how much information we could transfer, so we spent more energy and focused on one conversation. Going back even further to my parents' and grandparents' time, people spent days writing letters and weeks or months waiting for a reply. My grandfather used to walk 70 kilometres, climb mountains and spend a day and night to visit his relatives. The letters from that time are still kept carefully in their drawers. When my grandfather was alive, his relatives still came to his house every year at the same time, and they would sit and chat about old stories all day. My grandfather never got used to smart technologies. When I was away, although we did video chat, he was not used to it and would not treat it as a way of visiting. When I was back home, he had a paper calendar, and he would count down to the date of my departure on the calendar. My parents are used to video chatting with me, which relieves the pain of the parting. In comparison, my grandfather took parting more seriously. For him, meeting was not easy, which made the parting even more difficult.

Nowadays, the fact is that we do not need to write letters anymore, and parting tends to be more casual. With one click, I can get in touch with the people I care about. It seems to be a bit exaggerated to say "farewell" to them since, in some sense, they are never "away" from me.

I have a similar feeling towards my hometown. A lot of things can trigger my nostalgia for my hometown and make me eager to go back home. For example, I used to love a kind of drink in my hometown named "bubble tea" (tapioca in Japanese). I feel nostalgic whenever I want to drink it. However, in recent years, bubble tea suddenly became popular in Japan, and now I can easily buy it wherever I am. The trigger of nostalgia suddenly lost its power; I no longer feel nostalgia when I want to drink bubble tea since I can always reach it easily, even in a foreign country.

My personal experience matches scholars' point of view that nostalgia's precon-

dition is loss or distance (Stewart 1993, Boym 2007, Higson 2014, Sayers 2020). When the object of longing has become accessible, nostalgia disappears.

As Higson puts it, "nostalgia is not what it used to be anymore" (Higson 2014). The concept of hometown, the meaning of togetherness, and the perception of distance all seem to be shifting with the impact of globalisation, technology and media. I realise that this is not limited to my personal experience but also reflects the dilemma we face as the generation of the internet revolution and the social media boom. As Zygmunt Bauman states, "in the world we inhabit, distance does not seem to matter much. Sometimes it seems that it exists solely in order to be cancelled; there are no natural borders anymore, neither are there obvious places to occupy." (Bauman 1998) "We become nomads, who are always in touch." (Benedikt 1994)

Thus, departing from my own experience, I seek to rethink the concept of nostalgia – the emotion caused by distance – in the context of the modes of connection afforded by modern technology. I ask myself: how did technology change the way we connect with each other? How do we feel about these changes? What has changed in terms of forming relationships? Is the past without technology definitely worse than the present? Has modern technology truly increased feelings of intimacy? How should we perceive togetherness?

With these questions in mind, I focus on the area of emotional communication, aesthetic interaction and nostalgia design. By reviewing nostalgia theory and modern technology-mediated communication design, I want to explore what is progressing, what is missing, and what is worth preserving.

1.2. Why Nostalgia

Nostalgia usually refers to a sentimental longing for the past, and it is often mentioned in memory studies rather than in research on long-distance relationships. However, an early study by Holak and Havlena shows that close ones figure prominently in nostalgic experiences (Holak and Havlena 1992).

> Key people are consistently the focus of nostalgic experiences – from immediate and more distant family members, both living and deceased, to classmates and school chums, friends, co-workers, and ro-

mantic partners. . . The 'objects' are not what is important. What is
important are people, and memories which are basically what objects
do is evoke thoughts of people and memories. (Holak and Havlena
1992)

This result appears to be consistent with Wildschut's research on objects of nos-
talgia (Wildschut et al. 2006). People are the most common objects in qualitative
data about nostalgic narratives. The most common objects of nostalgia were
persons. When individuals engage in nostalgia they typically think about close
ones such as family members, romantic partners, and friends (Routledge 2019).
Also, Routledge notes that nostalgia reveals the importance of meaningful close
relationships.

Nostalgia plays a key role in fostering reconnections with family and
friends who live far away, in modern society where people are increas-
ingly disconnected from deep family. . . In general, nostalgic memories
are social memories. They always involve family, romantic partners,
or close friends. (Routledge 2019)

Nostalgia has been proven to have multiple beneficial functions in personal well-
being, including adaptive coping strategies, strengthened social connectedness,
continuity of self and enhanced meaning in life (Batcho 1998, Routledge et al.
2008, Zhou et al. 2008, Iyer and Jetten 2011, Sedikides et al. 2015). It also
positively affects interpersonal social bonding by motivating people to cultivate
meaningful relationships and pursue important life goals (Wildschut et al. 2010).

Researchers find that "nostalgic individuals perceive longer temporal distance,
which indicates nostalgia can slow down the perception of time. Also, nostalgic
individuals have a closer distance perception to others which means nostalgia
makes people feel more intimate with others."(Wang 2018) As a psychological
resource, nostalgia can promote relationship bonding (Abeyta et al. 2015). Many
people use social media both to meet new friends and to connect with families
and friends who live far away or whom they have not seen in years. In such
cases, nostalgia serves as a trigger or catalyst to motivate people to reach out for
connections.

Nostalgia makes people feel connected and more motivated to connect. Generally speaking, it refers to a sentimental longing for the past. However, in this dissertation, I focus on nostalgia's relationship with people who are living far away rather than nostalgia about times from one's own past. After all, it is our loved ones who trigger the strongest sentiments.

1.3. Positioning Nostalgia in LDR Design

1.3.1 Aesthetic Nostalgia

Nostalgia, which is derived from the Greek words *nostos* for returning home and *algos* for suffering, is generally used to refer to a "sentimental longing for a period in the past". However, my review of the theory of nostalgia showed that it does not need to be restricted to memories or the past. As Xue mentioned, the outdated view of considering nostalgia merely backward-looking prevents active design explorations related to nostalgia (Xue 2017).

There are several classifications of nostalgia, each of which has its own focus. As Boym points out, reflective nostalgia dwells in *algia* (longing), while restorative nostalgia stresses *nostos* (home, the past). Reflective nostalgia "lingers in the dreams of another place and another time"(Boym 2008). It can be further observed "that nostalgia promises no return and that the longing to 'return' is frequently for places that never existed."(Su 1999) "It is a fantasy of returning home, not an actual journey home."(Higson 2014)

Since reflective nostalgia is closely related to the complex feeling of "longing", scholars have found that it tends to have strong aesthetic and artistic features. As Horváth mentioned, "It might be due to exactly this layered approach, that pieces depicting reflective nostalgia are more significant aesthetically and from the perspective of art history."(Horváth 2018) Garda notes that "Reflective nostalgia is more detached from the past and sees history of the medium as a set of styles, it serves creativity and artistic erudition." (Garda 2013)

During my examination of nostalgia theory, I was enchanted by nostalgia's aesthetics and its related socio-cultural meaning, especially in Japanese and Chinese cultures. These cultures put emphasis on nostalgia's "sentimental longing" aspect

instead of its connotation to the past. I suggest that nostalgia can be reassessed from an aesthetic perspective as pathos toward the unreachable, sentimental longings lingering in the distance. The two sides of its bittersweet nature provide a dialectical way to view the past, allowing nostalgia to remain both reflective and prospective in the context of design.

Therefore, in my Ph.D. journey, I focus on the "sentimental longing" aspect of nostalgia rather than the type of nostalgia that seeks to restore the past. In particular, I try to detach nostalgia from its stereotypical association with memory and the past by shifting its focus to longing, wistfulness and a re-examination of the meaning of distance.

1.3.2 Understanding Nostalgia in LDR

Instead of past times or a distant hometown, I shift my attention to the people who we love but who live far away, focusing on the longing, bittersweetness and layered emotion we have towards them.

Due to COVID-19, I have not been home for almost three years. As a "specialist" in LDR, and as the only child of parents who live in another country, I sometimes have a complex, nostalgic missing feeling toward them. For example, this feeling happened when my dad called me twice to tell me that he bought a scooter. I felt that he was trying to connect and that something was still hanging over the call after we hung up.

Nostalgia is about attempting to bridge a distance that we cannot overcome; we try again and again and maintain hope, even if the distance is insurmountable.

All of us can have this kind of sentimental feeling towards people we love but no longer live close to us. Anyone may have experienced waving goodbye in tears, the lonely silence after hanging up and sleepless nights with overwhelming feelings of missing someone. In the meantime, we cherish the feeling of being remembered, and we feel thankful for people who care about, love and miss us despite the distance.

I define this emotion that arises in LDRs as nostalgic missing: a bittersweet emotion that involves caring about the other person, knowing the importance of their existence and feeling regret at no longer being able to enjoy their presence due to temporal or physical distance. Compared to the typical concept of "missing",

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nostalgic missing feelings have characteristics related to a "distance" that is hard to overcome in reality (such as wanting to go home but being unable due to pandemic restrictions) or knowing in one's heart that there is no need or no way to overcome it (such as meeting old friends while knowing that we are no longer the same people, and there is no way to be how we used to be).

But in a foggy train, in an old song we used to sing together, in a summer fragrance, in a breeze, in a sunrise, in a dewy morning... there are so many small, trivial or not-worth-mentioning moments that trigger this complicated and delicate emotion. I do miss my loved ones, and I miss them in a nostalgic way.

This dissertation is not going to discuss something obvious, but rather something behind the words, something gentle, vague, blurry but genuine. In particular, it is going to explore whether technology has enabled us to express these inner subtle feelings and increased emotional relatedness between LDRs in a suitable way.

1.3.3 Positioning Nostalgia

Designers have long employed nostalgia in design applications. However, most nostalgia-based designs focus on the fields of advertising, branding and marketing (Shin and Parker 2017).
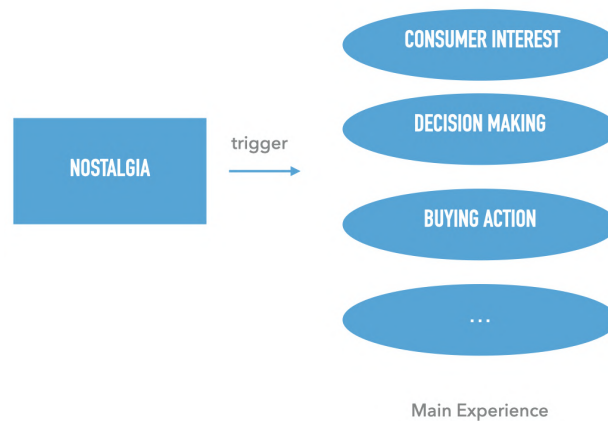
Figure 1.1 Nostalgia design in the field of advertising, branding and marketing

In most cases, designers position nostalgia as a trigger that promotes consumer behaviours. Accordingly, nostalgia design tends to be conceptualised as something that reminds people of the "good old times". It serves as an "appetiser" for memory and is separated from the main action or experience, which comes later.

As Newman and colleagues note, nostalgia serves self-oriented, existential and social functions (Newman et al. 2020). I believe that it is a missed opportunity that few designs have considered using nostalgia as an approach to design in the context of social connection. Nostalgia is a highly social-emotional experience with great potential to build deep connections between people and strengthen their sense of closeness. Therefore, I take the nostalgic experience as the main design concept and further propose that nostalgia could be used as a new approach to guide and design subtle connections for long-term emotional bonding in LDRs.

In this dissertation, I position nostalgia as a concept that encompasses the whole design process. I believe that nostalgia design should go beyond representing the past, designing a "retro" appearance or evoking the simple pleasure of being nostalgic. Instead, it should trigger people to think about the valuable things in their lives that they have lost or could lose. I do not wish to suggest that nostalgia is no longer related to the past. However, I consider the past as a kind of medium that reveals what we truly value in our lives instead of just an old outlook. By doing this, nostalgia design can go beyond stereotypical styles, offering a viewpoint to reflect on connection, distance and relationships.
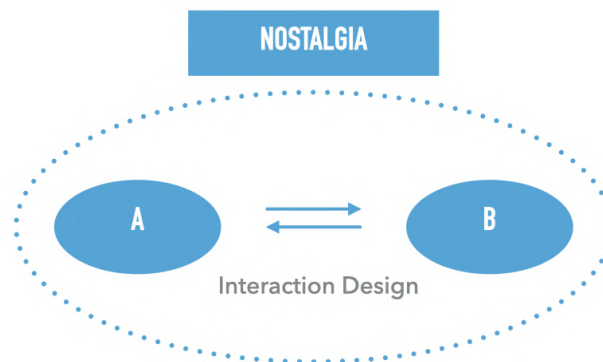
Figure 1.2 Nostalgia encompassing the interaction design of A to B

1.4. Research Scope, Questions, Approach and Process

Through the lens of nostalgia, I review the changes in human relationships and so-cial connections that digital technology has brought to us, especially over distance. I investigate how to inspire designers to actively explore other design possibilities on this topic, focusing in particular on determining what kind of communication design is most valued by people in LDRs.

Most communication studies and designs that focus on mediated intimacy nor-mally aim for higher *relatedness* and *social presence* (Short et al. 1976, Hassenzahl et al. 2012) but lack detailed explorations of a specific type of experience and fur-ther discussion of what kind of relatedness LDRs yearn for.

Although a higher level of social presence is acknowledged to be essential for supporting mediated relationships, when it comes to the nostalgia theory field where the distance concept and aesthetics play an important role, the situation may be different.

Different people will have different ways of expressing their nostalgic feelings of missing. For example, western countries are often regarded as low-context cultures, while many Eastern countries are typical high-context cultures. Com-pared to low-context cultures' direct, straightforward communication, expression in high-context countries is more implicit and indirect (Ramos 2014). Accordingly, the way of expressing nostalgic feelings tends to be more subtle and understated. Some people might be more willing to express emotion through straightforward bodily interactions, like hugging and kissing. Others, especially those from high-context cultural backgrounds that are well known for their reserved way of ex-pressing feelings, might choose to keep their feelings to themselves. In this study, I chose the target group as people who prefer to communicate, design, and cre-ate a mediated way to express their nostalgic missing feelings implicitly. And to be clear, the geographical definition of the eastern or western countries is not under consideration. People from western countries who prefer the high-context culture's way of expression are also included in the target group.

I argue that in LDR nostalgia design, in order to create a deep, meaningful emotional bond, design should not only focus on designing a memory trigger,

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especially a trigger with explicit signals that have a direct link with the past or memory. LDR nostalgia design should be in line with its aesthetic features, understand the "unsaid" in an understated manner, and fully explore other design possibilities.

This research is positioned within the field of Human-computer Interaction (HCI). Its scope is to mediate subtle emotional communication through unconventional user interfaces (UIs) in order to create a meaningful user experience (UX). It focuses in particular on families, couples and friends who are maintaining LDRs.

The research questions of this dissertation are as follows:

• How can we use nostalgia as a new approach to guide and build emotional connections in LDRs?

• What are the hidden potentials and design opportunities afforded by nostalgia design?

• How can design serve to translate research on LDRs' needs into practical mediated design solutions for LDRs?

I take *Research through Design* (Zimmerman et al. 2007) and *Concept-driven Approach* (Stolterman and Wiberg 2010) as the core approaches for achieving a better understanding of how design can be utilised to create interactions that enable us to express nostalgic feelings between LDRs.

The research process was iterative rather than linear. Systematic literature reviews were conducted to investigate the state of the art and define the research gap. A theoretical model and initial design framework were built to guide the pilot study. Iterative pilot interviews and pilot studies were conducted to collect insights and primary data to revise the final design framework. Finally, real prototypes were designed and implemented in a field study, and a variety of qualitative methods were employed for proof of concept.

1.5. Purposes and Contributions

Researchers have pointed out that there is an intermediate level of knowledge between general theories and specific design cases. This middle space includes examples like methods, strong concepts and guidelines, which are more abstract than specific design examples but do not yet form a general theory. This can be called intermediate-level knowledge (Höök and Löwgren 2012).

In the nostalgia design realm, research articles in this area typically contribute a single nostalgia design or a purely theoretical study of nostalgia. Very few researchers have contributed to intermediate-level knowledge, which is between theory and design practice.
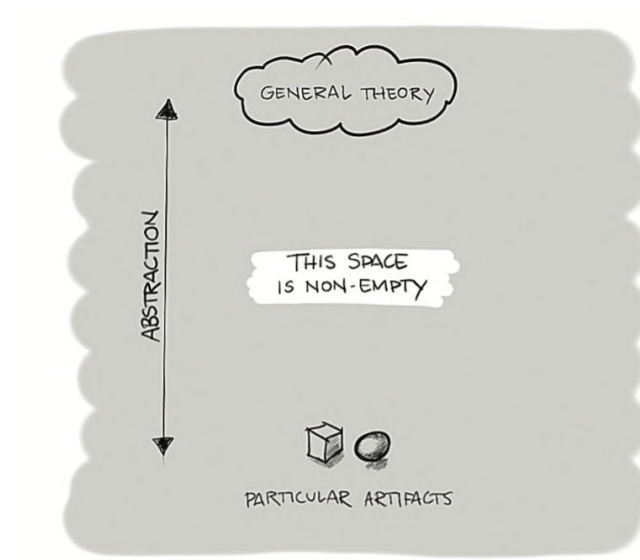
Source:(Löwgren 2013)

Figure 1.3 Intermediate-Level Knowledge

This dissertation argues that nostalgia design should go beyond the memory-related field. Instead, it should be seen as a new approach to connecting people and contributing to long-term emotional bonding in LDRs. Moreover, this dissertation aims to contribute to the intermediate level of knowledge, which can be used as a generative source to inform and inspire nostalgia designs and design research in the context of LDRs.

This dissertation's contributions are as follows:

1. An original LDR-mediated design framework that features nostalgia aesthetics.

My first contribution is an original LDR-mediated design framework that features nostalgia aesthetics. The key point of this contribution is the identification of three factors that help to shape the nostalgia-mediated design for LDR groups.

Current mainstream communications are inadequate for supporting intimate relationships' subtle emotions over distance, which is essential in close relationships. This dissertation aims to bridge the gap by supporting special, lasting emotional bonding that is different from mainstream forms of information-rich, rapid communications.

The design framework consists of three factors which are 1) Nature-mediated metaphor in content; 2) Aesthetic distance in interaction; 3) Ubiquitous tangible medium with time traces. It features the psychological and aesthetic theory of nostalgia and poses questions about digital technology's impact, the beauty of distance, and the nature of meaningful relationship bonding.

A variety of qualitative methods, such as in-depth interviews, observation, and the diary method, combining the participatory design approach and two functional design systems were employed to address the research questions.

2. A different aesthetic perspective for nostalgia design.

My second contribution is to introduce a new aesthetic perspective on nostalgia design. An original Aesthetic Nostalgia Experience Model is introduced to analyze the underlying process of aesthetic nostalgia experience. As a novel knowledge contribution, it provides a dynamic and layered perspective on reviewing the relationships between the Subject, the Object, and the emotion of nostalgia, by involving factors such as Distance and Sensibility in nostalgia theory. I later use the model to develop my initial design framework.

Most nostalgia design practices emphasize backward-looking, memory-related topics. Most use visual sensory design and are aimed at commercial purposes (Cross 2015). Less design research has investigated nostalgia as a form of emotional bonding in the context of socio-cultural applications.

Furthermore, the design field has neglected the meaning and aesthetic value

of nostalgia. This study of nostalgia from an aesthetic perspective promises to update designers' understanding of the topic. It aims to inform and encourage designers to explore more alternative design opportunities that would lead to meaningful and long-lasting emotional bonding in our rapidly changing world.

1.6. Dissertation Structure

In the Introduction chapter, I first introduced my personal experience of nostalgia and discussed the impact of digital technology. Then, I discussed why we may need nostalgia and its potential meaning in LDR design. I later described the missing pieces in the nostalgia design field, defined nostalgic missing feelings among LDRs and positioned nostalgia in LDR design. Based on these arguments, I listed my research scope, questions, approaches, process, purposes and contributions.

The Literature Review chapter consists of two main parts. The first is a study of LDR, and the second is a nostalgia study. I review LDR theory, design strategy and technology-mediated design cases. Then, I introduce nostalgia theory, aesthetics and nostalgia design. I discuss the lost potential of nostalgia and further illustrate the meaning of nostalgia aesthetics.

In the Concept chapter, I illustrate a model for analysing the underlying process of nostalgia, presenting the initial design framework and pilot studies. I discuss the further development of this framework by combining both primary data (existing knowledge from the literature review) and secondary data (qualitative data from pilot studies). The Aesthetic Nostalgia-driven Design Framework consists of three factors, and I elaborate on each factor in detail.

In the Proof of Concept chapter, I present two design studies that were implemented in the field, followed by in-depth interviews. The results, findings and evaluation are discussed.

Finally, in the Conclusion chapter, I discuss the limitations and future direction of the work. I end with some concluding remarks.

Chapter 2
Literature Review

This chapter consists of two main parts: first, an overview of LDR theory and design practice and second, a review of nostalgia theory and nostalgia-related design. The chapter covers LDR theory, LDR-mediated strategies used in the HCI field, and cases of LDR emotional design. In addition, it reviews the theory of nostalgia, aesthetic nostalgia, nostalgia design cases, and other extended design approaches such as alternative nostaliga design.

2.1. Basic Facts of LDR

2.1.1 LDR Definition

Although LDR often refers to romantic couples, not all LDRs are romantic. When people move away to attend school or change jobs, their relationships with family and friends also become long-distance. Therefore, LDRs can be categorised into three main types: long-distance romantic relationships, long-distance friendships, and long-distance family relationships (Stafford 2004).

Though the literature has not yet agreed upon a definition of LDRs, the most obvious feature of such relationships is the physical distance criterion, such as partners living in two separate households (Bunker et al. 1992, Anderson and Spruill 1993). Later, the definition was expanded to include a time criterion, covering people who "could not see their partner every day if desired" (Dellmann-Jenkins et al. 1994). In 1995, Rohlfing claimed that a relationship could be called an LDR when partners live far enough that it is impossible to see each other on a daily basis. He also pointed out that LDRs were an understudied phenomenon (Rohlfing 1995). Although academic interest in this topic has grown in the past decades, the discourse on LDRs remains relatively understudied compared to the

research on geographically close relationships (GCRs).

Rohlfing's definition of LDRs establishes criteria based on geographical distance and the frequency of face-to-face communication. However, Stafford proposed a slightly different definition of LDRs in 2004. According to Stafford, relationships are considered to be long-distance when 1) communication opportunities are restricted because of geographic parameters (in the view of the individuals involved) and 2) the individuals in the relationship have expectations of a continued close connection (Stafford 2004). By this definition, relationships between people who live in nearby yet separate houses (in Stafford's terminology, cross-residential relationships) but do not have frequent interactions can also be considered a form of LDR.

Interestingly, a similar term of "living apart together" called LAT relationship, which is used to describe couples who keep separate residences, is becoming a new family form (Levin 2004). Research indicates many couples from European countries such as the United Kingdom, the Netherlands, and France, prefer LAT. In the early 2000s, LAT couples account for around 10% of adults in Britain (Haskey 2005). LAT couples rely on digital communication for relational maintenance and the amount of digital messages makes a difference in the quality of relationships (Penn 2007). By Stafford's definition, the key point to define whether a relationship can be classified as LDR or not is no longer limited to geographical distance, but, is determined by two factors: the first is restricted communication, and the second is the yearning for a closer connection. Based on Stafford's definition, for LAT couples, even if they are living far away, as long as they are satisfied with their communication methods and distanced status, they should be excluded from typical LDR.

These criteria shift the definition of LDR from depending primarily on the relative distance, (which is usually determined by the travel time) to consider the degree of psychological distance as well.

2.1.2 Psychological Distance

Psychological distance is "a cognitive separation between the self and other instances such as persons, events, or times"; it describes the degree to which people feel detached from an object. It was developed by Trope and Liberman within

Construal-Level Theory (CLT) (Trope and Liberman 2010). CLT specifies that perceived psychological distance includes four dimensions: spatial distance, temporal distance, social distance and hypothetical distance. These can also be understood as the probability of occurrence, such as imagining that an event is likely or unlikely.

Scholars argue that the greater the spatial, temporal or social distance, the greater the perceived psychological distance will be. In this case, the distance is not limited to the physical circumstance; it can also be abstract. It is both assessed and affected by the perceiver's mental construal level which refers to the extent to which people regard the object as concrete or abstract (Trope and Liberman 2010).

The theory further specifies that "the perceived psychological distance can be reflected as well as regulated by certain behavioural strategies" (e.g., a speaker addressing a colleague politely to reflect the interpersonal distance between them) (Brown et al. 1987). Several studies have shown that nostalgia is a highly social emotion that buffers existential threats and bolsters perceptions of connectedness with others (Sedikides et al. 2008, Juhl et al. 2010, Abeyta et al. 2015). Moreover, some scholars believe that nostalgia can increase an individual's sense of social connection which, in turn, reduces the social distance between the individual and other people:

> Nostalgia, as a kind of psychological resource fostering interpersonal bonding or highlighting sense of social connection could reduce social distance and promote the closeness between people. (Lei 2009)

Through a statistical analysis of experimental data, Wang attempted to describe nostalgia's influence on distance perception in terms of three dimensions: social distance, temporal distance and spatial distance. Wang notes that nostalgic individuals have a closer social distance perception to others, which means that nostalgia helps people feel more intimate with each other. In terms of temporal distance, nostalgia prolongs the perception of time; by "slowing time", it lets people savour an experience. Finally, nostalgia shortens the perception of spatial distance, making people feel closer to others. (Wang 2018)

In light of social developments, the definition of LDR has shifted from "the habitual absence of a partner" to a broader sense of "long-distance". The meaning

of distance has undergone similar changes. Especially given emerging technology-mediated communication tools, the distance concept will continue to be further extended, transformed, and redefined.

In summary, nostalgia has demonstrated its potential to shorten perceived distance and increase the sense of closeness in interpersonal relationships. This potential is one of the reasons why I depart from the concept of nostalgia. I define my LDR group as those who have nostalgic emotions due to temporal distance, geographic distance, or social distance – in short, psychological distance.

2.1.3 LDR Relationship Maintenance

People in LDRs need to develop strategies to maintain their relationships. Relationship maintenance (or relational maintenance) has been discussed extensively in communication studies. Since the 1990s, scholars have agreed that maintenance is both a state and a process (Duck 1994, Stafford 1994). Most scholars agree that maintenance occurs "after a relationship has finished beginning and just before it has started to end" (Montgomery 1993, Duck 1994). However, "viewing maintenance as a middle period is remiss when applied to many forms of relationships other than those that are romantic...such as nonvoluntary culturally ascribed kinships" (Stafford 2004). Other scholars agree that maintenance is also a process (Dindia and Canary 1993). Every relationship has its ups and downs. And the literature contains multiple process-based definitions of relational maintenance.

Dindia Canary defines four categories of relationship maintenance according to different levels of relationship quality: 1) merely preserving the relationship's existence; 2) keeping the relationship in a specified state or condition; 3) keeping the relationship in a satisfactory condition; and 4) keeping the relationship in repair. (Dindia and Canary 1993)

There are different maintenance strategies depending on the goal. For the first type, in which the goal of maintenance is just to keep the relationship alive, infrequent contact may suffice to sustain the relationship. For the second type, the goal of maintenance is to keep the relationship as it is, achieving a stable relationship; regular contact behaviours like sending birthday cards may be necessary. The third type seeks to maintain a mutually satisfying relationship. Finally, the fourth type involves keeping the relationship in a good, sound condition (preven-

tative maintenance) or repairing a relationship that has fallen apart (corrective maintenance). (Davis 1973, Dindia and Baxter 1987)

Empirical studies show that nostalgia has a restorative function that can help with relationship bonding (Zhou et al. 2008). Researchers have noted that nostalgia can imbue individuals with social connectedness by making them focus on social interactions, relationships and being loved and trusted by others (Abakoumkin et al. 2019, Juhl et al. 2021). As a psychological resource, nostalgia can help counteract loneliness and promote help-giving behaviour (Abeyta et al. 2015, Zhou et al. 2012). Since nostalgia has the potential to contribute to psychological well-being and social relationship bonding, I focus on the fourth type of LDR relationship maintenance in this dissertation – that is, I assume that nostalgia can help to keep a relationship in good condition and prevent relationships from falling apart.

Dainton and Aylor argue that a large part of relationship maintenance activities is rather routine and non-strategic (Dainton and Aylor 2002). This claim is supported by empirical research showing that everyday, mundane behaviours serve important functions in the sustenance of a relationship (Chien and Hassenzahl 2020). Unfortunately, physical separation is a barrier to many of the most basic, routine, non-strategic relationship maintenance activities. To gain a better understanding of the current state of LDR strategy and recent technology-mediated design for relationship maintenance, theory and design cases on mediated relatedness will be discussed in the following section.

2.2. LDR Design

2.2.1 Technology-Mediated Strategies

Technology plays a pervasive role in contemporary social interactions. The digital revolution has not only brought changes in network speed and capacity by replacing devices and services; more importantly, it offers new options for interpersonal bonding, thus altering the way we connect with our partners, families and friends.

In the HCI field, many systems and platforms have been designed to support social interaction and connection. Several systematic reviews have been conducted

on technology-mediated interactions to summarise the strategies and approaches that these designs employ. Stepanova and colleagues note the two largest areas in terms of HCI strategies analysis: technology-mediated design for LDR and technology-mediated design for cooperative work (Stepanova et al. 2022).

Some reviews focus on the modality of interaction, such as biofeedback sharing systems. Lux and colleagues analysed 76 such systems and found that they are typically designed to support social interaction by providing information about the internal state of other users, thus amplifying social cues (Lux et al. 2018).

Other reviews have focused on a specific type of connection, such as collocated interaction systems. Olsson and colleagues present a review of 92 systems designed to facilitate collocated social interactions. These systems focus on inviting initial interactions or improving existing interactions among persons who are physically located in the same space. The design approaches are summarized as: *shared digital workspace, disclosing information about others, introducing constraints, matchmaking, open space for shared activity, self-expression, and topic suggestions.*The review's main focus is on collocated social interactions in the context of a workplace, aiming to support the sense of community by facilitating the co-awareness of co-workers. The work addresses the quantity and quality of interaction rather than the psychological sides of the connection (Olsson et al. 2020).

Instead of a system-focused review approach, Stepanova and colleagues focused on affective inter-human experiences from a psychological perspective. The researchers hoped to inform designers about how to foster a genuine feeling of connection in diverse contexts. They identified nine design strategies by analysing 50 systems designed to mediate interaction through purposefully designed technologies. They identified nine design strategies as: affective self-disclosure, reflection on unity, shared embodied experience, transcendent emotions, embodied metaphors, interpersonal distance, touch, provocations, and play (Stepanova et al. 2022).

The above reviews all examine a generalised group including both strangers and close relationships. A wide range of approaches is discussed, covering systems that elicit intimacy, global interconnectedness, social unity and other qualities. This gives us a broad and comprehensive view of which design elements of mediated systems can best support specific qualities of interactive experience in the current

HCI field.

However, this dissertation is focused on LDRs, which are relationship-specific and related to subtle emotions. Therefore, instead of strategies that seek to facilitate collocated social interactions or initiate new connections for strangers, I emphasise systems that are designed specifically for **emotional communication** using **LDR-mediated design**.

To gain an overview of the types of strategies used for emotional communication between LDRs, Hassenzahl and colleagues reviewed 143 articles on mediated-design artefacts. They identify six strategies (Figure 2.1) used to create experiences of relatedness: *creating awareness* refers to sharing different types of ambient information without requesting any conversation or shared activity; *allowing for emotional expressivity* emphasises supporting the explicit expression and reflection of emotions and feelings in an encoded way; *mediating physicalness* refers to creating a feeling of physical intimacy through physical proximity such as body heat or heartbeat; *gift-giving* describes the spontaneous demonstration of caring and thoughtfulness without expecting compensation; *joint action* means creating a shared experience or activity together; and *memories* refers to keeping records of past activities in order to reexperience past moments spent together (Hassenzahl et al. 2012).

The review focuses on the experience-oriented design of technology, analysing interactions that create relatedness and intimacy for people's psychological well-being. Hassenzahl and colleagues conclude by noting that only a few products are designed to connect distant individuals in more subtle ways than available technologies already provide. They argue that a new strategy for more subtle forms of communication, as well as more profound insights into people's acceptance and willingness to use such devices, are needed (Hassenzahl et al. 2012).

Hong Li and colleagues conducted another similar review of emotional communication in LDRs. The authors examined 52 published prototype devices with unconventional user interfaces for emotional communication. There is an overlap between the strategies identified by Hassenzahl and colleagues and those reported by Li and colleagues. Besides Hassenzahl and colleagues' six strategies, Li and colleagues added strategies of *unobtrusiveness, playfulness and joyfulness, per-*

Table I. Strategies

Facet	Description
Awareness	Artifacts that create a feeling of cognitive awareness and continuity by sharing different types of (ambient) information about current activities or moods among partners (without a conversation or doing anything together). Substrategies: Display of presence, activity, or mood. Psychological principles and key requirements for design: reciprocal self-disclosure, ambiguity, counteraction against idealization
Expressivity	Artifacts that emphasize the affective and emotional aspect of intimacy. They enable partners to express their feelings and emotions in a wide variety of ways, such as developing an own language or to use language in an ambiguous way. Substrategies: on-off, symbol. Psychological principles and key requirements for design: enriched expression of emotions, reciprocity, integration in daily routines, open to interpretation, phatic communication
Physicalness	Artifacts that mediate a feeling of physical intimacy. They simulate either secondary effects of physical proximity (e.g., body heat, heartbeat) or meaningful gestures (e.g., hugs, strokes). Subcategories: Physiological parameters, gestures. Psychological principles and key requirements for design: Reciprocity, simultaneity, contextual constraints
Gift Giving	Artifacts that demonstrate caring and valuing the other person by gift giving. Psychological principles and key requirements for design: Reflection, effort and appreciation, thoughtfulness and similarity, symbolic communication
Joint Action	Artifacts that allow for carrying out an action together, which usually requires being physically colocated. Substrategies: Established routines, new routines. Psychological principles and key requirements for design: Activating communication, behavioral interdependence, selection of activities, serendipity
Memories	Artifacts that keep records of past activities and special moments of a relationship. Psychological principles and key requirements for design: Memorabilia, commitment, tangibility

Source:(Hassenzahl et al. 2012)

Figure 2.1 Current Strategies of Mediating Intimate Relationships through Technology.

sonalization, coincidence, reassurance, effortlessness, and effortful investment (Li
et al. 2018).

However, while Hassenzahl and colleagues mainly focused on the strategies of
relatedness, Li and colleagues' primary interest lay in the characteristics of systems
with unconventional user interfaces (UI). From their findings, we can see that
movable or semi-fixed objects are the most common form factor used for LDR
design. Moreover, touch input and visual output are the most common interaction
modalities, and ephemeral messages are the most dominant message type. Besides,
Li and colleagues note that most systems are evaluated in the laboratory and over
a short time period, while in-the-wild studies on long-term usage are lacking.
They commented that it would be interesting if the system targeted a certain
experience and aimed at eliciting a specific type of experience.

Other reviews have focused on more specific target users, such as romantic re-
lationships. For instance, Branham and Harrison reviewed 40 published papers
on "couple technologies". They found that a majority of couple designs (76%,
31 out of 40) have tried to establish a form of "abstracted presence", seeking to
provide "intimate, non-verbal interpersonal communication... through aural, vi-
sual, and tactile manifestations of subtle emotional qualities." Only a few (24%,
5 out of 40) designs have tried to target "deep interpersonal sharing", which is
about encouraging partners to engage in deep interpersonal communication that
involves reflective activities and "has the power to actually change mutual un-
derstanding." Abstracted presence systems often rely on highly abstract, visceral
exchanges that tend to constrain the communicative meaning. In contrast, deep
interpersonal sharing supports grounding processes in communication that can
contribute to mutual understanding (Branham and Harrison 2013).

Branham and Harrison suggest that since it is difficult to define being distant,
fewer papers have attempted to describe the situation of the long-distance user
group rather than simply identifying that they are geographically separated. "No
one has actually defined what it means to be partners at a distance." They further
identified three under-explored design opportunities: abstracted presence for local
partners, deep interpersonal sharing for local partners and deep interpersonal
sharing for distant partners (Branham and Harrison 2013).

Although Branham and Harrison focus on couples' technologies, they provide in-

Source:(Branham and Harrison 2013)
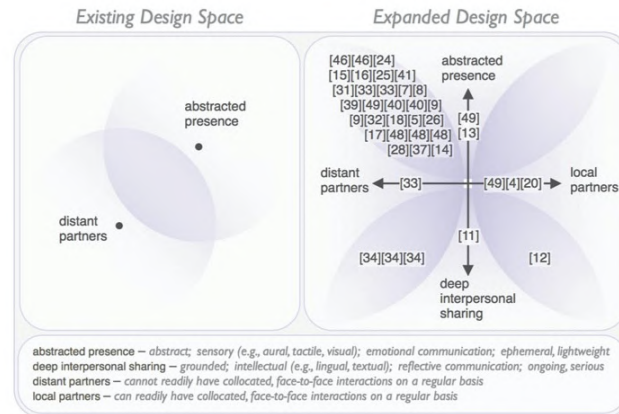
Figure 2.2 A visual representation of the design space as defined by the majority of current couple technologies (left) and a proposed expansion of this design space (right).

sights into abstracted presence and deep interpersonal sharing that can be applied to the broader context of LDR designs. For example, while abstracted presence may constrain communicative meaning and rely too much on users' own interpretations, it may nonetheless inspire and trigger further communication through other channels to search for deep interpersonal sharing (e.g. an abstract single-bit signal may trigger us to make a phone call and conduct deep interpersonal communication.)

As Stepanova puts it, the use of designed systems defines our cyborg selves (Stepanova et al. 2022). Therefore, it is important to review these systems and the design strategies behind them in order to understand what it means to connect with others. The reviews discussed above provide an enriched understanding of the current design space in technology-mediated interactions, the potential for mediated relatedness and the design opportunities for LDR emotional design. This potential includes considering the complexity of emotion and creating more subtle forms of communication, exploring more profound insights into users' situations and context, and thinking more richly about interaction modalities. Moreover, we need to go outside the lab to generate technologies that are more applicable

to real use cases.

2.2.2 LDR Emotional Design

The HCI research and design community has produced a huge number of platforms designed to support LDR connections. Multiple channels are provided to support a wide range of communicative activities. Unconventional communication tools have been produced to mediate physicalness and increase intimacy, such as remote telepresence robots, multi-sensory sharing systems and biofeedback systems.

One of the most salient strategies in LDR design is to create sharing activities. Examples include Bedtime Window (Kučera et al. 2021), which allows couples to engage in slow photo-streaming and real-time inking (Figure 2.3); FamilyStories (Heshmat et al. 2020), which consists of three digital probes, each of which allows a person to record an audio story and send it to another family member for asynchronous communication across time zones; and CoDine, an interactive system for remote dining that aims to increase family closeness through enriched multi-sensory communication.
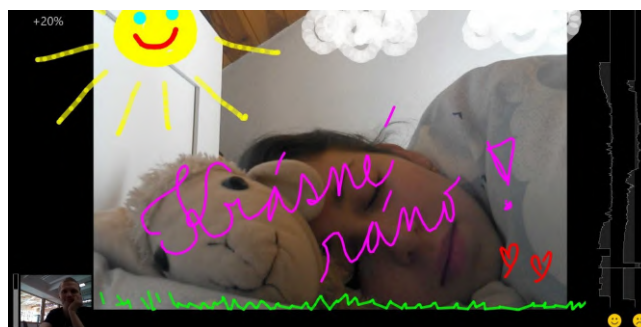
Source:(Kučera et al. 2021)

Figure 2.3 Bedtime Window system

Designers have realised the meaning and importance of light, such as indicating safety or security, communicating warmth and creating awareness, which can be utilised to indicate presence and communicate emotions over distances. Accordingly, prior work has introduced a wide range of modalities that use light to indicate presence.

WeLight (Morris et al. 2017) is a system of connected lights that allows individuals to configure the lights in the other's home as well as their own, in order to support spontaneous communication and shared scene creation.

Tollmar and Persson (Tollmar and Persson 2002) presented an aesthetic light sculpture that is connected to sensors distributed around the other person's house. The light will respond to the flow of electricity or water in the distant house. By varying the intensity of light, the living sculpture reflects the rhythm of the other person's life.

Connected Candles (Häkkilä et al. 2018) (Figure 2.4) is a pair of candle stands consisting of two candles, one of which is real and the other electronic. When one person lights the real candle, the electronic candle at the distant location will light as well. The designers sought to build a poetic emotional connection between couples through this non-intrusive symbolic interaction.
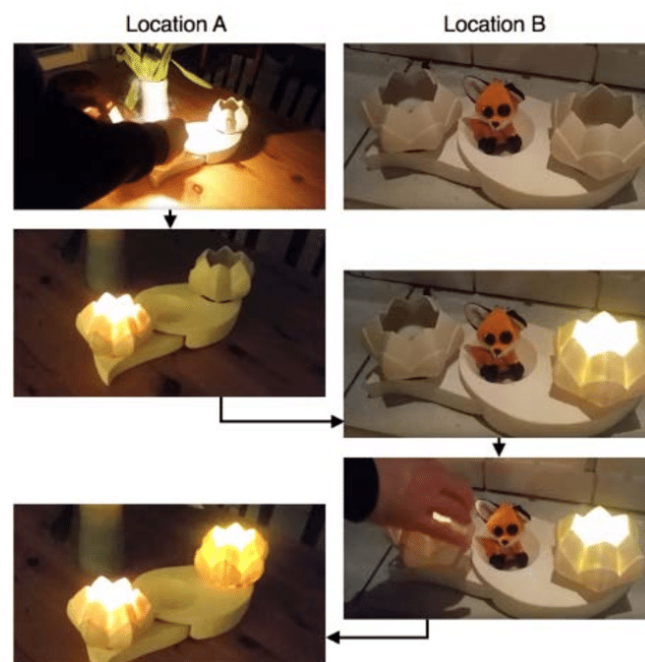
Source:(Häkkilä et al. 2018)

Figure 2.4 Connected Candles system

Other often-used design approaches in LDR design include embodied metaphors

and touch. As Stepanova and colleagues note, our bodily experiences affect our perception at a subconscious level (Stepanova et al. 2022). Since touching requires entering each other's intimate personal space, tactile expression is widely used to support and explore the richness of emotional communication in LDRs.

Keep in Touch (Motamedi 2007) (Figure 2.5) is a networked fabric touchscreen with a blurred digital projection of the participant's partner. It is designed to support intimacy for LDR couples through touching and body language. Another similar design is Touch Trace Mirror (Schmeer and Baffi 2011)(Figure 2.6), in which a pair of mirrors is used for emotional communication between romantic relationships. The sender can write words or draw patterns on the mirror and then send them to the recipient's mirror. Another project, LumiTouch (Chang et al. 2001)(Figure 2.7), provides a pair of photo frames. When one partner holds their photo frame, the remote partner's frame light up with colours that correspond to where, how hard and how long the frame is squeezed. Hug Over a Distance (Mueller et al. 2005) is a vest design that supports tactile interactions that simulate hugs between partners. The vest can fill with air to create a sensation resembling a hug. The "hug" can be initiated by one partner by miming a hug gesture. The other's vest will then fill with air until the hug is released by their partner. Finally, Move.me (Schiphorst et al. 2007) (Figure 2.8) aims to increase social intimacy by using touch-based interactive pillows to sense and respond to the quality of touch. In this context, the pillow refers to the secret internal world of the body, which connotes a comfortable, cosy, playful and warm feeling and provides a sense of intimacy. The project's use scenarios could include both private or public environments, such as a home or a café lounge.

Instead of creating new interfaces, most of the above design cases use everyday objects to develop interactions. One of the benefits of using such objects as the user interface is that the designer can borrow existing metaphors of intimacy, thereby embedding technology in a more subtle way to create a non-intrusive experience.

Designers often assume that people in LDRs seek to connect through rich, high-traffic media. Interestingly, however, subtle and minimal communication has also been found to be valuable in communicating intimacy (Kaye 2006, Strong and

Source:(Motamedi 2007)

Figure 2.5 Keep in Touch system

Source:(Schmeer and Baffi 2011)

Figure 2.6 Touch Trace Mirror system

Source:(Chang et al. 2001)

Figure 2.7 LumiTouch system

Source:(Schiphorst et al. 2007)

Figure 2.8 Move.me System

Gaver 1996). Several designs have focused on such subtle emotional interactions. Two pioneering examples are the Feather and Scent systems proposed by Strong and Gaver (Strong and Gaver 1996), which are the first couple-technology systems to be published in HCI. Both are targeted at relationships in which one partner is travelling while the other remains at home. The Feather system is composed of two physical artefacts: a picture frame and a glass vase containing a feather. If the travelling partner picks up the picture frame, the feather at the other partner's home will float. The Scent system is a variation on the Feather system. In place of the vase, the Scent system uses an aluminium bowl to vaporise essential oil, filling the air with a lingering fragrance that represents the traveller's thoughts. These two systems aim to support simple intimacy through implicit, non-verbal, symbolic interaction, thus providing an ephemeral, poetic experience of connection.

VIO (Virtual Intimate Objects) is another system that offers emotional communication through limited, single-bit interaction for couples in LDRs. It is a simple computer system that appears as a circle in the user's Windows taskbar (Figure 2.9). When one partner clicks on the circle displayed on their screen, the corresponding circle on the other's screen turns bright red and then fades over time. Kaye suggests that even this simple, minimal interaction can create rich and complex interpretations and a sense of intimacy: "a single bit of communication can leverage an enormous amount of social, cultural and emotional capital, giving it a significance far greater than its bandwidth would seem to suggest." (Kaye 2006)
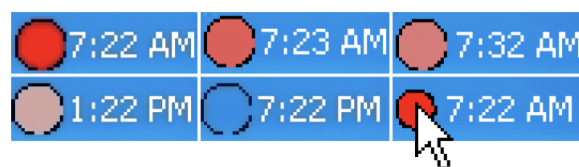
Source:(Kaye 2006)

Figure 2.9 VIO System

However, the design practices described above focus on general emotional communication and intimacy. Chien notes that few approaches have taken up the

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challenge of performing more complex emotional exchanges. As one user of the VIO system noted, there is a difference between feeling "close" and feeling "connected". Therefore, a more specific type of intimacy or relatedness needs to be addressed and discussed.

Besides, many emotional communication designs target a specific group (e.g. romantic couples) to address a problem mainly based on a technical theory perspective, such as using biofeedback and tactile technology to build connection (since tactile sensory experiences can help increase intimacy, etc.). In contrast, few designs have started from a vision targeting a specific inner experience such as "nostalgia" to build a strong concept-inspired design. As mentioned by Branham and Harrison, many take the definition of LDR without asking basic questions such as what is really meant by distance. This may limit our understanding to narrow personal assumptions and inhibit truly innovative ideas.

2.2.3 Summary

Easily accessible media platforms with rich content are widely used in communication design since they can offer explicit information and amplify the sense of presence. However, researchers have noted that increasing the ease of use is not the right solution for all contexts (Gooch and Watts 2011). While such channels offer efficient communication, they are one-size-fits-all solutions that lack emotional and intimate experiences (Gaver 2002). Moreover, most available technologies focus on functionality rather than creating a sense of relatedness through design, which is essential in close relationships (Hassenzahl et al. 2012). There are also risks of problematic or addictive use with extended screen times and constant checking behaviour (Shin and Dey 2013).

As Strong and Gaver note in a discussion of intimacy and emotional communications systems, less explicit forms of information can encourage imagination and expression of value and attitudes (Strong and Gaver 1996). Designers should explore new materials and interactions to create new forms of aesthetic pleasure, thereby evoking a deeper and richer experience.

Compared to interactions that are highly demanding and engaging, I am more interested in designs that focused on "minimal communication" and "subtle emotion". Such designs allow users to layer their own meanings and add emotional

interpretations. Therefore, in this dissertation, I focus on designs that eschew the mainstream's rich content and high-volume exchange to propose alternatives that prioritise inner emotional communication over technical communication, thus mediating subtle relatedness among LDRs.

To conclude, this examination of LDR-mediated strategies and designs has revealed the following design opportunities:

1. Aim at eliciting a specific type of emotional experience.

Although there are cases focusing on subtle affective cues among current LDR emotional designs, there is still a lack of discussion of more complex emotional exchanges (Chien and Hassenzahl 2020). Most emotional designs have a generalised purpose; for example, some designs seek to create closeness without asking what kind of closeness LDRs are looking for. It is true that building a sense of closeness is the common goal of any kind of communication design. Nevertheless, the way people feel close is not only counted by distance or presence; to borrow Marcel Proust's words, it is also "measured by the heart". Therefore, it is worth exploring a specific type of experience for LDR design and digging deeper into the concept by asking what kind of intimacy people in LDRs are looking for.

2. Aim at a broader sense of LDR emotional design.

Many LDR designs focus on couple technologies, especially when it comes to topics of intimacy and emotional communication. However, they neglect the subtle emotions between family and friend relationships.

3. Evaluate design using in-the-wild studies.

Many design evaluations are conducted in the form of one-day workshops or lab experiments and lack real uses in LDR's life for a longer period of time (Li et al. 2018).

Therefore, in the following sections, I will dig deeper into subtle forms of emotional interaction with a special focus on the concept of nostalgia. I will thus explore and discuss how factors such as distance, content-less approaches and

slow media, which may seem to create the opposite of closeness, could actually increase intimacy and strengthen bonding in LDRs.

2.3. Basic Facts of Nostalgia

Nostalgia theory and related designs will be discussed in this section. The history, definition, categorisation and aesthetics of nostalgia will be introduced to further illustrate its underlying values. These values will, in turn, contribute to the LDR media design presented in this dissertation.

2.3.1 Modern Nostalgia vs. Postmodern Nostalgia

Modern Nostalgia

The term "nostalgia" has drifted considerably from its original meaning in the seventeenth century. Deriving from the Greek words nostos for return and algos for suffering, the literal meaning of nostalgia is the suffering caused by the yearning to return to one's place of origin. The term was introduced by the Swiss physician Johannes Hofer to refer to the adverse psychological and physiological symptoms displayed by Swiss mercenaries who plied their trade on foreign shores (Hofer 1934). Later, from the 19th to the 20th centuries, nostalgia gained a temporal meaning, as in a "lost era", in addition to its original spatial meaning of a "lost place". Its meaning expanded from homesickness to a general longing for the past. This shift also marks nostalgia's transition from a purely medical concept to a concept in the cultural realm.

This shift in meaning is closely connected to the Industrial Revolution, dramatic social change, and developments in the media. As Boym puts it, "this temporal nostalgia is very much a product of and a response to the experience of modernity" (Boym 2008). The experience of rapid change and displacement breeds the feeling of nostalgia. When the present seems unstable and the future uncertain, the natural response is to look back towards a past when there was a greater integration between self and community. For Boym, nostalgia is thus "a rebellion against the modern idea of time". It is not a mere memory, but a new understanding or construction of the meaning of time as a governing principle of

our lives.

Importantly, in modern nostalgia (or temporal nostalgia), the past we long for is very likely the imagined, idealised past. Indeed, nostalgia is a function of the imagination as much as memory. The world it produces is very different from the mere sum of recollectable moments. In fact, nostalgic longing is often for something that never existed. Through the rose-tinted glasses of nostalgia, the past is a mixture of memory and imagination.

Su writes that "they very clearly and articulately recognise that nostalgia promises no return and that the longing to return is frequently for places that never existed." (Su 1999)

"In nostalgia," Casey writes, "we have recourse to imagination just where perceiving and remembering fail us – and they always do fail us to some significant degree." (Casey 1987) Therefore, modern nostalgia refers not so much to the desire for a real return but to a longing that can only be experienced from an impassable distance.

The insuperable distance between past and present enables us to imagine, rethink and recreate our own idealised past. This distance can trigger sentimental feelings and arouse aesthetic awareness of the transience of life and things, thus laying the foundation for the basic wistful tone of nostalgia. As such, it is a fundamental condition for modern nostalgia. But what if the past is no longer distant?

Mediated Nostalgia

As Mindich puts it, modern society is a mediated world (Mindich 2020). The digital revolution not only has a dramatic impact on our engagement with the past but also introduces novel dynamics in relationships. The media environment has changed from print culture to visual culture and from analogue to digital. Given the prevalence of social media, we are exposed to information, and we are more connected than ever before. In this context, nostalgia is not just a reaction to the changes brought by media technologies but "is actually enhanced by those very technologies"(Sayers 2020).

As Coontz writes in *The Way We Never Were: American Families and the Nostalgia Trap*, media content in the 20th century laid the foundation for a yearning

for "good old days" that never truly existed. Such media constructs an imagined golden age that becomes the object of nostalgia (Coontz 2016) (see Figure 2.10).

In the 21st century, the media industry is increasingly ubiquitous, and its rapid growth has profoundly changed the way we interact with each other. In our daily lives, we rely heavily on digital communications to maintain relationships. Our constant digital presence has allowed us to overcome physical distances, going beyond our physical existence to create a shared sense of place. Indeed, it seems that distance no longer matters much in the age of the internet. We are leading a mediated life, and we are simultaneously citizens of the physical world and the digital world. If the development of globalisation caused national borders to fade, the advent of the digital revolution further contributes to this process, confirming the pronouncement of "the death of distance" (Couclelis 1996). The media channels and platforms dominated by digital technology blur the lines between the physical and virtual, diminishing the meaning of distance and parting. These are essential conditions for the bittersweet longing unique to modern nostalgia.

The history of nostalgia is deeply intertwined with the development of media. Nostalgia, as an experience of "re-living time", is closely related to photography, documentary media, and the mass media industry. Today, these include printed albums and social media trends, such as ThrowbackThursday on Instagram (Figure 2.11). Nostalgia is not only a reflection of the past or a coping mechanism to handle changes, but also a retro lifestyle augmented by media technologies. As Boym puts it, the first decade of the twenty-first century was characterised by the proliferation of nostalgia (Boym 2008). Nostalgia, which was once understood as a sociocultural response to forms of discontinuity, can now be understood also as a visual style – that is, as a mediated emotion.

Postmodern Nostalgia

The digital age has changed how we view time and store records of the past. Various media forms (e.g. pictures and videos) allow the past to be everywhere, coexisting with the present. Nostalgia is no longer restricted to the past. Today, it might be called *"nowstalgia"* (Korin 2016), as people take pictures to preserve every moment, or "anticipated nostalgia", which is nostalgia for the present and the future (e.g. "I anticipate that I will feel nostalgic about my children's childhood
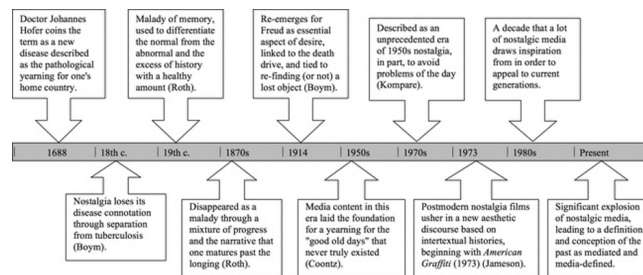
(Source: (Lizardi 2014))

Figure 2.10 Mediated Nostalgia

Source: Expedia (@Expedia), "For tomorrow's #TBT join our #ThrowMeBack contest on Instagram

Twitter!" Twitter, July 17, 2014, https://twitter.com/expedia/status/489483888386138112

Figure 2.11 Expedia #ThrowMeBack Contest

in the future"). Cheung and colleagues find that anticipated nostalgia is related to deliberate savouring techniques, such as purchasing souvenirs and documenting moments with pictures (Cheung et al. 2020). This example shows that nostalgia does not rely on reflections of the past.

Thus, nostalgia shifts from temporal to atemporal, standing outside of time. The atemporal version of nostalgia is called postmodern nostalgia, defined by Jameson as "the collective social desire to appropriate an idealised past through aesthetic representation." (Jameson 1991)

Brown describes this transition in *in The Retro Revolution*:

> These days, nostalgia is not what it used to be – since it is no longer
> a thing of the past... From neo-steam trains and retro motorcycles to
> artfully aged sales brochures and Habitat's recently announced policy
> of reproducing 1960s design classics, it seems that then-and-there is
> here-and-now.(Brown 2001)

Postmodern nostalgia is the result of the development of popular culture, mass production and the digital media environment. We are provided with a variety of nostalgic objects or simulations of them. In this context, nostalgia is simply a brand name, a means of marketing or a particular kind of product. It is "the symbolization of an emotion". Higson argues that postmodern nostalgia erases the sense of distance between the past and present; "memory is often not even invoked in postmodern nostalgia experience, let alone wistfulness." (Higson 2014) In contrast, wistfulness is the essence of modern nostalgia:

> What I am calling modern nostalgia may be about longing for a lost
> past, but it is not about returning to that past; Modern Nostalgia
> is precisely that experience of longing, that experience of wistfulness.
> (Higson 2014)

Distance is the prerequisite for nostalgia. It determines modern nostalgia's wistful tone and is also a key element in nostalgia's aesthetic value. The distance in modern nostalgia helps to differentiate it from postmodern nostalgia. However, with the development of digital technology and ubiquitous media, we can diminish

the meaning of geographical distance by being always online. As a result, nostalgia becomes more merchandised and entertainment-oriented.

The transition from modern nostalgia to postmodern nostalgia is not an absolute, one-way transformation, and the two types often overlap and coexist. Nevertheless, this transformation reveals that nostalgia does not have to be restricted to the past. Moreover, the wistfulness and bittersweetness that were once nostalgia's distinctive features are fading in the age of the digital revolution.

2.3.2 Simple Nostalgia and Reflective Nostalgia

Similar to the concepts of modern and postmodern nostalgia, Svetlana Boym has drawn a distinction between "restorative nostalgia" and "reflective nostalgia":

> Restorative nostalgia stresses nóstos (home) and attempts a transhistorical reconstruction of the lost home. Reflective nostalgia thrives in álgos, the longing itself, and delays the homecoming—wistfully, ironically, desperately. (Boym 2008)

Restorative nostalgia usually involves happy memories associated with the past. It not only represents a desire for the past but also attempts to experience it in the same form. When we feel restoratively nostalgic, we are likely to feel motivated to patch up the gaps in our memory and recreate the past. Restorative nostalgia is visible in retro gaming practices and the repair of historic buildings.

Reflective nostalgia also recalls the past, but this desire for the past is followed by a reflexive, critical attitude (Horváth 2018). Restorative nostalgia manifests itself in "total restoration of monuments of the past", while reflective nostalgia "lingers in the dreams of another place and another time" (Garda 2013).

Reflective nostalgia dwells in *algia* – that is, in longing and reflection on loss. While restorative nostalgia believes in "truth and tradition" and hopes to return to an exact "past", reflective nostalgia calls this into doubt and focuses on "the ambivalence of human longing and belonging":

> The subject-matter of reflective nostalgia is not the glorified historic past, but the individual resonances of the past, and the passing itself. (Boym 2008)

Compared to restorative nostalgia, reflective nostalgia tends to be more conscious and complex in its way of viewing the past. It requires more of a personal interpretation from the experiencer, which, in turn, makes the past more of a resource for interpretation. As Horváth suggests, "reflective nostalgia is a resource for processing the passing of time in a creative manner."(Horváth 2018) Due to this feature of reflective nostalgia, it is more closely related to artistic expression and aesthetic studies.

The above two terminologies are very close to Davis's threefold classification (Davis 1979), which includes simple, reflexive and interpreted nostalgia. These types of nostalgia are differentiated based on the degrees of cognitive reflection experienced.

First, simple nostalgia involves the belief that things were better in the past. People enjoy the experience of simple nostalgia but leave it unquestioned. Second, reflexive nostalgia "summons to feeling and thought certain empirically oriented questions concerning the truth, accuracy, completeness, or representativeness of the nostalgic claim" (Davis 1979, p.21). By posing questions like "was my past life really that happy?", simple nostalgia becomes reflexive nostalgia, which is "a more complex human activity that can better comprehend ourselves and our past" (Davis 1979, p.21).

Interpreted nostalgia, which is the third order of nostalgia, is probably rare among most people. It is more like a researcher's job: to analyse nostalgia as a social phenomenon and psychological process.

Both reflexive nostalgia (Davis 1979) and reflective nostalgia (Boym 2008) share the same attitudes toward the past through their elements of reflection and complexity. Thus, in this dissertation, I use the terms interchangeably.

In addition, I understand the definition of simple nostalgia (Davis 1979) to be close to the idea of postmodern nostalgia (Jameson 1991, Higson 2014), where the distance can be shortened and sadness, wistfulness and reflection can be eliminated. Moreover, reflective nostalgia (Boym 2008) shares the same quality as modern nostalgia (Boym 2007, Higson 2014), as both emphasise the "distance", the passing and the longing itself (although the former need not imply the latter).

Because reflective and modern nostalgia focus more on loss and longing, they
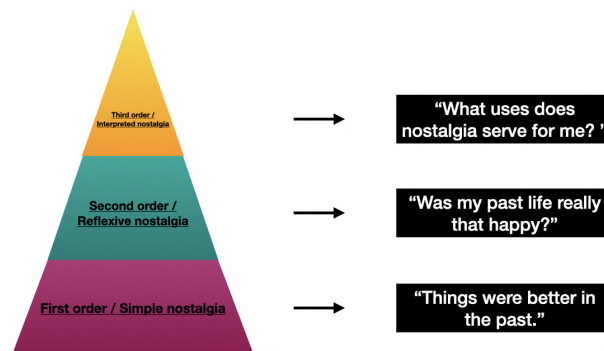
Figure 2.12 Simple nostalgia, reflexive nostalgia, interpreted nostalgia.

tend to have strong features in aesthetics and are highly related to philosophical interpretation. Indeed, they are often depicted in artistic works and designs, such as art pieces by Ai Wei Wei (Figure 2.13) and reflective design (Horváth 2018). In this dissertation, reflective nostalgia (rather than simple nostalgia) became my research focus.

2.4. The Lost Potentials: Aesthetic Nostalgia

The definition of nostalgia is always changing. As the discussion above shows, it has changed from lost home to lost time (temporal nostalgia) and to a time we never experienced (mediated nostalgia) and even a time that has yet to come (anticipated nostalgia (Cheung et al. 2020)). However, as Weiser notes, what matters is not technology itself but its relationship to us (Weiser and Brown 1997). In the context of nostalgia, what is important is not its theoretical semantic definition but how we treat, interpret and reflect on it.

   As Jessica Helfand writes, "nostalgia privileges memory and perception over reality, and favours utopia."(Helfand 2005) Unlike reminiscence, which refers to the recollection of existing memories, nostalgia is an emotional and cultural experience of longing that involves reflection and "creativity for processing the passing of time" (Horváth 2018). It is often directed by the imagination, and it dwells

Source: Installation view, Taipei Fine Arts Museum, 2011.

Figure 2.13 Ai Weiwei, "Forever Bicycles," 2011. A household Chinese bicycle brand "Forever" used to be part of everyday life in China in 1940. However, with the rapid modernisation in recent years, these "Forever" brand bicycles have been slowly disappearing from the streets. A tinge of nostalgia accompanies the irony of the word "Forever".

on a romanticised past; it is "An emotional state in which an individual yearns for an idealised or sanitised version of an earlier time period."(Stern 1992) Nevertheless, nostalgia itself is not rosy but rather "a rough-and-tumble emotion" whose "rocky structure and consequences may capture rather convincingly the vicissitudes of life" (Stephan et al. 2012).

Nostalgia has a bittersweet affective signature, and it is tied to the feeling of loss. Compared to purely positive recollections, nostalgia has a less hedonic tone. The whole basis of nostalgic recollection is a restricted and reserved mode of enjoyment. This leads to a richer form of mental activity with deeper, more complex connotations; it involves not only psychology but also aesthetics, philosophy and reflective thinking. Moreover, it can be extended to the theory of psychological distance, ambivalence, tangibility, authenticity and even feminism (Boym 2008, Evans and Bussey-Chamberlain 2021).

While the aesthetic aspects of nostalgia comprise one of its most important characteristics, serving to differentiate it from other emotions, they remain relatively underexplored in academic research. Therefore, I seek to explore nostalgia

theory from an aesthetic perspective and to develop potential designs on this basis.

The terms aesthetic nostalgia and nostalgic aesthetics are interchangeable. I created the term aesthetic nostalgia to refer to certain features and aspects that are linked to aesthetics studies and theories that reflect or are related to nostalgia (modern nostalgia, reflective nostalgia, wabi-sabi, and so on). While some of these aspects may not seem to fit under the term "nostalgia" itself, they capture shared, similar aesthetic characteristics and can be taken as "part of" nostalgia.

2.4.1 The Meaning of Distance in Aesthetic Nostalgia

As Stewart says, the nostalgic is enamoured of distance (Stewart 1993). Nostalgia begins with distance, features distance and flourishes in distance. Distance is one of the most important factors of nostalgia.

While recent studies have found that nostalgia increases positive affect (e.g. by shortening the psychological distance), some scholars have begun to revive questions about the unfavourable aspects of nostalgia (Larsen et al. 2001, Larsen and McGraw 2011, Hepper et al. 2012). Such work has highlighted its distinctively bittersweet nature, which directly links to the very concept of distance in this dissertation.

The essence of distance is the unreachable, the unattainable. It is the gap between here and there (spatial distance) and also the gap between now and then (temporal distance).

Distance can trigger sentimental longing and arouse aesthetic awareness of the transience of life and things, thus laying the foundation for the basic wistful tone of nostalgia. As Higson puts it, "it is a fantasy of returning home, not an actual journey home."(Higson 2014) Nostalgia refers not to the desire for real return, but to a longing that can be experienced from a distance. Besides, the unreachable detaches us from "a practical relationship" and "the utilitarian aspect of things"; it gives us perspective and enables us to imagine and recreate an aesthetic interpretation.

Below, I will discuss two essential concepts for interpreting the aesthetic meaning of distance: sensibility towards loss and decay and disinterestedness in the appreciation of beauty.

2.4.2 Sensibility (the Beauty of Loss) in Mono No Aware

> The dew may disappear while the flower remains – yet it lives on only to fade with the morning sun. . .If our life did not fade and vanish like the dews of Adashino's graves or the drifting smoke from Toribe's burning grounds, but lingered on forever, how little the world would move us. **It is the ephemeral nature of things that makes them wonderful.**
>
> –*Essays in Idleness* (Kenk 1998)

From an aesthetic perspective, nostalgia is very similar to the Japanese aesthetic concept of *Mono No Aware*, which describes a gentle sadness and awareness of the impermanence of life. It is translated as "an empathy toward things" or "a sensitivity of ephemera" and is used to describe the awareness of *mujo* (impermanence).

The most frequently cited example of *Mono No Aware* is the cherry (sakura) blossom in Japan. Huge crowds of people go to view the cherry blossoms every spring (Figure 2.14). The flowers are so fragile that they will not last for more than a week after their first appearance, and the petals fall like drizzling rain (Figure 2.15). "It is precisely the evanescence of their beauty that evokes the wistful feeling of *Mono No Aware* in the viewer."(Parkes and Loughnane 2018) They are more highly valued because of their transience, which is reflected in *Mono No Aware*.

"*Aware*" means to feel the world and be touched by its ephemeral beauty; it can be understood as "sensibility". Some scholars have compared several Japanese words related to nostalgia, and they emphasise that the "sentimental" feature is the key to translation. Compared to reminiscence, memory and homesickness, nostalgia contains a deeper, more mixed feeling. It is "a joy tinged with sadness". In that sense, aware as sentimental awareness fits the spirit of nostalgia, which is the bittersweet sadness at passing times.

What is interesting in the concept of "*aware*" is that it is not primarily about "feeling sad" or "being sentimental" but more about reflecting on life, appreciating the ephemeral, and understanding transience in a poetic and philosophical way.

As Chamber says, "Mono no aware is herein viewed as a concept metaphor

Source:"Cherry blossom season in Japan: the love of the ephemeral" accessed online, March 13, 2020,

https://wattention.com/cherry-blossom-season-in-japan-the-love-of-the-ephemeral/.

Figure 2.14 Hanami Event on Postcards from the early 20th century.
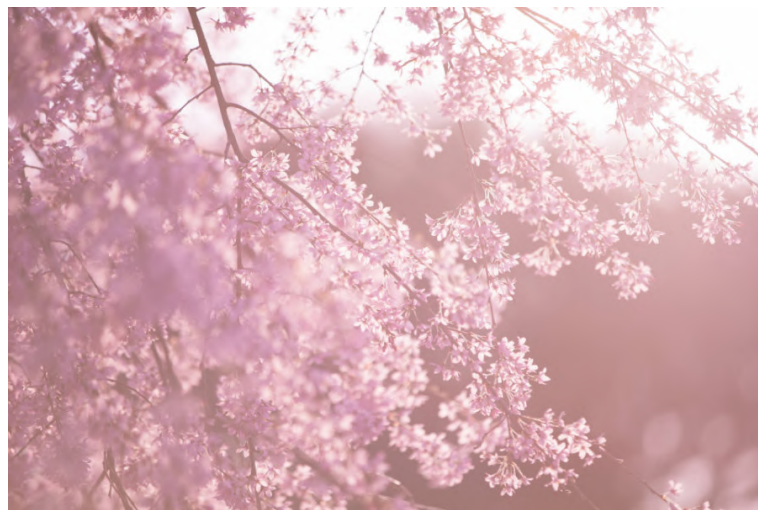
Source: "Cherry blossom season in Japan: the love of the ephemeral" accessed online, March 13, 2020,

https://wattention.com/cherry-blossom-season-in-japan-the-love-of-the-ephemeral/.

Figure 2.15 Symbol of Mono no Aware: the delicate blossoms.

for poetic and philosophical interpretation and internalisation of the inherently transient quality of all life and things." (Chamber 2013)

The key point of both *Mono No Aware* and the distance concept of nostalgia is the **awareness** of life's ephemerality and impermanence. To understand the ephemeral nature of things is to feel the pain and beauty behind them. This need not lead to nihilistic despair but rather serves as a call for gratitude that another moment has been granted to us.

2.4.3 Sensibility (Imperfection of Nature) in Wabi-sabi

> Are we to look at cherry blossoms only in full bloom, at the moon only when it is cloudless?
>
> –*Essays in Idleness* (Kenk 1998)

Similar to *Mono No Aware*, another fundamental Japanese aesthetic is *Wabi-sabi*. Its aesthetics are centred on the acceptance of impermanence and transience, which shares similarities with mono no aware. However, *Wabi-sabi* emphasises "imperfection", which refers to the beauty that is "imperfect, impermanent, and incomplete". From my point of view, *Wabi-sabi* shares aesthetic characteristics with nostalgia since it is specifically related to "the delightful contemplation of what is old and worn" and can be interpreted as accepting things as they are or accepting the nature of things.

Wabi-sabi consists of two Japanese words. The term *Wabi* means "simple, austere", which can be "traced back to loneliness or melancholy, to the appreciation of a serene life, far from the urban hustle and bustle." Meanwhile, *Sabi* can be translated as "desolation in a poetic way", which could also mean an "antique look, old and elegant".

Characteristics of the *Wabi-sabi* aesthetic include asymmetry, simplicity, roughness and the suggestion of natural processes. What attracted me most to this concept is the interpretation of "nature".

Wabi originally referred to the loneliness of living in nature, remote from society. Some scholars have argued that *Wabi* contains the linguistic root *wa*, which refers to harmony and balance; it has come to mean simple, humble by choice and in

tune with nature. While *Sabi* connotes a natural progression, *Wabi-sabi* connotes natural simplicity, freshness and quiet.

A significant aspect of *Wabi-sabi* is the concept of "nature", which is related to the aesthetic appreciation of ageing, flaws, decay, desolation and the value placed on intrinsic beauty. These can all lead to ideas of returning to the simplicity of nature, the transience of nature, accepting imperfection in nature, embracing roughness in nature, and so on. There are many examples of design and art (Figure 2.16, Figure 2.17) that employ *Wabi-sabi*, thus reflecting this fundamental concept of nature.
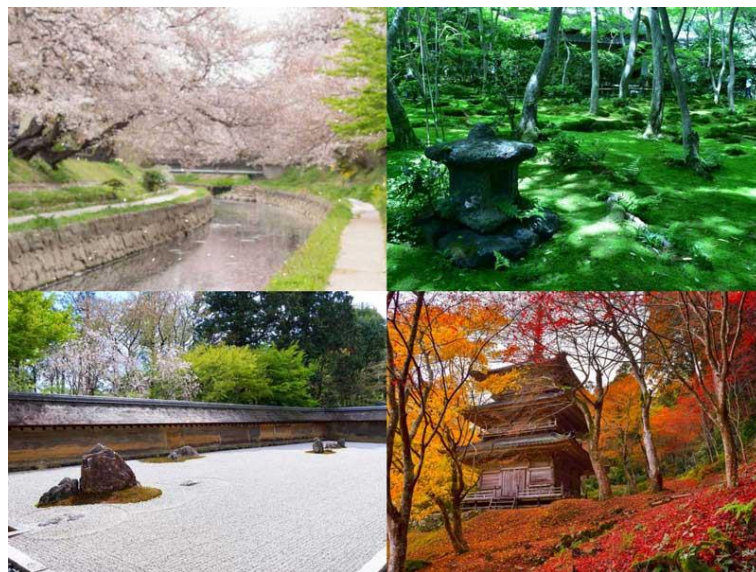
Source: "What Is Wabi-Sabi? 5 Kansai Scenery Where You Can Experience This Japanese Aesthetic" accessed online, October 23, 2022, https://www.the-kansai-guide.com/en/article/item/16213/.

Figure 2.16 Symbol of Wabi-sabi: the nature and seasonal change.

The *Wabi-sabi* concept is well-grounded in the traditional Japanese appreciation of the transient and imperfect aspects of nature:

> Starting in the Heian era, Japan revitalized its focus on the natural world, embracing its unpredictable fluctuations and adopting a sensitivity to and appreciation for nature. (Prusinksi 2012)

Figure 2.17 Symbol of Mono no Aware: flawed beauty.

> The Japanese appreciation of the evanescent aspects of nature is rooted
> in the psychological benefit the Japanese derive from them: justifica-
> tion of the impermanence of human existence. (Saito 1985)

Therefore, I summarise the nature concept in *Wabi-sabi* as manifesting in two
main aspects:

1. Imperfection in nature, which indicates the beauty of the effects of time
and the enhancements of ageing. Natural imperfections that show in artworks
and designs, such as flaws and raw textures, are often valued more highly in the
Wabi-sabi aesthetic.

2. Impermanence in nature, which indicates the irregularity and the imperma-
nence of all things.

The *Wabi-sabi* aesthetic is linked to solitude and contemplation. It is a tran-
scendental beauty achieved through respect for and reflection on fleeting things.

2.4.4 A Fog at Sea: Aesthetic Disinterestedness

There is an old saying: distance makes the heart grow fonder. Indeed, distance
is an important factor in aesthetic principles such as *artistic detachment*, and

aesthetic disinterestedness.

In an analysis of Japanese aesthetics, Odin interprets artistic detachment as an "aesthetics of reclusion" wherein ideals of beauty are rooted in detached contemplation:

> I argue that beauty is not just the fixed and given property of an object but requires an 'aesthetic attitude' of disinterested contemplation. . . Disinterested contemplation of beauty does not mean that one is 'uninterested' in the object. It simply means that one enjoys beauty for its own sake apart from concerns for self-interest. (Odin 2001)

The term *aesthetic disinterestedness* can be understood as the appreciation of beauty without a concrete purpose. Schopenhauer claims that a person typically relates to the world according to his or her own interests, but an aesthetic experience temporarily disengages them from those interests. (Schopenhauer 1960)

Edward Bullough uses the term "psychical distance" to note that aesthetic appreciation stands outside of our personal needs: "Distance, as I said before, is obtained by separating the object and its appeal from one's own self, by putting it out of gear with practical needs and ends." (Bullough 1912, p.91)

Bullough believes that there is no specific criteria or category to define beauty. For him, beauty comes from the psychological effect of people's appreciation, and this effect is born from psychical distance.

Psychical distance does not refer to distance in space or time, but the distance between the self and the affective object (e.g. between the viewer and the work of art). The distance eliminates the viewer's practical attitude towards the work, allowing the aesthetics to focus on pleasure. The psychical distance enables the viewer to have a new experience and to appreciate what is in front of them.

Bullough gives the example of fog at sea to clarify this concept:

> Imagine a fog at sea; Finding oneself in a sea fog when travelling by boat is not at all pleasant. Apart from the physical annoyance and remoter forms of discomfort such as delays, it is apt to produce feelings of peculiar anxiety, fears of invisible dangers, strains of watching and listening for distant and unlocalised signals.

47

Source: "Rare sea fog shrouds Perth coastline and Fremantle Port in a ghostly haze," ABC online, February 5, 2020, https://www.abc.net.au/news/2020-02-05/rare-sea-fog-shrouds-perth-coastline-and-fremantle-port-in-haze/11932256.

Figure 2.18 Fog at Sea

> But considered from another point of view a sea fog is a most beautiful spectacle. For a moment you do not think that it is holding up the voyage, you do not think of it as being dangerous and annoying. Instead, you observe this phenomenon with the utmost concentration; observe this light vapour that seems as a soft veil that, just like a cage, covers the mirror-smooth sea. (Bullough 1912, p.88)

The difference between these two experiences is the psychical distance between the self and the fog. In the first case, the sea fog is part of the practical world. It is too close to the viewer, who has no chance to appreciate it with calm judgement and instead considers practical interests such as safety and delays. In the second case, by locating the fog outside the practical world, "the self" is able to appreciate "the fog" with "objectivity".

According to Bullough, the transformation of aesthetic appreciation by distance is produced "out of gear with our practical, actual self; by allowing it to stand outside the context of our personal needs and ends – in short, by looking at it 'objectively'" (Bullough 1912, p.89).

However, as Bullough mentioned, the role of distance is not simple but highly complex. If the distance between the self and the affective object becomes imbalanced, "over distance" or "under distance" would lead to artificiality, emptiness and a failure of aesthetic appreciation.

Distance can be a double-edged sword. In the context of nostalgia, distance isolates us, causes loss and brings sadness. At the same time, it offers different perspectives and serves as a source or vehicle of aesthetic appreciation, which may provide a deeper pleasure through reflection.

As Bullough puts it, "it is distance, which supplies one of the special criteria of aesthetic values as distinct from practical (utilitarian), scientific, or social (ethical) values." (Bullough 1912, p.118)

To conclude, the meaning of distance in aesthetic nostalgia can be interpreted as follows:

1. The beauty of transience: Distance creates a gap in the temporal or physical dimension, makes us aware of the ephemerality of life and contributes to our

aesthetic sensibility. It helps us understand that beauty is transient, fleeting and comes with time. This, in turn, may lead us to cultivate gratitude for the time that is granted for us to be together or to cherish the present.

2. The beauty of imperfection: Distance indicates the absence, unpredictable fluctuations and natural passing of time. It may teach us to embrace the elements of life that are imperfect, impermanent and incomplete, help us to recognise the beauty of decay and lead us to contemplate emptiness. This can also be applied to create an understated elegance in design.

3. The beauty of disinterestedness: Distance detaches us from personal interests and utilitarian values, instilling within us an aesthetic appreciation of experience, relationships and life. It may also offer new perspectives and objectivity to understand "otherness", and it may serve as a vehicle of affective feelings that can contribute to a better relationship between the one and the distant other.

The status quo makes people feel safe, which is why we do not like the endings and changes that distance brings. Nostalgia is understood as a socio-cultural response to discontinuity. It is used as a psychological source to conquer distance.

However, by reviewing the role of distance, we can see that nostalgia's entanglement – and even obsession – with distance supports a lot of extra meaning, including aesthetic awareness and affective reflection.

In Parkes and Loughnane's words, "it is not just lamenting – sometimes lamenting but more often celebrating it."(Parkes and Loughnane 2018) It is hard to tell whether nostalgia aims to overcome the distance and achieve a real return or whether it is actually enamoured and enchanted by the distance itself. Indeed, we may find that it is precisely this distance that produces fruitful meanings and possibilities that transcend the term "nostalgia".

2.5. Nostalgia Design

2.5.1 Contemporary Nostalgia Design

Designers have played a leading role in employing the power of nostalgia for commercial profit. Today, contemporary nostalgia designs and design approaches related to branding, marketing and services are widely used.

Examples include nostalgic advertising campaigns such as Sony's Walkman, which attempted to trigger nostalgia by echoing the thoughts of a middle-aged fan for whom the Walkman provided the soundtrack to their youth (Figure 2.19).

Source: "Hit rewind: Sony Walkman triggers nostalgia on 40th birthday" accessed online, October 22, 2022, https://www.thejakartapost.com/life/2019/08/12/hit-rewind-sony-walkman-triggers-nostalgia-on-40th-birthday.html

Figure 2.19 Various models of Sony Walkman audio players are displayed at an exhibition marking the 40th anniversary of the iconic device in Tokyo.

In another example, nostalgic product design was used for Motorola's RAZR series (Figure 2.20), a clamshell foldable smartphone that the company introduced in 2020. The device aims to take users back to the days when people carried flip phones.

Nostalgia is also used as a branding strategy. Burger King rebranded its logo in 2021 to resemble its logo in the 1970s (Figure 2.21) in order to create a sense of familiarity among consumers.
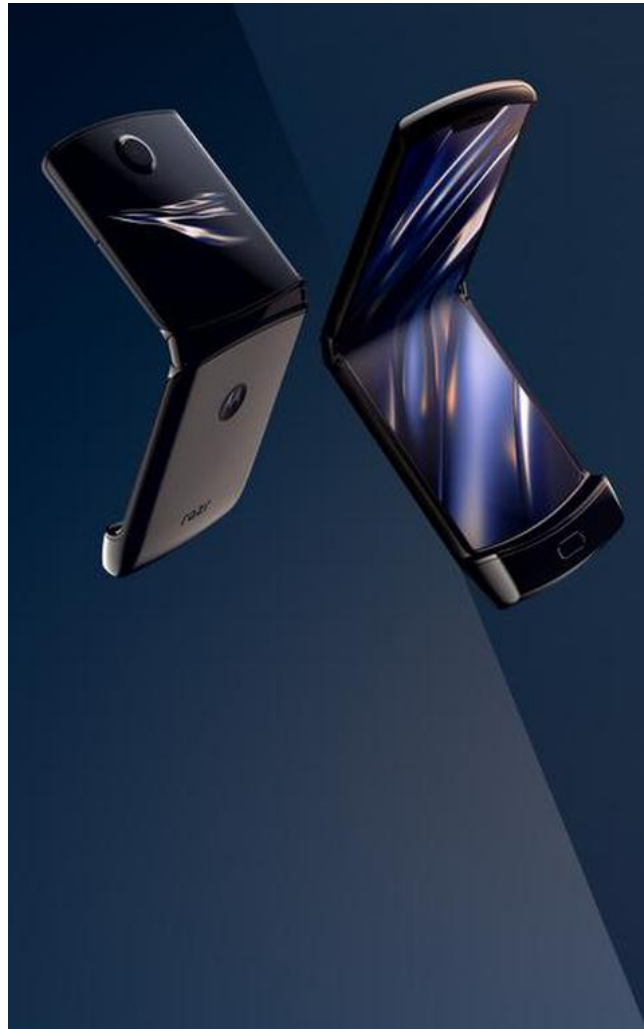
Source: "Moto Razr: Nostalgia meets transformation" accessed online, October 22, 2022,

https://www.thehindubusinessline.com/specials/technophile/moto-razr-nostalgia-meets-

transformation/article30924734.ece

Figure 2.20 Motorola evokes nostalgia for a favourite flip phone.

Source: Burger King (@BurgerKing), "Wout with the old, in with a new classic #NewProfilePic" Twitter,

January 08, 2021, https://twitter.com/burgerking/status/1347232689502396418

Figure 2.21 Burger King bring back its old logo

Social media companies know how to use nostalgia to grasp attention through trending topics. Expedia's "throw-back" campaigns on Instagram aim to stoke fond memories of family travel to trigger thoughts of new trips (Figure 2.11). Similarly, Facebook's On This Day feature offers a review of personally generated content from the same date in the past (Figure 2.22).
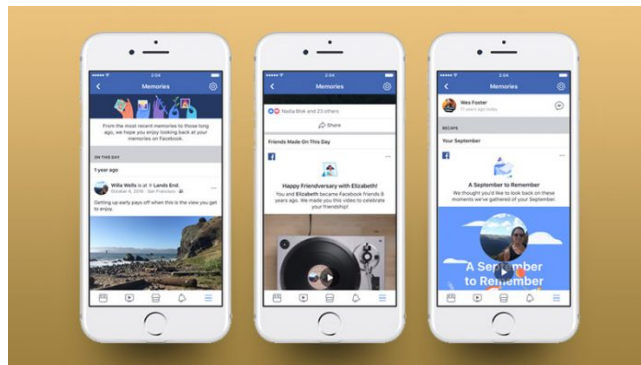
Source: "Say hello to Facebook Memories, a dedicated section for your Facebook past" attention online,

October 22, 2022, https://www.socialsamosa.com/2018/06/facebook-memories-dedicated-section/

Figure 2.22 Facebook Memories

Emotional consumption rather than material need increasingly governs today's market, which makes design powered by emotion essential. As Tseng and Ho put it, nostalgic products have a personalised aspect. Such products start from consumers' emotional needs, evoke their precious memories and induce spiritual resonance (Tseng and Ho 2011). Nostalgia – in either personal or collective form – has become a popular tool for designers; it achieves better emotional engagement with consumers and better product design using symbolism and distinctness.

Meng Shu points out that contemporary design is more concerned with "the future of nostalgia". Instead of visual representation that portrays the past faithfully and precisely, contemporary nostalgia design focuses on a forward-looking engagement with stories about the past, which "highlights the humanistic and social value of design beyond time and space" (Shu 2014).

For example, "Macau Impression" is a design course offered at Macau University

of Science and Technology. It requires students to create visual representations of cultural memories (Figure 2.23). By undergoing this journey of examining the past and using memories as materials for the symbolic representation of self-expression, the students are encouraged to engage in critical self-examination and explore what constitutes "I", "You", and "We". This process may contribute to self-identity and belonging to a future community (Shu 2014).
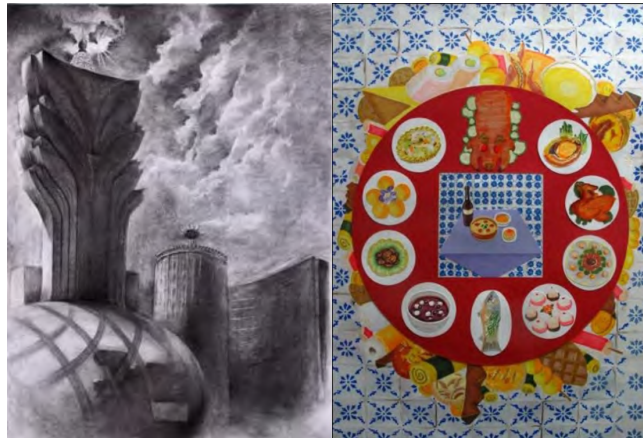
Source: (Shu 2014)

Figure 2.23 Macau Impression, students' visual art works

A few contemporary nostalgia designs have tried to involve nostalgia without using any visually arousing elements. For example, Haian Xue produced a UX design for "drawing a watch on your wrist" (Figure 2.24) that attempted to trigger nostalgic memory without "making an old-looking design outcome". (Xue 2017)

This design idea is derived from the designer's childhood memories. Many children in China used to like drawing a watch on their wrists to play with friends. Inspired by that memory, Xue designed a nostalgic interaction by asking users to draw a watch on their wrist.

However, the above designs are still restricted to memories, and most of them rely on a visual storytelling method. Besides, nostalgia research has been predominantly conducted in the contexts of advertising, branding, product development and consumer marketing (Shin and Parker 2017). Therefore, past work may ig-

Source:(Xue 2017)

Figure 2.24 Nostalgia design - "drawing a watch on your wrist"

nore the potential to foster individuals' long-term relationship with the designed objects and to seek benefits in cultural and social interactions.

2.5.2 Alternative Nostalgia Design

In order to understand nostalgia as "not only a love of the past that halts progress but also as a resource for designers", Kurlinkus "casuistically stretched" the concept to cover a broader meaning. From his point of view, nostalgia is "pride and longing for lost or threatened personally or culturally experienced pasts."(Kurlinkus 2018).

He further segments this notion into four elements: *pride and longing; for lost or threatened; personally or culturally experienced; and pasts.*

"Pride" refers to a positive sense of past self or community, and "longing" describes a drive to recover something stable in times of flux. Kurlinkus believes that these two aspects of nostalgia help differentiate it from the sister emotion of melancholia, which only indulges in the past without thinking of the future.

By "for lost or threatened", Kurlinkus emphasises that nostalgia can apply to things that have not been entirely lost, as in the case of anticipatory nostalgia. He argues that nostalgia is deeply protective of the threatened.

With the phrase "personally or culturally experienced", he frames nostalgia as a collective and generationally learned emotion. This means that people can be nostalgic for events they have not personally experienced.

Lastly, the "pasts" are perhaps the most notable elements for nostalgia design.

As mentioned in the previous section, most nostalgia designs tend to use memory-related or retro elements.

Through this wide-ranging definition, nostalgia can be extended to a more inclusive and meaningful approach to design that can mediate technological conflicts. Indeed, nostalgic design is a way to "listen for users who feel left out of current conceptions" and "slow the pace of technological consumption by encouraging users to rethink meaningful memories of use"(Kurlinkus 2018).

In light of Kurlinkus's broad definition of nostalgic design, I take nostalgia as an inspiration for design innovation and explore what has not typically been labelled as "nostalgic design". As a result, my nostalgia design concept is closer to Kurlinkus's definition of alternative nostalgia design:

> Nostalgia, thus, doesn't have to be a careless embrace of the past; it can open our minds to alternative possibilities as well...
>
> I hope readers will find themselves asking: is this really nostalgia?...I've 'casuistically stretched' the word because a theory of nostalgic design would be nothing if it couldn't be practically applied in specific milieus, and practical application always involves adapting, modifying, and stretching.(Kurlinkus 2018)

One of my favourite alternative nostalgia designs is Thomas Brisebras's "No Coaster Please" (Figure 2.25).
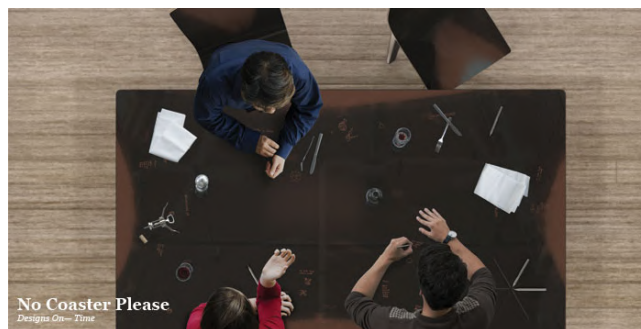
Source: "No Coaster Please" Thomas Brisebras, https://designson.ideo.com/time/no-coaster-please/.

Figure 2.25 Thomas Brisebras's "No Coaster Please" table.

The wooden table and chairs are coated with several layers of special coloured paint. As users rest damp cups, spill bowls of soup, or simply rest their hands, the paint gradually wears away, leaving unique traces of interaction.

As Kurlinkus comments on the "No Coaster Please" design: "this is what I mean when I say nostalgic UX highlights a design's place in time."(Kurlinkus 2018) The nostalgia concept of "recalling time" is embedded in the UX interaction process; the table depicts the process of ageing, reflecting "traces" of passing time and containing the story implicitly.

Another example is the design of an existing hotel named Wei Chi featuring the "return" concept of nostalgia. The idea of return is reflected in the yearning to be close to nature, return to an ancient lifestyle and live in solitude. Compared to city tours, some people prefer to stay in countryside hotels for holidays to avoid crowds. Homestay inns or hotels in the village have become popular among Chinese people.

Wei Chi is a homestay hotel located in China. According to its architects, its design is derived from the concept of nostalgia. Instead of generalised personal nostalgia, the designers focused on collective nostalgia (which is discussed as "culturally experienced" nostalgia above).

The designers of Wei Chi believe that the ancients knew better how to appreciate and coexist with nature. They argue that "it is important for us to look back and learn from old traditions." Inspired by the "Dwelling in the Fuchun Mountains" painting (Figure 2.26), they decided to design the hotel based on the idea of "appreciating the mountain".

They created ten rooms that provide ten different ways of looking at and appreciating the mountain. For example, "looking at the mountain through a long narrow window frame" creates a real-time landscape painting hanging over the wall (Figure 2.27, left), while "looking at the mountain through original trees" (Figure 2.27, right) turns the leaves into a perfect foreground visual effect.

As Kurlinkus says, "designers seek to redesign technologies by returning home in memory to more comfortable times, actively layering innovation and tradition."(Kurlinkus 2018) The above design cases, which originate from the idea of "recalling time"

Source: "China Online Museum", accessed online, October 22, 2022,

https://www.comuseum.com/product/huang-gongwang-dwelling-in-the-fuchun-mountains/

Figure 2.26 Dwelling in the Fuchun Mountains

Source: "Weichi Boutique Inn", accessed online, October 22, 2022,
https://www.tripadvisor.com/Hotel$_R$eview $- g660719 - d14962191 - Reviews - Weichi_Boutique_Inn -$
$Tonglu_County_Zhejiang.html$

Figure 2.27 Wei Chi room views

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or "returning (nostos)", fall outside of typical "nostalgia design", which tends to visually depict the past or memories. Nevertheless, they are good examples of how designers can think of nostalgia in a more alternative, inclusive and diverse way, going beyond appearance alone.

Chapter 3

Concept

3.1. Research Method

This dissertation takes *research through design* (Zimmerman et al. 2007) and concept-driven approach (Stolterman and Wiberg 2010) as core research method to generate knowledge contribution by utilising design not only to create tools that are able to support user interaction, but also taking design as probes and reflection of the concept, with focus on "making the right thing" and intention to "transform the world from the current state to a preferred state" (Zimmerman et al. 2007). Nostalgia design, as described in Chapter 2, is dynamic, uncontrollable, indeterminate, and has no "true or false" answer. Compared to "tame" problems, which can be addressed by the engineering approach of prototyping and iterative testing (Wolf et al. 2006), nostalgia design is more pointed to an opportunity for creative design approach, which provides complementary knowledge contributions through methods unique to the design and design processes.

In general, research through design approach is interdisciplinary. It combines the behavioral sciences *(true knowledge)*, technical opportunities *(how knowledge)*, and field data *(real knowledge)*:

> Interaction design researchers integrate the true knowledge (the models and theories from the behavioral scientist) with the how knowledge (the technical opportunities demonstrated by engineers). Design researchers ground their explorations in real knowledge produced by anthropologists and by design researchers performing the upfront research for a design project. Through an active process of ideating, iterating, and critiquing potential solutions, design researchers continually reframe the problem as they attempt to make the right thing... The

final output of this activity is a concrete problem framing and articulation of the preferred state, and a series of artifacts—models, prototypes, products, and documentation of the design process (Zimmerman et al. 2007).

Zimmerman and colleagues argue that engaging in the iterative design of artifacts not only produces artifacts but adds to knowledge in various ways, such as helping identify gaps and blind spots in the existing models of behavioral scientists. Instead of taking design as "providing surface structure or decoration", it views design as concrete embodiments of theory and technical opportunities. It is about creating "artifacts intended to transform the world from the current state to a preferred state." (Zimmerman et al. 2007)

In this dissertation, I specify the "preferred state" as supporting emotional communication through design. My major goal is to employ technology in a way to mediate emotional exchanges and create meaningful interpersonal experiences. I will "ignore or de-emphasize perspectives in framing the problem" (Zimmerman et al. 2007). In other words, I am not trying to develop specific design practices for connecting LDR or to tackle a particular user problem. Rather, I am intended to start from concept-driven approach, exploring the question of how interactive technologies can further augment, extend and support design for the relatedness, and add to an understanding on how to mediate intimacy.

The research process was not linear but iterative. I first came up with a preliminary model and 1st framework (Chapter 3.4) based on pilot interviews (real knowledge) and literature review(true knowledge). I then created designs by using the framework and conducted pilot studies (real knowledge). Finally, I evolved the framework (Chapter 3.6) based on primary data (literature review) and secondary data (pilot study). I iteratively evaluated the model through technology-mediated designs (how knowledge). All of these design works have been conducted in-the-wild user studies. Functional prototypes have been used in real-life situations and some users still keep using them after the user study. Semi-structured interviews, questionnaires, and focus group have been used to collect insights and obtain feedback.

Instead of designing in a bottom-up fashion, I choose to start from a holistic, theoretical perspective. As Stolterman points out, interaction design practice has

a strong focus on how to approach a specific problem domain—the situation at hand, while the concept-driven design "is optimized in relation to a specific idea, concept, or theory rather than to a specific problem, user, or a particular use context" (Stolterman and Wiberg 2010). The point of the design is a conceptual and theoretical perspective rather than an empirical one.
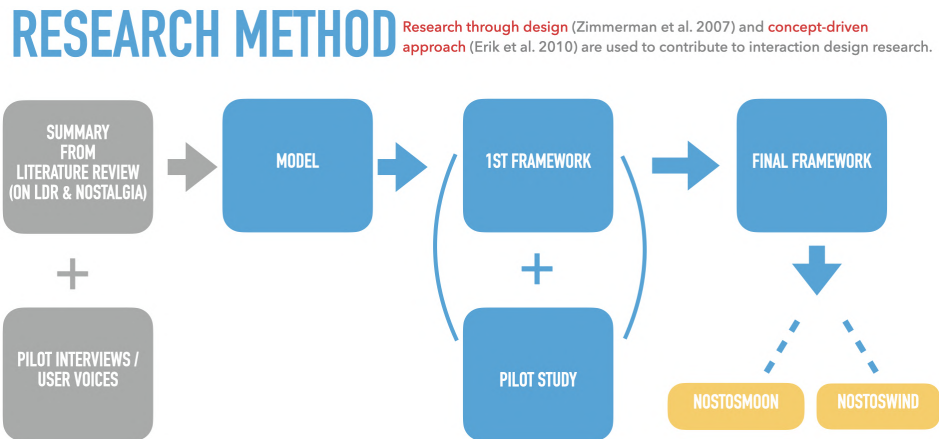
Figure 3.1 Research Method

Through the research process, I look for the invention of integrations of how knowledge, true knowledge, and real knowledge. The design framework as research outcome is not emphasized on producing commercially viable products nor tackling at-hand problems, but to attempt to unite and advance the findings from the theory and iterative design process, and to formalize the idea of the nostalgia-inspired LDR design. A set of basic principles that constitute the framework, a rationale for the selection of the specific principles and the design implications given by these principles are presented in the following chapters (Chapter 3.6).

3.2. Nostalgia in LDR Design

3.2.1 Focus Group in LDR

This dissertation covers all three groups, long-distance romantic relationships, long-distance friendships, and long-distance family relationships with a particular

focus on the last two groups.

The reasons behind this are: first, in the LDR design domain, compared to romantic relationships, family and friends relationships are less theoretically and practically explored. Second, the emotions between partners in a romantic relationship are different from other LDRs, especially for those couples who are in a stable relationship and determined to be together in the future. Their psychological distance is not that obvious compared to those families and old friends who used to live together, play together, and share lives on a daily basis but for different reasons had to part as life goes on. In this sense, families and old friends tend to be more in line with the main concept of this dissertation, which is mainly about digging into the meaning of parting, the meaning of distance, and reflections followed by that.

3.2.2 Design for Aesthetic Nostalgia

As Grainge points out that nostalgia is defined by the experience of loss (Grainge 2002), nostalgia is not just a sentimental feeling towards home or the halcyon days of the past. It is also a feeling generated by the loss itself.

In many Eastern cultures, nostalgia can also be understood as a meditation on the historical past (such as "Huai Gu" in Chinese). Nostalgia is weaved into rituals, such as the traditional Chinese Qingming Festival, also known as Chinese Memorial Day. Moreover, the Mid-Autumn Festival is a festival typically linked with nostalgia for homecoming and missing families. These festivals are not only celebrated in China but also in Singapore, Malaysia, Japan, and other countries that share a similar culture. In these festivals, nostalgia is not about returning or reliving the past but rather about remembering the passed-away and missing the far-away. In this sense, they turn the nostalgia emotion into a cultural tradition endowed with a deeper inner experience meaning.

Meditation is emphasised over the restoration or preservation of the personal past, which is more connected to inner experience. The point is no longer about going "back to that time", but about remembering and accepting that the "past is the past".

Similarly, the Japanese aesthetic tradition of "Mono No Aware" also stresses the feeling towards "loss, changing, and transience". It is not the cherry flower

itself that Japanese people feel sympathized about, but the transience of that flower makes them feel wistful. They reflect this "sensibility towards transience" in life, creating a unique aesthetic sense based on the appreciation of beauty that is doomed to disappear. Another example can be found in the Japanese tea ceremony and the related cultural concept of "Ichi-go, Ichi-e". This concept means "once in a lifetime" and reminds people to cherish every gathering that they may take part in because no moment in life can be repeated. It encourages people to realize the gathering will be gone forever and to treasure the unrepeatable moments in life. From this perspective, nostalgia share similarities with Japanese aesthetics which is a sensibility to ephemeral beauty and aesthetic awareness of transience (See Chapter 2.4).

The above examples show that the "distance" and "sensibility" aspects of nostalgia – rather than the "past time" or "home" aspects – are closely intertwined with cultural aesthetic values that are reflected broadly in all aspects of social life. To be more specific, the emphasis is not on what people feel nostalgic for but rather the awareness of the "lost" and the sensibility to feel that "loss", which reveals nostalgia's meaning-making process. Therefore, design should not merely bring the past to users but aim to cultivate aesthetic appreciation and a sensibility for the transience of life.

I argue that current nostalgia design over-emphasizes the topics of the past and memory, and overlooks nostalgia's aesthetic meaning that lies in "distance" and "sensibility", taking nostalgia as a positive emotion to trigger consumer behavior, but ignoring the dual character and complexity of it. When the "pastness" can be consumed or enjoyed in the present, nostalgia's sentiments, the bittersweetness, and the wistfulness become undermined. However, it is exactly those mixed and complex feelings combined to endow nostalgia layered with meaning and differentiate it from other emotions. The meaning behind why we feel nostalgia is important if we want to have a deeper understanding of nostalgia design. Nostalgia design should go beyond retrospective remembering. Moreover, design should not merely bring the past to users but aim to cultivate aesthetic appreciation and the sensibility for loss, distance, and transience in life.

3.2.3 Nostalgic Missing in LDR

In general, nostalgia often refers to the longing for a past time, but its literal or original meaning is "a pain caused by the yearning for returning". This "return" could be a return to a hometown or a return to a happier time. However, in terms of this dissertation, I extend the meaning of "return" to include a return to the person they are missing. I adopt a different perspective on nostalgia – that of aesthetic nostalgia – and apply it to LDR connection design.

Many emotions can arise in LDRs, including worrying, jealousy, loneliness, depression and acceptance (Freitas 2004). Compared to other LDR emotions, nostalgia has a multilayered meaning with its own distinct features.

There are different types of nostalgia. As discussed in Chapter 2, scholars give different classifications of nostalgia, such as modern nostalgia and postmodern nostalgia (Higson 2014), restorative nostalgia, and reflective nostalgia (Boym 2008). Davis categorizes nostalgia as simple nostalgia, reflexive nostalgia, and interpreted nostalgia (Davis 1979). On the one hand, simple nostalgia simply believes that the past is better than the present. It emphasizes *"nostos"*, which stands for the returning. Examples of simple nostalgia design include archaized craftwork (to give an archaic appearance in craft), or an antique design. On the other hand, reflexive nostalgia emphasizes *"algia"*, which refers to pain. It stresses the reflection on the emotion itself and questions the meaning behind it. It might be due to its exactly layered meaning, that pieces depicting reflective nostalgia are more significant aesthetically and deeply involved with art expressions (Horváth 2018). As mentioned in Chapter 2.3.3, in this dissertation, I use the term reflective nostalgia and reflexive nostalgia interchangeably.

Because reflective nostalgia is more closely related to aesthetic studies and focuses more on reflective features of nostalgia including the longing and the distance aspects, it lines with my research purpose for digging deeper into the meaning of alternative nostalgia design. Thus, in this dissertation, I focus on reflective nostalgia instead of simple nostalgia.

Furthermore, I use the term "simple nostalgia" to relate to the "thinking of" experience in LDR and "reflective nostalgia" to relate to the "nostalgic missing" experience.

Pilot Interview: Thinking of and Nostalgic missing

I conducted semi-structured pilot interviews with seven interviewees who are aged from 20 to 30 years old, all in romantic long-distance relationships. In the pilot interviews, I probed on the question of "the feeling of missing someone" and discussed "actions they usually take when they have missing feelings", and perceptions on similar terminologies such as "nostalgia, missing, remember, think of, etc."

First, interviewees noted that there was a difference between the feeling of "missing" and "thinking of" someone. While the feeling of missing is usually involved with complicated emotions such as "sadness" "touching" and "clinging", the feeling of thinking of tended to be more casual, "just want to get in touch" or "want to know what she/he is doing". Second, the availability of a partner, the frequency of contact, the relationship status including the possibility for them to end up this long relationship. . . I summarize as: the factors that will affect psychological distance in a relationship, will trigger different feelings and arose different levels of that specific feelings.

The pilot interviews with LDR couples show that most of the couples tend to have "think-of experience" more than "missing experience". And they usually choose instant messaging to contact each other when they feel missing or just think of the other one.

One interviewee mentioned that the "nostalgic missing feeling" was supposed to be "towards someone who was really close but cannot have frequent contact for now". The other interviewee mentioned that she would refer "nostalgic missing feeling" to her grandparents, but not to her boyfriend, because she could contact him or manage to see him anytime she wanted, while her grandparents are passed-away. She felt there must be "an unreachable or at least difficult to connect" condition to trigger the "nostalgic missing feeling". One interviewee expressed that to feel "nostalgic missing feeling", he needed some special trigger, such as at the end of travel or seeing off.

The pilot interview has a small quantity, but it allowed me to have a deeper discussion with the focus group and offered insights for guiding the research and conceptualizing the design. The interview results suggest that the emotion of "missing the other one" actually has different meanings and levels. Due to the

convenience of communication technology, the complexity of the feeling of "missing" declines and tends to be a more casual feeling of "thinking of the other one".

The reasons for that can be further concluded as:

1, Availability; easy to get in touch; before the emotion can develop into nostalgic missing, LDRs have already solved the problem and get connected.

2, Closeness in the relationship and future possibility. Most of the interviewed LDRs are in a stable relationship and they have a strong belief that they will end this long-distance situation in the near future which gives them hope and confidence to get rid of sentimental nostalgic feelings.

From interviews, I also find in reality there is a lack of a different way for LDRs to contact each other and express inner emotions except for instant messaging.

Figure 3.2 Pilot interviews I did in the very beginning for probing user insights and narrowing down the research subject.

Hereby, I specify that the experience of "thinking of" someone occurs when the person simply comes to mind; this experience suggests mere contact with that person. The indicated design could be: designing instant contact or highly

engaged interaction. In contrast, the feeling of missing is more complicated. It is not about "I want to see you" or "I want to have contact", but more interior, sensitive and private. It is thinking "I wish I could have" but knowing "I cannot"; it involves feeling sad about a loss but fulfilled by having experienced it.

Although the "nostalgic missing feelings in LDR" eludes a clear and simple formal definition, taking reference from the "reflective nostalgia" definition, I define the "nostalgic missing feeling" as follows: a spontaneous overflow of a bittersweet emotion for caring about the other person and longing to be together while knowing that this is impossible. It is often followed by reflections about life and realizing the other's importance in life. Compared to simply "thinking of", it is a mixed emotion involving sadness tinged with fulfillment, and it involves deeper reflection.

3.3. Aesthetic Nostalgia Experience Model

Research articles that are related to nostalgia and design field typically introduce single design cases or theoretical studies but lack discussion on intermediate-level knowledge (Figure 3.3) that resides in the realm between the particular instances and the general theories.

The idea behind the notion of intermediate-level knowledge is that "the space in between the instances and the theories is non-empty and can be filled with knowledge opportunities that are more abstracted than particular instances, yet do not aspire to the generality of a theory." (Höök and Löwgren 2012)

Few intermediate-level knowledge had been contributed to the nostalgia design filed. The Heuristic Model of DENE (Design-evoked Nostalgic Experience) (Figure 3.4) proposed by Haian Xue is one example as a form of intermediate-level knowledge. Via the model, Xue explains the underlying process of a design-evoked nostalgic experience and further illustrates influential factors and potential design cues for designing nostalgic experience (Xue 2017).

Xue suggests that, nostalgia can be examined through three levels: experience of meaning, aesthetic experience, and emotional experience. And memory retrievals standing in the middle work as the mediation between the human-product interaction and the eventual three levels of nostalgic experience. The memory retrievals
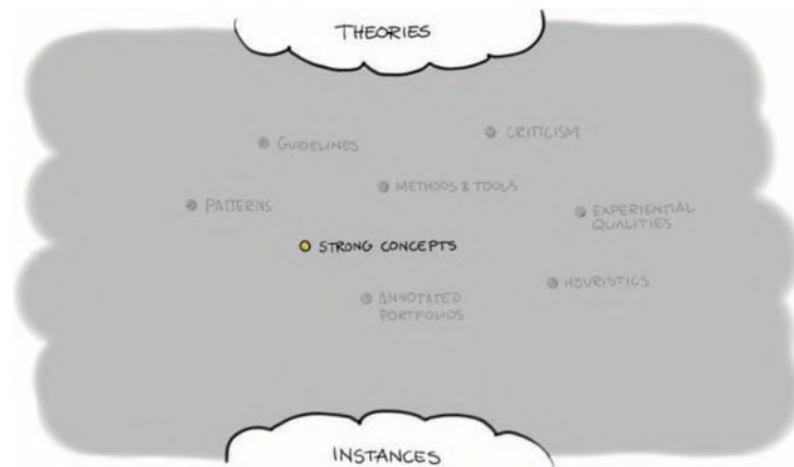
Source: (Höök and Löwgren 2012)

Figure 3.3 Intermediate-level knowledge.

include both explicit memory, e.g. recalling a nostalgic episode; and implicit memory, e.g. having a particular aesthetic preference (Xue 2017). At the bottom is the human-product interaction process which involves four factors that may influence nostalgic experience: 1) the product, 2) the user(s), 3) the interactive process and 4) the context.

Xue's DENE model can help designers to determine what experience should be designed for and how to identify appropriate elements or cues to evoke the experience.

However, Xue's model is based on product experience framework by Desmet and Hekkert (Desmet and Hekkert 2007). Thus, the model's focus is mainly on the interrelationship between nostalgic experience, memory, and product design.

In order to better understand aesthetic nostalgia and its application to LDR design, I created the Aesthetic Nostalgia Experience Model (ANE Model) (Figure 3.5). This model is based on existing knowledge of nostalgia theory, experience design, and knowledge of psychology and aesthetics drawn from other disciplines. I further elaborate on the ANE model with the main focus on LDR interaction.

Inspired by Tim Wildschut's research on nostalgia's Content, Object and Trigger (Wildschut et al. 2006), I separate the nostalgia experience into three parts and from the bottom-up they are: the fundamental condition in reality, the outside
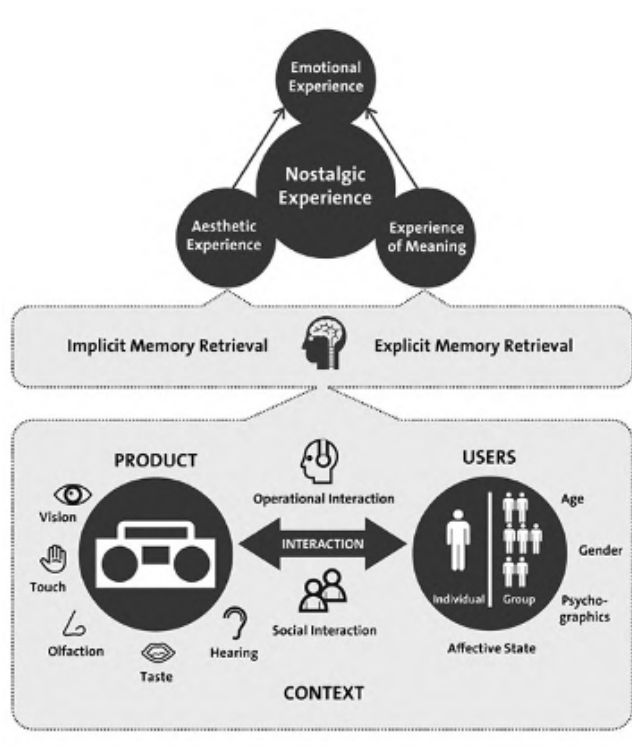
(Source: (Xue 2017)

Figure 3.4 A heuristic model explaining the underlying process of DENE.
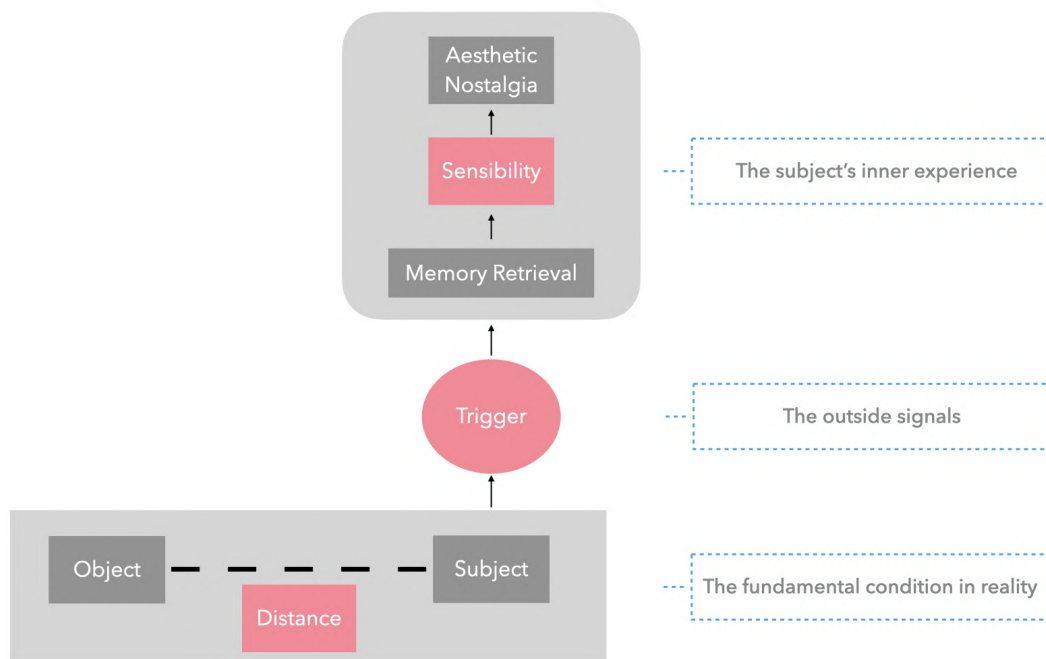
Figure 3.5 Aesthetic Nostalgia Experience Model

signals, the subject's inner experience. During this process, nostalgia is influenced by five determinants: 1) Subject; 2) Trigger; 3) Object (including Imagined Object); 4) Distance; and 5) Sensibility.

Firstly, in terms of the fundamental condition in reality, Subject, Distance, Object are included. Subject represents the human being who is experiencing the emotion. Object is the nostalgia's affective object, which is lost to or distant from Subject. It is often a hometown or past times but is not necessarily limited to these examples. In this dissertation, I take Object as the one who is in LDR.

Object represents the people whom we love but live far away. Imagined Object means that in the nostalgia process, the object that people long for is usually the imagined version instead of the real version. It helps to explain why there are cases like romantic couples who are fond of each other when they are living separately but quickly break up once they live together. Such couples idealize one another when separated by distance. However, in this dissertation, this factor is less considered.

Distance is the insurmountable condition that exists between Subject and Object. It determines the fundamental tone of nostalgia, which is tinged with sadness.

Secondly, Trigger represents the exterior signals working as a reminder or catalyst to provoke nostalgia. It could be something directly linked with the past, like childhood albums or used clothes, or something implicitly linked - something that refers to the past, such as a familiar scent that unlocks the memory, or a song the Subject used to listen.

Finally, after being triggered, Subject will undergo a memory retrieval, and this step is also mentioned in Xue's DENE model that Subject will have implicit memory retrieval or explicit memory retrieval.

If it is implicit memory retrieval, then Subject will experience an unintentional, non-conscious form of retention, and "it is assessed with tasks that do not require conscious recollection of specific episodes", while explicit memory "involves conscious recollection of previous experiences" (Schacter 1992). As Xue puts, nostalgia's aesthetic experience may result from the unconscious retrieval of implicit memory. When nostalgic experience involves implicit memory retrieval,

through which Subject undergo unconscious, affective meaning-searching rather than precise, factual, information-checking, the nostalgic experience tends to be more aesthetic, which in return results in an aesthetic nostalgia experience.

I further specify an important element during aesthetic nostalgia experience process which is the Sensibility. Sensibility refers to the ability of Subject to feel nostalgia and can be understood as *Nostalgia Proneness* which refers to a person's tendency to feel nostalgia (Köneke 2011). And from Chapter 2, it can be understood as the core of the wistfulness of modern nostalgia (Higson 2014). It is similar to the idea of "awareness" from the Japanese aesthetic concept of "Mono No Aware", which means to be touched by things in life rather than aloof or indifferent to them.

Sensibility is related closely to the concept of distance. As Grainge argues, by reducing sentiment in nostalgia, nostalgia has become divorced from a necessary concept of loss (Grainge 2000). The loss or the distance lays the foundation of this wistful longing and triggers sensibility. Sensibility is the most difficult part because it reflects humans' subjective feelings and sensations. Sensibility may not be designable but can be facilitated and cultivated. It is worth keeping in mind that we can not program one's emotion nor design people's sensibility, but we can choose appropriate design methods in order to facilitate it.

If Subject did not have sensibility triggered, then she or he would experience simple nostalgia. Most existing nostalgia designs are focused on this level, aiming to design Trigger with explicitly past-linked elements and visual-dominated methods such as retro design. The nostalgia experience triggered in this process is often involved with explicit memory retrieval and may result in simple nostalgia (Figure 3.6).

There are many real business practices using simple nostalgia, such as Guangzhou Nostalgia-theme Cafe (Fan et al. 2015) and Neng Mao shop (Figure 3.7) (Xue 2017). And the features are: the distance needed for simple nostalgia can be extremely shortened, sensibility (wistfulness, sadness) can be excluded in the process, Object is often the Imagined Object which is full of joy. However, many of those simple nostalgia design practices showed difficulty in maintaining a long-run business. I assume their failure may indicate that simple nostalgia is more suitable for events like advertising campaign which only requires short-time attention. A
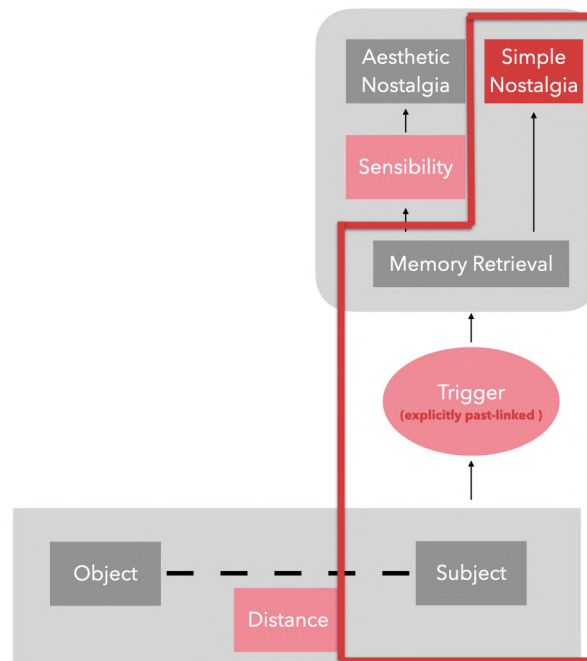
Figure 3.6 Simple Nostalgia in Aesthetic Nostalgia Experience Model

different strategy may be required for long-term use.

Depending on design purposes, designers can choose different entry points in the ANE model. In terms of product-related nostalgia design, it is usually applied in the second part which is "the outside signals" part. Now if we revisit Xue's DENE model and compare the DENE model with the ANE model, the Product he mentioned in context is what I understand as the second part which is the Trigger in ANE model. Instead, the Context concept in his DENE model becomes the Distance condition which is in the first part of ANE model.

While examining existing nostalgia designs, most of them focus on the second part which is designing the Trigger, or interactions between the Subject and the Trigger, but ignore the other dynamic tensions between the Subject, the Distance, the Object, and even the Sensibility, to understand the whole experience from a holistic perspective.

In summary:

1. Most existing nostalgia designs aim to design the Trigger, and they often belong to product design with visual elements to elicit explicit memory. And the nostalgia experience triggered in this process is often a simple nostalgia experience.

2. There is design space for considering how to facilitate the Sensibility, how to design the Distance, and develop new design approaches for LDR nostalgia design.

3. My aim is to design a proper way to express emotion, not to trigger it. We cannot program peoples' emotions nor design their sensibility, but we can choose appropriate design approaches in order to facilitate these factors.

3.4. Initial Design Framework

As Gaver says, it's important to distinguish systems that actually communicate emotions from those that simply evoke them (Gaver 2002). In terms of this dissertation, my primary goal is not to evoke the emotion, but to create a proper way to communicate the already existing emotion. In the ANE model, the design's role actually comes after the process of "aesthetic nostalgia". To be more specific,

(Source:(Fan et al. 2015, Xue 2017)

Figure 3.7 Nostalgia theme cafe and Neng Mao shop

I design for those who had nostalgic missing feelings already but find it difficult to express over distance.

The initial design framework is based on existing knowledge of nostalgia theory and insights from mediated communication design. And the ANE model serves as a fundamental base that helps to develop the initial design framework. In order to properly communicate the emotion to the other person which is the object in Figure 3.8, the green box area in Figure 3.8 which contains factors of Content, Interaction, and Medium will be the key to LDR nostalgia design and is where the design framework will focus.
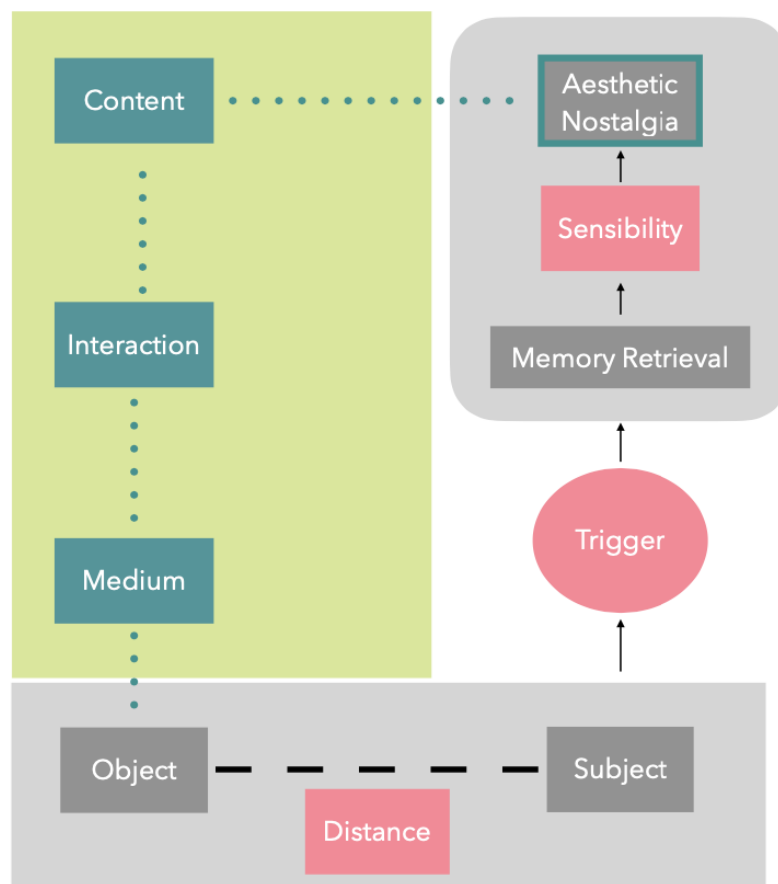
Figure 3.8 Aesthetic Nostalgia Experience Model for Initial Design Framework

The initial design framework consists of four principles based on the Content,

Interaction, and Medium factors which are: Aesthetic Disinterestedness in Content, Distance in Interaction, Ubiquitous Medium, and Realised Output.

Aesthetic Disinterestedness in Content

This factor concerns what information or message designers should plan to deliver. It includes two elements: Inutility and Implicitness. The bittersweet emotion of nostalgia is universal, but the way of expressing it varies. I propose that creating inutile and implicit content in interaction could be more favourable in terms of delivering nostalgic feelings.

Inutility

"Inutile loveliness" is the keyword in novelist Vladimir Nabokov's writing. He explained "inutile" as "the novel has its only purpose to provide aesthetic bliss".

Borrowed his words, inutility here refers to the disinterestedness theory in aesthetic experience. Disinterestedness is a famous aesthetic concept. It stands for the appreciation of beauty without having a concrete purpose. Schopenhauer first claims that a person typically relates to the world according to his or her own interests, and aesthetic experience temporarily disengages a person from these interests (Hilgers 2016).

Kant also calls for disinterestedness in aesthetic experience. His contemplation of beauty is disinterested and without the consideration of utility (Vandenabeele 2012). This concept is similar to notions of "art for art's sake" and "a poem is a poem per se" (Chinol 1960). Nostalgic experience is an aesthetic experience. It offers people a poetic escape from the now. Nostalgia's aesthetic value lies in its spontaneous flow. People do not feel nostalgia for a certain purpose. Therefore, while designing the content of a nostalgic interaction, it should be accordingly less purposive. Whatever content designers are going to design should be better not to contain any pragmatic information or utility.

Implicitness

Another important element is the Implicitness of the content, which can be understood as the use of metaphor, abstract content, and openness to interpretation. The message itself is just a metaphor or excuse used to convey the nostalgic

missing feelings. For example, parents might not say "I miss you" in front of their children. Instead, they will send their children's favourite home-made food. The food is the metaphor they use to express the missing feelings. The more abstract the message is, the easier it is for partners to catch emotional clues and feel the beauty in the interaction. Just like the writer Cristiane Serruya says, "Sometimes, silence speaks louder than words. You have to learn to listen to what she is not saying." (Serruya 2013). Opposite to explicit ways of expressing, such as verbal expression, the method of interaction should be in line with nostalgia's basic tone: understated, subtle and ambiguous so the message can be open to interpretation. It should not be content-rich. Designers need to think about how to leave space for imagination and contemplation.

Distance in Interaction

The Distance factor encapsulates the type of interaction and communication strategy that designers need to consider, as well as what features should be included in the interaction for LDR nostalgia design. Distance is the fundamental element of nostalgia. It is the prerequisite of nostalgia's existence. The essence of distance is the "unreachable", which produces the feeling of yearning and wistfulness. As the proverb says, distance makes hearts grow fonder. Similar to the design concept of "less is more", creating a meaningful but not superfluous distance is the key while designing ways to deliver nostalgic feelings. In LDR design, I understand distance as a communication factor that is less easy to access, less interruption, and less straightforward. It is the opposite of mainstream communication's pursuit of "high speed and high capacity" of connection. It can be further interpreted as involving *Slowness* and *Effort* in interaction.

Slowness

Slowness refers to the time needed for completing a message exchange. It is the opposite of the instant, speedy method of connection. Nostalgia has been regarded as a typical emotion of longing for a slower rhythm of life, working against the fast-changing nature of our world (Boym 2007). It motivates people to slow down to reminisce patiently in order to prolong their enjoyment of the memory. "When people savor an experience, they take their time in the course of

enjoying it."(Huang et al. 2016) Slowness can make people more mindful, giving time for contemplation and emotion. In terms of emotional interaction design, slowness not only gives time and space for privacy, but the waiting it brings also makes everything more precious. Consider the experience of receiving a letter. The waiting increases expectations and makes people thrilled when they receive it. Slowness in design can be interpreted as *asynchronised* communication or a time-delayed interaction.

Effort

Effort stands for difficulty in completing the process of interaction, referring to both the time consumed and the attention required for transmitting and receiving. It can be regarded as a signal of caring that is appreciated in intimate communications. There has been an assumption that in the HCI literature the ease of use is always good (Gooch and Watts 2011). However, in intimate relationships where people value the emotion more than the utility, increasing the difficulty of communicating could be more favourable. Handwritten letters are good examples of investing effort. Compared to typed letters, they show the willingness to share time, adding value to mutual bonding. Therefore, LDR nostalgia design should reflect this. Designers may consider creating barriers for delivery or making it difficult to receive. The process of communication does not have to be complicated but should invite more personal thoughts and depth in emotion.

Ubiquitous Medium

Screen-based communication tools like phones and tablets are very common for LDRs' daily uses. The biggest limitation of such conventional tools is that they focus on delivering explicit and instantaneous messages and are not designed for subtle emotional interaction. Although unconventional designs are emerging, many focus on increasing the level of social presence and believe that higher social presence means that a communication tool is more intimate, social and welcoming. Social presence was defined by Short and colleagues as "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship" (Short et al. 1976). Kreijns and colleagues later defined social presence as "the perceived degree of illusion that the other in the communication

appears to be a real physical person" (Kreijns et al. 2007).

The ubiquitous concept is very close to peripheral and ambient design (Dunne 1994, Ishii and Ullmer 1997) and the awareness strategy mentioned by Hassenzahl and colleagues (Hassenzahl et al. 2012). Just as the literal meaning implies, ubiquitous media can increase relatedness by offering and sharing information around partners. It is unobtrusive, creating a peripheral, implicit experience without demanding primary attention. Nostalgic missing feelings are more psychologically oriented than "physically oriented". By "physically oriented", I mean to experience nostalgia, we do not need physical proximity or real physical representation of that person. It is more about to feel their existence rather than to see their existence. As mentioned in Chapter 2, nostalgia is not about a real return but a journey of remembering. This indicates that a high level of social presence sometimes will not contribute to nostalgia; on the contrary, the sense of reality may spoil the emotions.

Thus, I propose that social presence is not a primary need in nostalgic LDR design. Instead, sharing different types of ambient information (e.g., weather, activity) to create a feeling of "cognitive awareness" (Hassenzahl et al. 2012) rather than physical proximity (e.g., body heat, heartbeat) to embody the presence may be more appropriate to express and deliver the inner subtle emotion. Designers should exploit more peripheral elements in design, such as a shared environment.

Realised Output

According to Gooch and Watts (Gooch and Watts 2011), outputs can be categorised as fleeting or *realised*. A *realised* output means something physical that can be kept. Common examples are letters and text messages. A fleeting output, similar to an ephemeral UI, which is temporal in nature and disappears with time, is the most dominant type in HCI research. A phone call is the typical example of a fleeting output design, for there is nothing to keep after hanging up.

Nostalgia is instinctively linked with memory. However, as mentioned in Chapter 2, nostalgia does not only rely on the reflections of the past. Anticipated nostalgia (Cheung et al. 2020), which is nostalgia for the present and the future, is associated with "deliberate savoring techniques" (Fiorito and Routledge 2020). In light of that, a *realised* output is more suitable for nostalgia design. The *realised*

output will become a substantial memory and offer a trigger for future nostalgia.

Besides, distinct from "thinking of", the nostalgic missing feeling is not a one-time, disposable action. It is a stronger and more lasting emotion that involves deeper, reflective cognition. Compared to fleeting output, *realised* output can better represent the passing of time and the long-lasting bonding.

In summary, the initial design framework serves as a generative source informing that nostalgia design can be not solely associated with memory and past. It offers different perspectives in both nostalgia and LDR design fields and helps to inspire designers to produce new patterns and tools. In the following chapter, I used the initial design framework to guide and design pilot study cases, and further refined the design framework afterward.

3.5. Pilot Study

Three in-the-wild pilot studies with in-depth interviews were conducted to collect user insights in order to better develop the design framework.

3.5.1 Case 1: We Share the Same Moon

In 2019, I carried out a pilot study with a Wizard of Oz prototype (Figure 3.9). The overall idea was inspired by the famous Chinese poem, Shuidiao Getou: "though miles apart, we are still able to share the beauty of the moon together". The hypothesis is that by utilizing the sociohistorical context of the moon as a natural metaphor, participants' attention can be shifted from the screen to the ambient natural environment, thus slowing down the interaction process and creating a poetic, aesthetic connection that is different from verbal-based instant communication and is able to deliver LDR's nostalgic emotion.

The system was implemented by the author. The participants formed 12 groups (24 participants: two couples were friends, while the others were in romantic relationships) aged 21–30. They were all in long-distance relationships. The meeting frequency varied from once a week to twice a year. Most of them used

smartphones to text, call and video chat with each other. We implemented the user study for one week.

Figure 3.9 Left: handmade moon sticker. Middle: written postcard. Right: moon pictures took by participants.

The participants were divided into sender and receiver groups. The sender group was asked to send a picture of the real moon to the system. They had to go outside, find the moon and take a picture. When the system received the picture, a handmade moon sticker would be made according to the moon phase in the picture. The system would then send the sticker's picture instead of the real moon picture to the receiver group. The crafted moon sticker received by the receiver group indicated that this was the moon sent out by their partner, that this moon phase was in the night sky and that this was what their partner was looking at. I deliberately designed the message content as: just the moon phase, without any dialogue, in order to check the "implicitness" factor in the design framework. I would like to find out by such a "meaningless" and implicit signal, how receivers would process the message and perceive this action.

The senders were told to send out the moon when they miss their partner (in Chinese, I use "Xiang Nian" to describe the feeling which has a close meaning of nostalgic missing). They can send it whenever they want. The action was not mandatory. The receivers were informed that they would receive the moon from their partner. But they do not know in what form and specifically how the moon

would be sent. Finally, we mailed a real postcard to all the participants recording all the moon phases as a tangible memorial and with the purpose of checking how the realised factor would have an effect on the interaction.

After the user study, we conducted semi-structured interviews and question-naires to evaluate how the participants perceived the experience.

3.5.2 Results and Discussion

The results revealed that a clear majority – 22 out of 24 participants –were gen-erally dissatisfied with their current verbal communication to express feelings of missing one another and hoped to establish a new way of connecting:

> I miss her, but I won't contact her. I am not sure if she's busy. And more importantly, those feelings are so trivial, I don't know how to express it in words. I feel it is a bit much to make a phone call.

Moreover, 21 out of 24 participants liked the implicit method of connection. One participant noted that "I think it is interesting by not saying it straightforwardly." Another explained, "I like the implicit way. I believe love goes beyond what gift you buy or what you say." A third participant stated that "The missing feelings are a subtle emotion, when you express it loud, it easily fades away. The moon is a romantic symbol and is very suitable for conveying this kind of emotion."

Finally, 22 out of 24 participants liked the idea of using nature as the message content. Participants from the sender group mentioned that they had to go outside to take pictures of the moon. Sometimes, they had to wait for the clouds to drift away, bringing them a small moment of escaping from social life and experiencing real nature. They appreciated the romantic and poetic elements in the design, stating "I think it is beautiful", "We all need a little romance in life that is not related to any materialism" and "We need poetic things in our life. That makes the world better."

In the receiver group, eight out of 12 participants understood the picture of the moon as a message of "I am missing you" and felt it created a new connection. Several responses revealed this effect on the participants:

- "If he didn't miss me, he would forget to send the moon."

- "I was waiting to receive the moon every night, and if I didn't receive it, I would wonder was he too busy, or was it bad weather."
- "Receiving the moon let me feel closer to him."
- "I believe it can serve as a little surprise. Like receiving a letter."

The participants also commented on the media factor, stating "I would like to choose something physical to express my emotion. It has deeper meaning [than digital communication]" and "I hope to have something in hand as memory, or something accumulable, like those paper folding stars we used to put in a jar and give to the people we love."

In the sender group, the initial purpose of the design was to deliver "I miss you" feelings. However, in the real user study, I did not require senders to be exactly in the sentimental emotional state to send the signal. Therefore, instead of checking with them about missing feelings, I asked questions like "Are you willing to send the moon to your partner?" "How do you feel about sending the moon picture?" and "Sometimes you forget to send the moon – why?" The user study shows that 10 out of 12 senders indicated that they would like to use this kind of design in the future if they missed the other person. One participant explained that "I am the kind of person who doesn't like to take the initiative to contact, so this kind of interaction fits me very well." Similarly, another noted that "I am not a romantic type, but after trying the test, I found she liked it, and I also had some special feelings. Our world has a more delicate connection."

Moreover, many senders expressed that they liked sending the moon because they knew their partners were waiting for it. The senders stated "Whenever she receives the moon picture, she will forward it (the moon sticker) to me" and "I know she's happy to receive the moon, and I want her to be happy."

However, one of the senders did not like the moon idea because it is "too romantic" and he has no time or energy for those "poetic things":

> My life is too busy. It's chaos now. I felt a bit sad when I saw the moon was getting smaller. It seems to kind of reflect my situation...I think if we got enough private time, I would use this kind of interaction. But the truth is, we are far too busy, efficiency is more important.

Although this statement describes a negative feeling, from another perspective, it also helps to prove that the moon can reflect emotion. Indeed, the moon can

reflect not only the emotion of missing someone but also one's current life state. Apparently, people need more "leisure time" to slow down the pace of life and feel poetic, aesthetic emotions. One of the participants mention that the moon can be replaced with another object, depending on the type of relationship:

> I think anything abstract could work; it does not need to be the moon. The moon is associated with romanticism and has special meaning. But sometimes, I just want to share interesting things with my friend.

Others echoed this opinion:

> I think the way of connecting depends on the type of relationship. For example, for some friends whom I usually hang out with, I will not use this kind of poetic communication. But for others, I may want to use it.

The user study also revealed that the slowness or slow communication is well perceived and appreciated in the interaction. One participant stated, "I am busy at work. I like the way of not sending a direct message, so I don't need to worry about a reply." Another explained that:

> It reminds me of the time of my parents' youth when they had to write letters to keep in touch. Dozens of letters are still being kept in our house. It seems people in old times had longer and more lasting relationships. Now, in the digital world, everyone seems to be closer, but in some sense, the relationships are so fragile.

One interesting finding of the user study is that it reveals a controversial point on reminders and feedback.

Half of the senders mentioned that they wanted a reminder to remind them to send the picture of the moon. The reason for this is that they understood that they were in a user study. It was their task to send pictures. Also, they did not want their partner to feel disappointed or blame them for not sending the moon.

As mentioned above, the user study was designed for "missing feelings"; obviously, people cannot be forced to miss someone. Therefore, many of the senders

in this user study were not in the exact right emotional state, and that is why they wanted a reminder. After discussion, we agreed that in real-life situations when people are truly missing someone, they do not need any reminder.

Some senders also mentioned that they want more feedback from their partners, saying "There's no feedback, I don't know what's happening" and "I feel the action is meaningless." However, expectations when receiving something, such as messages and replies, can have negative results and cause tension in relationships. The expectation from the receiver might make the sender feel pressure. I assume the essence of sending the "I miss you" signal or expressing love is not about asking for a response. Unlike other interactions, which may focus on mutual exchange, the key to nostalgia design is expressing and delivering the message in a proper manner. As one of the participants described, "I don't think the experiment is interactive, but it is expressive."

I assume that the key to designing the feedback is to keep it quiet – knowing the message was received is enough. According to the senders' description, what senders want is more like a notice of successful delivery rather than an interactive reply: "She showed me the moon sticker. As long as she likes it, I would be glad and motivated to continue."

Couples, especially those in more stable relationships (e.g. married couple) with closer contact (e.g. every one or two days), seem to be less concerned about feedback. Therefore, I assume that feedback is not very important as long as participants know what is going on and how their partners feel about the result.

Another discovery is about the future trigger. One of the participants mentioned her association with the moon, which is related to future nostalgia. "I think next time when I see the full moon, it will remind me that it's been a while since our last meeting. I'll think, see, it's the full moon again, one month just passed." I thus assume that nature, especially certain natural phenomena that have seasonal or periodic features, can serve as a future nostalgia trigger in LDR emotional design.

To conclude, I draw the following conclusions from the moon user study:

1. Compared to rich content, simple and implicit messages are appreciated for expressing subtle inner feelings.

2. Nature-related content is perceived as an implicit and poetic signal and

can serve as a future trigger if it happens again in future. Depending on the relationship, the romantic element may not be necessary.

3. Feedback in subtle emotional communication is necessary but does not have to be instant or highly interactive.

4. Slow communication can serve as a supplementary tool for LDR communication, especially for expressing missing feelings.

5. Tangible things are preferred in order to save as memories. However, what is behind tangibility, such as something that can be touched and held as an extension of loved ones, something that triggers memory or something that represents past time, needs to be discussed and explored more.

Overall, the user study reveals that there is a need for LDRs to develop new methods for expressing subtle emotions such as the nostalgic missing feelings we discussed in this chapter. Moreover, nature-related content, slow interaction and tangible things have positive feedback in terms of contributing to delivering nostalgic feelings and are worth investigating further.

3.5.3 Case 2: Letter from Wandering Clouds

In addition to the moon, I also wanted to test other natural elements, like the clouds. This time, the message was changed to a letter. The clouds were used as a key for decoding the letter. Compared to the moon, clouds are much more changeable, which requires more effort from participants to complete the interaction. Also, two forms of letter (voice and paper) were used to test the media factor. The idea was similar to the moon user study: using clouds to send a letter. However, the user study was slightly different in terms of content and the way of interacting (effort and slowness). The participants needed to spend more time and needed a bit of luck to complete the interaction. In this user study, I focused on how the distance factor in interaction affected the participants' feelings. Other factors such as tangible output (entity) and intangible output (voices) were also taken into account.

I used a Wizard of Oz prototype to examine the concept. One couple aged 27-28 participated in this user study. A and B were the participants, and C played the role of the system. We used the WeChat app to send pictures and the Ximalaya app to upload voice messages. First, A took a picture of clouds and recorded

a voice message through Ximalaya. Then, A sent a picture and voice link to C through WeChat. In order to give B a physical thing (entity) to preserve, A also needed to send a text version of the voice message that could be printed out. After A completed the steps, B started to send a picture of the clouds to C. C judged the two pictures. If the clouds in B's picture matched those in A's picture, C would forward the voice link and text to B. B would print the text out and listen to the voice message (Figure 3.10). I later asked A and B to exchange roles. The user study lasted for 2 weeks.
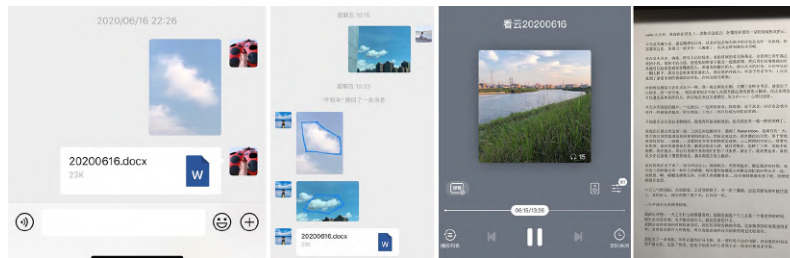
Figure 3.10 Messages from A, B to C; voice message and printed message.

3.5.4 Results and Discussion

Interviews and a diary survey method were used to evaluate the results. Both participants expressed that they could feel a new kind of connection, stating "Even though we call every night, I feel that there is a difference between an instant voice call with a set time is set and a waiting letter" and "it is different from a daily call, which is mainly for casual talking."

Both mentioned that they liked this interaction, and the difficulty of finding the same clouds made them feel more curious and eager to see the letter. The Effort factor proved to have a positive effect in this experiment:

> I became very curious while waiting. When our clouds didn't match, I felt more motivated to send more clouds and find out what's in that letter. (Female receiver)

> On the first day, there were no clouds in the morning, and there were only cumulocirrus clouds (no clear shape) at noon; the next day it

rained and there were no clouds all day. I felt a little frustrated, and
I hoped I could find a cloud soon. (Male receiver)

Also, in order to complete the experiment, they needed to go out, walk and
look at the sky and find clouds before night fell. This series of actions triggered
special feelings, including creating a childhood-like, off-the-grid experience:

Walking around on the street and looking for clouds in the sky, I found
clouds moving so fast. I suddenly felt that people on the earth have
always been acting based on the ground, such as following maps to go
to a certain place. Few look up, wander and decide where to go based
on things in the sky. (Female, when she was the receiver)

In order to take a picture of that cloud, I stood in front of a building
and waited a while for it to drift. I felt relaxed and felt like I was
doing a kind of meditation. (Female, when she was the sender)

Both participants expressed their special feelings about clouds. One mentioned
that the behaviour of finding clouds reminded him of childhood: "I found that
the cloud is so ever-changing and worthy of observation. [...] It is more fun, like
a childhood game."

In the user study, it took only two days for their pictures to match, so B
successfully received the message in a short time. B commented, "The current
difficulty is moderate, I feel that it is okay. But I think the difficulty should be
adjustable according to personal preference."

However, even in such a short time, B had very strong feelings towards the
letter he received:

When I received it, especially when I heard the voice, I felt extremely
touched. It is different from our daily call, which is for casual talk and
sharing news. I listened when I had just left work late. I could feel
her feelings through the voice message, very emotional and sincere. I
replayed it several times.

In the diary, the participant mentioned that voice messages are better than
printed messages, which is somewhat different from the previous assumption.

However, after discussion, we agreed that this is mainly because the voice contains much more personal features than the typed letter: "I might feel differently if it was handwritten."

More importantly, the voice message was not shown in an instantaneous manner, which left time and space for him to feel the emotion. Also, the reason why this letter is so touching is that it has been a long time since he last received a serious letter. It is more about deep interpersonal conversation rather than casual talk.

Both participants agreed that this kind of interaction is special. They noted that when connecting by clouds, the sense of interactivity is much weaker compared to instant messaging. However, they found it more entertaining than nostalgic.

> I didn't go out today. But in order to take a picture of the clouds, I had to leave the house before it got dark. My boyfriend also told me he was on a business trip, and the first thing he did when he got off the airplane was look for clouds. He worried that once it got dark it would be hard to find clouds. I felt warm by his words...at the same time, I felt a bit amused about the idea of two grown-ups taking cloud-finding so seriously.

One of the participants indicated that the moon may work better than the clouds for nostalgic feelings because the moon appears at night and is more culturally linked with sentimental feelings.

To conclude, I draw the following conclusions from the user study:

1. A new way of connecting was built, but it seems not to be used for nostalgic communication because the message content (letter) contains a lot of other information and the clouds are too playful. They can be used for more casual relationships such as friends or parents and young children.

2. Effort, and the waiting it brings, are appreciated in emotional interaction.

3. An action (looking for clouds or taking a walk before sunset) driven by the purpose (receiving a letter) creates an off-grid experience that can be considered as a different way of creating the "distance" in the communication design.

3.5.5 Case 3: How's the Weather There

In this user study, I adopted the method of *participatory design.* Rather than doing all the design and setup myself, I talked with a participant who was going to set up an experiment with his mother by applying the initial design framework. I explained the framework to him face to face and gave him a written handbook to better understand it (Figure 3.11).

Handbook for Use

1, Aesthetic Disinterestedness in Content *Inutility / Implicitness*

The message should be uninformative, with no special purpose. And use metaphors with subtle meanings.
Suggested message: sending environmental content like nature-related information, seasonal wind, and flower blossom. Sending abstract content like the warmth of the hand, heartbeat, footsteps voice in room, etc.

2, Distance in Interaction *Slowness / Effort*
The way of interaction should be slow, time-consuming, and require waiting and effort.
Suggested way: sending one-way message and showing in a no-notification mode. Require extra attention, like handwriting, going out of the room, etc. Setting special conditions. Adding uncertainty in the way of sending.

3, Ubiquitous Medium
The medium should be peripheral, ambient type.
Suggested media: the ambient environment, wall, lamp illumination, window, windbell, etc.

4, Realised Output
The outcome needs a physical form showing the time passing by.
Suggested material and effect: paper-made, handcrafts; growing changes, faded-effect, lunar phase, wrinkles, etc.

Figure 3.11 Handbook for designer

The design here was planned by Receiver Qi.

Receiver: Qi (son, location: Japan, City T).

Sender: Lihua (mother, location: China, City Y).

Time and period: 7 days, starting from February 2021.

Design idea: Using the weather temperature difference to build a subtle connection displayed through ubiquitous, tangible, calm media.

Framework factors:

Content – the temperature difference between two cities.

Interaction – one-way communication (to release from reply pressure), one-to-one, non-interrupting.

Medium – a lamp with colour-changing function.

The Design of the NostosLamp

In order to further evaluate the concept, I discussed it with receiver Qi and we build a prototype named NostosLamp. The idea derives from observations: we found that in a parent–child relationship, romantic elements are less important than signals of caring. One of the most common topics between mother and son is the weather. They want to know how the weather is to remind each other to keep warm, etc., and they use this as a small chat to keep in touch. We believe this is also a subtle way for parent–child relationships to express nostalgic "I miss you" feelings. We set a tangible smart lamp that was remotely controlled by the mother in her son's room. The interaction design follows the principles of contentless, nature-related, slow and subtle interaction. The content of the message was customised as follows: if the temperature in the mother's city Y was higher than in the son's city T, the lamp's colour would be warm, and vice versa (Figure 3.12). The mother calculated the temperature difference between the two cities and used her phone to send the number to the lamp server. According to the number, the lamp would show a different colour in the son's bedroom. Different from other lamp or light-related paired designs (Häkkilä et al. 2018), this design focuses on Parent-child relationship without consideration on intimacy, on the countrary, we want a "limited, reserved" way of expressing caring and missing feelings.
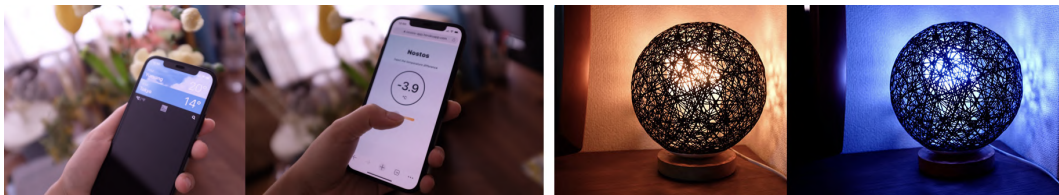
Figure 3.12 Left:checking weather and sending temperature difference number. Right:the NostosLamp.

We created a website for the mobile phone to access and send a number to the

lamp server (Figure 3.13). We also created an application for Apple computer to
control and conduct the turning-off command to the lamp (Figure 3.14). After
the mother sent the number, the website on her phone would show a locked icon.
When her son used the app to turn off the lamp, the icon would be unlocked,
indicating that she could send the number again.
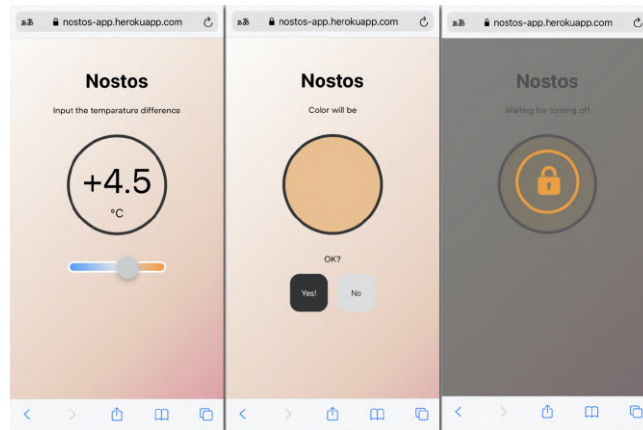
Figure 3.13 Website for mobile access, for sender
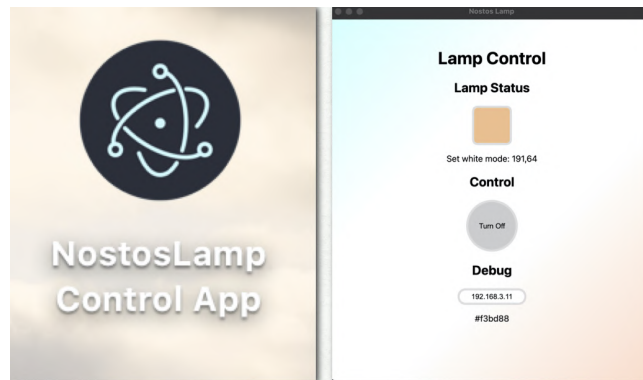
Figure 3.14 App for turning off the lamp, for receiver

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3.5.6 Results and Discussion

We conducted the user study for one week and finished with a semi-structured interview. The overall feedback showed that the son, who saw the lamp every day, had much stronger emotions compared to the mother who just used a smartphone to send numbers. The son mentioned that the light made him feel warm, especially when he came back home from outside:

> I came home late and suddenly saw the lamp was on. There was no one in the room. I knew the signal came from my mom, who is thousands of miles away. I could feel she was thinking about me.

Sometimes, when he turned off the lamp, the lamp turned on again after a short while: "At that time, I strongly feel my mom is really missing me."
He mentioned that he liked the limited nature of the connection:

> We set every Thursday as our video chatting day. She knows I'm busy, so we barely talk on other days. But sometimes I miss her, and I also wonder what she is doing...but I won't call her because I don't have much time to spend on video chat...Now with this device, I feel it can serve as a minimum connection that still can show love and care.

He also anticipated that it may work even better if the device was put in his mother's room: "I think the love of parents for their children is always deeper. If I leave a message to my mom, she will definitely cherish it more." Regarding the colour difference, the cities they are living in share similar temperatures, so the colours shown in the lamp were almost the same. He could hardly notice any change in the colour. He mentioned that if they lived in completely different temperature zones, it may have a better effect.

From the mother's side, she first mentioned that the experiment was easy to understand. She was worried that if there was too much technology involved, she would not be able to follow the experiment. However, she found it "smart, meaningful, and very human".

She liked the way of connecting: "I can contact him without worrying about interrupting."

However, she did not connect with this action as a way of delivering her feeling of missing:

> I can feel the connection, but it was less related to emotional connection, more about practical uses... I thought I was helping my son to turn on a lamp and maybe in future I can help him turn on a rice cooker.

She also mentioned that the reason she did not have strong emotions was that the action was too simple: "All I did was select numbers and send." However, after I explained to her what happened in her son's room and how her son felt about it, she changed her mind by saying "Now I understand what I was doing. I would feel much different knowing how he felt about this."

She enjoyed checking the weather: "The weather information let me think and imagine, like, the weather there was so great, maybe he went out for fun, etc."

To conclude, the purpose of the user study was to use a customised and nature-related implicit signal (weather difference) to deliver the message of "I miss you". Compared to the moon idea, the idea of using temperature difference is less romantic but more caring. However, compared to taking pictures of the moon, calculating numbers is less aesthetically pleasing and takes less effort. Also, due to a lack of feedback from the receiver, less emotion is evoked in the sender. In the future, we should add more aesthetic elements to the interaction, and it is important to let the sender know the meaning behind their action.

3.6. Aesthetic Nostalgia-driven Design Framework

3.6.1 Developing the Framework

Based on the literature review and the insight collected from the pilot study, I revised the initial design framework. Major changes from the previous version are explained, and a more detailed illustration is added to clarify the meaning behind each factor.

I set three factors (instead of four) to systematically analyze the features of nostalgia-mediated LDR design. These factors include Content (what to deliver), Way of Interacting (how to deliver), and Medium (what to present).

To further refine the details of the framework, I also draw on a design framework for mediated personal relationship devices by Gooch and Watts (Gooch and Watts 2011), a summary of technology-mediated methodologies by Hassenzahl and colleagues (Hassenzahl et al. 2012) and a review of newly emerged user interfaces for emotional communication in HCI design by Li and colleagues (Li et al. 2018).

According to Hassenzahl, the awareness strategy in mediated design refers to "creating a feeling of cognitive awareness and continuity by sharing different types of ambient information". And the expressivity strategy refers to "supporting the explicit expression and reflection of emotions in an encoded way, such as by using artifacts that emphasize the affective and emotional aspects of intimacy" (Hassenzahl et al. 2012). Both strategies are adopted in my framework. To be more specific, the sub-strategies of displaying mood and symbols are adopted.

> The substrategy *mood* is to provide information about the emotional state (e.g., happy, sad, bored) of a partner by interpreting body language, physiological parameters, or external indicators (e.g., music). In contrast to a phone call, the sender does not consciously reflect his/her emotional state.
>
> ...
>
> The substrategy *symbols* invites variety in messaging. In contrast to currently available technologies, which provide only limited customization for emotional messaging through, for example, emoticons, the majority of the symbols concepts encourage couples to develop their own emotional language. (Hassenzahl et al. 2012)

Both the awareness strategy and the expressivity strategy emphasize on providing information in an ambiguous way, offering the flexibility of interpretation, and encouraging users to develop their own emotional language and load it with meaning.

Hassenzahl also mentioned that an aspect often neglected in expressivity is the exchange of negative emotions. The expression of negative emotion can also

play a vital role in terms of relationship maintaining (Hassenzahl et al. 2012). Compared to positive affective exchanges, such as saying "I love you", nostalgia expression will be more considerate since it combines both positive and negative components. It is necessary to search for new ways of supporting expressivity in such emotionally complex moments.

To better analyze design attributes and characteristics of unconventional LDR emotional interface design, Li and colleagues(Li et al. 2018) developed a codebook consisting of four main attributes. These include *the nature of messages, strategies for expressing relatedness, interaction types, and form factors. The nature of messages* refers to the types of messages being sent or received from the designed devices. *The Interaction types* presents the input and output modalities, and symmetry of the interaction between users. *The Strategies for expressing relatedness* refers to Hassenzahl's categorisation (Hassenzahl et al. 2012) of different strategies used to create relatedness in intimate relationships. *The Form factors* refers to UI used in mediating emotional communication between LDRs.

To further construct my design framework, I combine interaction types and *strategies for expressing relatedness* from the listed attributes as the Way of Interacting (how to deliver), while *the Nature of message* as the Content (what to deliver), and *form factors* as the Medium (what to present).

Gooch and Watts(Gooch and Watts 2011) created a framework for designing intimate communication devices. Based on their suggested methods, I adopt *metaphor of use, effort, realised output* as appropriate design methods. *The metaphor of use* concerns the nature of the message being sent through the communication system. *The effort* refers to the effort being invested during the interaction process. And *the realised output* stands for the nature of the output of the communication which can be classed as being fleeting or realised. I further analyze and redefine these factors through the special lens of aesthetic nostalgia. The final design framework is made up of three factors: Nature-mediated Metaphor in Content, Distance in Interaction, and Tangible Medium with Time Traces.

3.6.2 Nature-mediated Metaphor in Content

Major changes

Aesthetic Disinterestedness in Content changed to Nature-mediated Metaphor in Content.

Aesthetic disinterestedness is regarded as the beauty of uselessness and the non-utilitarian principle in design; these concepts still remain a part of this factor. After considering both the evaluation of the tests and the findings of the literature, nature exhibits a more prominent effect in guiding designs and shows a positive effect in communicating emotion. Hereby I extract the word "nature" and give a further definition in the following.

Content factor

The content factor focuses on the nature of the message. It refers to what kind of information designers should plan to use to express nostalgic feelings.

In a review of unconventional communication systems, Li and colleagues (Li et al. 2018) divided the types of messages being sent or received from the system into two types: messages that were open to interpretation and messages that were explicit. Considering nostalgia's emotional nature, I propose that implicit messages and less practical information will be beneficial for triggering sensibility and communicating inner feelings. To be more specific, in this dissertation, I use nature as an extended metaphor in content design.

Nature meaning

I understand there are different opinions towards "nature". As mentioned in Chapter 2, in some cultures, nature may seem to be more related to "awe" and "vastness" and sometimes could even cause an overwhelming fear and distress (Stepanova et al. 2022), while in other cultures, nature is usually associated with "tranquility", "slow" and is closely related to the concept of "returning" in nostalgia. When introducing aesthetic nostalgia, I referred to the aesthetics of *Wabi-sabi* and one of the significant aspects of *Wabi-sabi* is the concept of "nature" (see Chapter 2.4.3). And I concluded the concept of nature could be reflected in

several points, such as the transience of nature, imperfection in nature, accepting the nature of things, and so on.

Zhao writes, "in the theoretical history of nostalgia, the manifestations of 'home' are diverse but can be roughly summarized into several categories, such as 'nature' – the natural environment and natural attributes, as opposed to man-made environments and attributes." (Zhao 2009)

I echoes with Zhao's claim that nature has been mentioned frequently in and closely related to the theory of nostalgia. But I am not intended to create a dichotomy between "nature" and "manmade". Rather, I am more interested in how to mediate "nature", and extract favorable attributes of "nature" to create design.

Inspired by the concept of nature in *Wabi-sabi* and drawn from insights of pilot studies, I extract several elements in nature which I found favorable in terms of emotional design and conclude as below:

1. Involve components from the natural environment or increase interaction with the environment, especially by using culturally significant components of nature and learning from ethnographic observations.

The selection of natural components can take reference from ethnic culture. For example, the moon is a typical cultural symbol for Chinese people, and the Sakura (Japanese cherry) is of psychical importance for Japanese people.

2. Consider not only creating an artifact alone but creating a SHARED nature-mediated scenario to create connectedness, such as "share the same moon" or "share the same wind".

3, Choose components that have repetition, regularity, or cyclicality, and may appear out of the blue so as to leave a clue for future nostalgia. For example, if we designed an interaction that involved the seasonal wind, it may leave memory clues for future interactions when the seasonal wind comes again.

Besides, the nature selected should cover the meaning of disinterestedness, uselessness, and the lack of informational content.

The Use of Nature Metaphor

Nature has always played an important role in literature, especially in poetry. Many poets use nature as a way to express their inner emotions of love, secret

infatuation, and the feeling of missing someone.

Using nature as a metaphor to express feelings is a typical method widely used in Chinese literature, songs, and movies. There is a well-known Chinese song that sings the memory of generations: "The moon represents my heart". The title, which is also the lyric, fully embodies the implicitness and shyness of Eastern culture: "You ask me how deeply I love you, look, the moon represents my heart."

Another example of using nature to express missing feelings is introduced in how to write a traditional Chinese letter:

> Before getting to the body of the letter, the writer should briefly express how he or she misses the receiver, which is called the 'missing-you' part of the letter. In the 'missing-you' part, the writer can express emotion from the perspective of the change of season. Taking advantage of a scene (which is the use of nature) to express one's emotion makes the emotion more delicate and mild. (Chen et al. 2018)

There is a well-known Chinese poem that related to nostalgia: "The moon does wax, the moon does wane, And so men meet and say goodbye. Though miles apart, we'll share the beauty she displays." Back in ancient times, there was no technology, even no systematic transportation. When people had to separate, there were limited things that could console them. Typical examples are personal belongings or some keepsakes. But in ancient China, there was an intangible thing that can represent one's hometown and loved ones: the moon.

The poet employed the moon to express his missing feelings toward distant loved ones. And when he missed them, instead of looking at specific artifacts, he chose to look at the moon and consoled himself: at least we share the same moon no matter where we are.

What's clever in this poem is that the poet uses a shared nature, that is the moon instead of specific artifacts, to reflect his emotion and imagine a connection. Later the moon becomes a symbol of nostalgia in Chinese culture. Even after a thousand years, when the Chinese talk about LDRs, they often refer to this poem. Two people by just looking at the moon, can feel a tacit bonding. From the designer's perspective, I think we can learn from the poet by using nature as media to build an emotional connection.

3.6.3 Aesthetic Distance in Interaction

Major changes

The core of this factor remains almost the same. A "limited" element is added to indicate the frequency of interaction. The distance factor should reflect nostalgia aesthetics – the beauty of loss concept – and thus stands for "limited, slow, effort". Distance in interaction means less frequency, longer time needed and more difficulty to complete the interaction. Some elements of the distance factor are elaborated on below.

Nostalgia's distance meaning

As mentioned in Chapter 2, distance is a defining feature in aesthetic nostalgia concept: "The modern, temporal version of nostalgia is founded on the unattainable distance between the past and the present" (Higson 2014) "The nostalgic is someone 'for whom desirability is enhanced by distance'"(Sayers 2020) "Nostalgic love can only survive in a long-distance relationship." (Boym 2007)

Distance, which represents the sense of the unattainable, the unreachable, and the underlying possibility of disappearing and loss, has profound aesthetic meanings. It triggers sentimental feelings, arouses aesthetic awareness of the transience of life and things, and establishes nostalgia's basic wistful tone.

Aesthetic distance in LDR

As George Eliot once wrote, "only in the agony of parting do we look into the depths of love". Distance may breed positive nostalgic feelings between LDRs. Recent research shows that couples in LDRs are equally or even more trusting and satisfied as geographically close relationships. This helps to validate the view that absence may improve communication (Crystal Jiang and Hancock 2013).

The sense of closeness might vary in different kinds of relationships or even in different statuses of one relationship. For example, for couples who have just begun their relationship, a video chat may be awkward and less romantic than a letter. According to Sidelinger and colleagues (Sidelinger et al. 2008), "couples are prone to idealization when communication cues are limited". Although increased idealization may lead to disillusionment upon reunion, moderate idealization can

preserve the relationship. Actual idealizations, also called "positive illusions" in romantic relationships, contribute to greater relationship satisfaction (Murray et al. 1996).

In the moon test, one of the participants said: "I did not feel a need to see him in person, rather, I would prefer to stare at his belongings and recall the time we shared together privately. That's the way I deal with my longing." This helps to illustrate that distance can also be favorable in communication design because imagination and private space are equally needed.

Aesthetic distance in interaction

In terms of interaction strategy, distance shares the same spirit of slow and calm design. Distance interaction design is not about building mysterious obstacles deliberately. Instead, it is about balancing connection, making space for privacy, and keeping the right distance so the relationship connection can be sustainable and last.

In the initial framework, slowness mainly reflected the time-consuming nature of communication and the necessary waiting, which is mainly based on the sender's perspective; the sender needs more time to send out a message and the receiver needs to wait a while to receive it. In real cases, I found that many participants emphasized the pressure to reply rather than concerns about the time used. Therefore, the focus of the slowness element shifted from time-consuming communication to "no instant reply needed". Depending on the receiver's reply speed, it may take a long time for them to complete the interaction. That is where the slowness comes from.

Besides, as discussed in the initial design framework, effort are highly valued in intimate relationships:

> Families also relied on the postal system to send letters, cards, and
> other greetings to their remote family members where they would feel
> more connected despite the medium's less-timely communicative na-
> ture...In fact, a paper card may in some ways be more special by
> the very fact that it is so much easier to send something digitally.
> (Neustaedter et al. 2013)

It echoes the result from the clouds test, the participants mentioned that waiting did not wear down their patience; on the contrary, it made them feel more eager to see the result.

Symmetry of interaction

I added one more element in the distance factor, which is the "limited" element. "Limited" refers to the frequency of interaction and is added as a sub-factor. Besides, asymmetric communication is also added and emphasized under the factor.

Two-way communication, or the symmetric interaction method, is widely used in interaction design. However, such responsive interactions require participants to reciprocate and remain aware of the situation. Scholars find that responsive interaction may come to be a social routine (Chien and Hassenzahl 2020).

The replying pressure problem is highlighted in communication design. There is evidence indicating that communication openness can even exacerbate disagreement. Undesirable communication is found to be disruptive: "Family members must also balance their needs to stay connected with privacy issues of revealing or sharing too much information, or being 'too connected'" (Birnholtz and Jones-Rounds 2010).

Since most mainstream communication tools are used for synchronised communication, they may impose an obligation to reply. One participant mentioned that even if he missed his partner, he would rather not say it to her. One of the reasons stopping him from expressing his feeling was that the phrase sounds like asking "How about you, are you missing me too?" The underlying expectation in the conversation not only makes the receiver feel pressure but also reduces the sender's motivation to express themselves.

Thus, I propose asymmetric, or one-way communication, which is used mainly for expressive purposes, can avoid over-connection, and is preferred in nostalgia LDR design.

However, it is worth mentioning that asymmetric communication may also lead to disappointment and hinder communication: "in the absence of reciprocity, self-disclosure can lead to vulnerability and disappointment." (Stepanova et al. 2022) Designers should think carefully about the balance of creating distance, such as creating limitations in one interaction, in the meantime opening opportunities for

other connections.

3.6.4 Ubiquitous Tangible Medium with Time Traces

Major changes

1. Integrated Media factor and Output factor in the initial design framework into one, since both of them can be seen as a factor of the Medium.

2. Ubiquitous medium changed to Ubiquitous tangible medium. In the initial framework, the "ubiquitous" referred to off-screen, peripheral media and ambient design. I added the tangible as a supplement.

3. Realised Output changed to Time Traces. "Realised" means something not ephemeral. The reason for preferring a realised output is that such output can be kept as a memorial and serve as a nostalgia trigger. After reviewing the literature, I found that the meaning of memory trigger can be extended to Time Traces which will be illustrated below.

Mediated Nostalgia

The Media factor refers to the final representation or display form of the nostalgic emotion. It involves elements of media and result (output).

Media and nostalgia cover a wide range of research topics, including the digital nostalgia wave, mediated authenticity, retro modern technology, ephemerality, interface criticism, and analogue culture. In this section, I focus on the digital impact on both nostalgia and media, and discuss what designers should focus on when designing the media of nostalgia.

The "long-lost" meaning keeps changing along with the development of digital technology. In the past, people living far away had to spend months going back home; at that time, nostalgia mainly referred to homesickness. With the advent of the modern transportation system, the nostalgia towards hometowns shifted to a more general nostalgia for a past time. Coming to the digital era, as Higson mentioned in a discussion of atemporal nostalgia, "we live in a timeless mediated world" (Higson 2014). The evidence of timelessness can be found in the digitally archived culture: the past is everywhere and remains accessible in our present life. We still feel nostalgic about the past, but the level or meaning of nostalgia has

slightly changed (from modern nostalgia to postmodern nostalgia) (Higson 2014). The digital impact on nostalgia can be defined as the death of "temporal distance" which results in a lack of "time traces".

Another digital impact on media is reflected in "the disappearance of physical things". The physical thing is losing relevance in our lives:

> Even media formats with a strong tradition like the book or cinema are now perceived to be threatened by obsolescence and seem to be outpaced by their increasingly ephemeral digital successors. (Schrey 2014)

However, nostalgia, as a rebel of the fast-changing world, is "born with an analogue heart" (Luna 2017). "Interestingly, nostalgia for analogue music began almost immediately after the CD was introduced into popular culture." (Potts and Salvo 2017) Marks suggests that in our digital video world, the nostalgia for analogue video can be described in C. S. Peirce's terms as a longing for *Firstness* – that is, "the dropout and decay that correspond to our bodily mortality" (Marks 2002). Her opinion resonates with Kurlinkus's "nostalgic resistance":

> "This nostalgic resistance echoes through today's craft revival, in which a generation that grew up on digital technology looks to physical making as a way to slow time, commune with permanence and find meaning in knowledge-based jobs." (Kurlinkus 2018)

People tackle digital intangibility and ephemerality by nostalgically turning to tangible things, crafts, and time traces. The preference for the tangible can be found in previous user studies as well. Tangible forms are preferred for their preservable feature and a sense of existence. While designing the media for nostalgia, designers may better consider "the longing for the analogue", "the longing for something to preserve" and "the longing for *Firstness*".

Time traces

Marks writes: "our bodily relationship to the medium consists in 'identifying' with the attenuation and transformation of the signal, the sense of passing of time and

space during transmission." (Marks 2002) The time traces concept is developed from *Wabi-sabi* aesthetics and the beauty of decay. The core ideas of *Wabi-sabi* can be understood as the appreciation of a beauty that is doomed to disappear (Walther 2021).

The *Wabi-sabi* aesthetic is one good example of mediated design for its appreciation of naturally aging and time traces (Juniper 2011). As the beauty ages, the fading traces it left become silent contemplation and produce a new charm. The fading of autumn leaves, the cracks in the bowl, and tea stains on the coaster are typical design examples indicating the sign of use and the elapse of time.

In nostalgia theory, the temporal meaning, or the feeling of time passing by is quite essential to differentiate it from atemporal nostalgia. The traces (signs of use) in tangible things strengthen a feeling of existence and a sense of company. It is a hidden power that can trigger nostalgia. Designers may benefit from rethinking the media form of nostalgia and consider how to reveal the passing of time, sign of use, and beauty of decay.

In addition to visual elements such as wrinkles, cracks and fading colour, other things like natural phenomena including lunar phases, flower blooms and even non-substantial elements such as seasonal changes in weather may invite people to feel the passing of time as well.

Source:(Xue 2017)

Figure 3.15 TDK Life on Record Project

3.7. Summary of Concept

In order to construct an emotional connection, we first need to understand the emotion, identify the potential and create the most appropriate design approach. I argue that in LDR nostalgia design, besides the Trigger, other factors such as Distance and Sensibility should also be considered and included in the design. As mentioned in Chapter 1, nostalgia emotion is "something gentle, vague, blurry but genuine". LDR nostalgia design thus should be in line with its features. Based on that I first came up with an aesthetic nostalgia experience model and create an initial design framework. I conducted pilot user studies. Combined with literature reviews and study findings, I revised the initial framework into the final version of the aesthetic nostalgia-driven design framework.

Finally, I identify three factors that incorporate the concept of aesthetic nostalgia. Within the content factor, the aesthetic disinterestedness, the nature concept in *Wabi-sabi*, and other aesthetic features in nostalgia theory are used to develop the design method, which are described as nature-mediate and metaphoric elements in content design.

For the interaction factor, the concepts of distance and the beauty of loss are adopted to guide design and are finalized as slowness, less (feedbacks) and effort to create aesthetic distance in interaction.

In the medium factor, digital impact on nostalgia and media, the atemporal aspect of nostalgia, the beauty of decay, produced the tangibility and time trace concepts in medium design.

In the following chapter, I will use this framework in real design cases to further illustrate how to use aesthetic nostalgia to approach LDR emotional design.

Chapter 4
Proof of Concept

Both design experiments were implemented in prototypes and real-world uses. The design experiments lasted from two weeks to one month. In-depth interviews were used to collect data.

4.1. NostosMoon Design

4.1.1 Design Idea

Similar to the pilot moon experiment, the moon alone is used as message content in the NostosMoon system. I want to use the moon to create a slow, poetic connection that delivers nostalgic missing feelings. Unlike the previous experiment, I designed a real prototype to display the message and fulfill the interaction without a third person intervening in the test. In terms of display, I first considered an ambient screen to display the moon. I used a wooden frame and Japanese paper to cover the screen surface and obscure the screen's digital nature (Figure 4.1). However, I changed my mind, deciding to use a light-shadow reflection to display the moon because compared to electronic display, light and shadow appear to be more "analogue" and subtle. China has an idiom "the flower in the cup and the moon in the cup". It is used to describe a relaxed delightful time during a beautiful moonlit night, when the moon and the flower are reflected on the water in a wine cup. Similarly, the Japanese term "tsukimizake" refers to drinking wine while appreciating the moon (Figure 4.2).

A moon reflected in water represents a beautiful peripheral scene. The light, shadow and water reflections gently create a poetic association that fits the concept of aesthetic nostalgia design. Inspired by those words, I designed the "moon

reflection in cup" and built a prototype.

Figure 4.1 Moon display made by traditional Japanese paper Washi

4.1.2 The Prototype

The main part of NostosMoon consists of three tiny lights and one smart plug. Each light has a handmade lampshade corresponding to three different moon phases: full moon, half moon and crescent moon. I bundled them up, made a lampshade to cover the lights' surfaces and used a wicker box to hide the plug. I decorated the lamp with miscanthus grass, which is a traditional decoration for the Japanese Mid-Autumn Festival. All the materials are handmade to reflect the nature concept in nostalgia. According to the signal sent by the sender, different lights will be turned on and shed a light on the surface of the cup, leaving a moon reflection over it.

4.1.3 Experimental Procedure

The experimental procedure is as follows. Each group had one sender and one receiver.

I asked the senders to follow the following steps:

Source: "TUKIMISAKE" by Hiro, Ganref online, May 27, 2013,
https://ganref.jp/m/blueblack/portfolios/photo_detail/1786598

Figure 4.2 Moon reflection on water
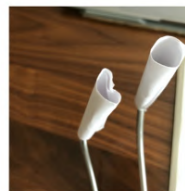
Figure 4.3 Making NostosMoon Prototype
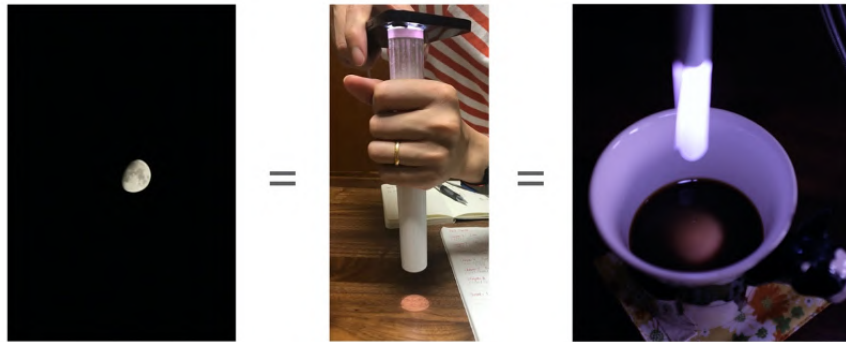
Figure 4.4 Moon phase reflection

Figure 4.5 Moon reflection in cup

1. Observe the shape of the moon, then draw a picture of the moon shape and take a picture of it. Or simply take a picture of the moon. (I encouraged them to draw pictures because I wanted them to observe the moon carefully).

2. After confirming the moon phase, use a given email address and send an email to the IFTTT email address. The email subject should be '1', '2' or '3'.

The sender must decide whether it is a full moon, a half moon, or a crescent according to the shape of the real moon and then enter the appropriate number (with a pound sign).

#1 represents the full moon

#2 represents the half-round moon

#3 represents the crescent moon

Email content: the picture the sender just took.

3. After sending the email, the device will be turned on in the receiver's house. (I showed a picture of the scene at the receiver's house to senders, to let them know what happened after this action.) When the receiver turns it off, the mailbox will automatically receive an email indicating that the receiver has received the moon.

I also mentioned to senders that I hoped they did not consider it an obligation and that the decision to send or not should depend entirely on their mood. Finally, I told them that any comment, whether positive or negative, was welcome after the experiments.

I asked the receivers to complete the following steps: 1. Set the moon device and put it in their bedroom. 2. Turn off the light whenever they want.

4.2. Case Study Group 1 (Y and Z)

4.2.1 Analysis and Observation

Group 1 is a friend-relationship. Y (female) was the sender and lives in China. Z (female) was the receiver and lives in Japan. The experiment lasted for three weeks. Semi-structured in-depth interviews were conducted after the experiment. The interviews lasted 31 minutes for the sender and 38 minutes for the receiver.

Y and Z are close friends who have known each other for 10 years. They usually use WeChat (an instant messaging application) to contact each other. Their

conversations are not very frequent, occurring around one or two times a month. Both the sender and receiver expressed feelings of missing the other by stating that "although without frequent communication, we still have each other in our heart" and they hoped to have an indirect, gentle connection to feel the other's missing feeling. Concerning their current digital connection, sender Y expressed that she regarded it as merely a tool that is convenient and straightforward, but that nothing could compare to face-to-face (FtF) communication in terms of emotional connection. Subsequently, our device worked better than the instant communication tool but could not replace being together. Receiver Z expressed her dislike of the instant tool for expressing emotional needs, especially for sentimental emotions such as nostalgic missing feelings; she preferred gentle, light expressions.

Sender Y sent the moon picture 11 times in total. She chose to take a picture of the moon. The pictures attached in the email indicate that she went outside to take the picture. Each picture's angle was different, indicating that she had searched for the moon.

In the beginning, due to weather and air quality, Sender Y could not see the moon for over one week. She felt upset and discussed with me what if there was no visible moon during the whole experiment. We considered that the important thing was when she missed her friend, she tried to look for the moon to send out a message. Therefore, we decided to change the plan slightly: even when there was no moon, as long as she looked for it, she could still send out the email with the sky's picture, and I would check the moon phase via an online moon phase calendar and manually turn on the light for the receiver. When the light was on, Receiver Z usually turned it off after a delay; sometimes she kept it on all night.

4.2.2 Results and Findings

Overall, both sender and receiver showed positive feelings towards the NostosMoon device. They appreciated its "just right", "suitable" way of delivering the missing feeling. They also liked the moon idea, and they felt that a subtle connection – in the sender's words, "a spiritual companionship" – was built through "sharing the same moon". Compared to the receiver, the sender had more chances to get in touch with nature, so she had more sensitive feelings towards the real moon.

Figure 4.6 Picture from Group 1 Receiver's room

Figure 4.7 Picture from Group 1 sender

These included a typical nostalgic feeling about her childhood, when she used to play under the moonlight. The receiver had been waiting for the moon for a while. The first time she received it, she felt a strong feeling of companionship, reporting that it "felt like she was just next to me". Later, she kept the light on for a long time because she did not want it to disappear. Also, through this experiment, the frequency of communication through their other channel (WeChat) increased along with their mutual missing feelings. They sometimes would talk about the weather, the moon and would share updates as they came up during these conversations.

1. It shows the moon can not only deliver nostalgic missing feelings but also trigger sensitivity for other feelings such as childhood nostalgia

The reasons why the moon can create nostalgia are as follows. First, the moon is unique and exists in the sky, so it can create a sense of connection because wherever we are on the earth, we can always look up at the sky and see the same moon. Second, the moon has distinct aesthetic properties, both visually and culturally. Receiver Z mentioned that:

> Although I think the moon is just a representative...I don't think it can be anything. For example, if it's leaves, it might be a little bit lacking, because it is not unique. The representative thing must still be meaningful. After all, there is only one moon, the moon she sees is the same as the moon I see. Well, there are so many leaves, I don't think leaves are good ideas, the meaning behind them is a little different. (Receiver Z)

Sender Y first mentioned that the moon is a typical symbol of nostalgia in Chinese culture. She thought that it was very appropriate to use the moon to build connection. Later, she added that the moon reminded her of her childhood; when she was young, she played with other children under the moonlight outside, which made her feel relaxed:

> Except on August 15 (the Mid-Autumn Festival), you will appreciate the moon. On typical days you will rarely look up at the sky...Due

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> to this experiment, I became used to checking the moon at night.
> It reminds me of my childhood...When I was young, I used to play
> with a group of children together. The feeling of playing outside at
> night remains fresh in my memories. Every household was outside.
> It suddenly made people feel free and relaxed...when the same scene
> of the moon appears, I suddenly pull my thoughts back to that time.
> (Sender Y)

When I asked what other things could replace the moon, she replied that the
stars could because they are in the sky and are certain to be there. This brings **a
sense of certainty**, so whenever she misses her friend, she can use that to send
a signal.

2. It suits old friends who are not always in contact but always remember each other

Both participants described their relationship as "very good friends but not always
staying in touch". They knew each other for a long time, but due to long distance,
they seldom meet in person, especially during COVID-19.

> The two of us have known each other for almost ten years. Our The
> two of us have known each other for almost ten years. Our friend- ship
> is the kind of relationship that you don't see each other often, but you
> have each other in heart. Even after a long time apart, as soon as you
> meet again, old-pal feelings are still there. (Sender Y)

> We've known each other for years...but since we lived in different
> places, somehow we haven't contacted each other often. Sometimes
> we don't know what to say even if we want to contact. But your
> device is very useful. Without any language, I can still know she is
> thinking about me. (Receiver Z)

The reasons for them to think it is "suitable" are as follows: "it has a more
cere- monial feeling, compared to instant chatting"; "the degree of intimacy, of

emotion, of attention or effort needed, are just right, not too much or too little"; "it is simple (non-verbal), we do need to find topics in order to maintain the connection."

Besides, this one-to-one device makes the participants feel exclusive and special. It exists only for the two of them. "You can contact anyone, anytime via WeChat. But this is only for us..." Sender Y also mentioned that the device is more suitable for very close friends than for romantic couples because in romantic relationships, "you might expect an instant response whenever sending the messages." This comports with the initial assumption that for some LDR romantic couples, the nostalgic feeling is not as obvious and strong compared to old friends who have loose contact.

3. The device creates a special emotional connection. It can serve not only as a connection itself but also as a trigger of connections via other channels

Both participants mentioned that the device can be represented as a "spiritual company". By the word "spiritual", they expressed their understanding of not taking the device as a functional tool but more like an emotional company: "The first time when the light turned on, I saw the moon, I felt quite happy and I felt like she was next to me." (Receiver Z)

Receiver Z also mentioned that one of the reasons she did not turn off the light immediately was that she felt the light provided a sense of company.

> On the one hand, it is my habit. I reply slowly; if someone On the one hand, it is my habit. I reply slowly; if someone sent a message, I will not reply immediately. The second is that I want to look at the moon for a while. I think it's pretty. If she sent it to me and I turn it off immediately, it will turn into repeated receive and reply. The feeling is different. If I leave it overnight, then I feel the thing is there, with me. (Receiver Z)

Both participants mentioned that the experiment helped them feel closer and establish a special connection. During the experiment, they thought of each other much more frequently. Sender Y said that "I think of her every day".

Sender Y explained that "not only via the device, I also sometimes chat with her via WeChat. And I look forward to sending the moon to her every night. I wish, by doing these actions, she can have, kind of a sense of belonging in a foreign country." Also, the frequency with which they use WeChat to communicate has increased. It is like a catalyst; before the experiment, they had to find topics to start a conversation. During the experiment, from time to time they would discuss the moon, the weather and share updates. As Receiver Z noted, "Before we started the experiment, we didn't contact each other so frequently...After the experiment started, I felt a connection with her." The device thus served as an emotional connection.

4. Soft distanced connection is preferred by certain groups of people

By soft distanced connection, I mean connection that delivers emotion gently and implicitly, with respect for each other's privacy. It can also be understood as a non-demanding interaction.

Receiver Z mentioned that she is a "shy person" and does not like when another person expresses love or missing feelings in front of her, especially in a close relationship. Moreover, she felt that in daily life it is too dramatic to say the words "I miss you":

Receiver Z observed that:

> High emotional demand and emotional attachment will make me afraid and want to avoid. Even for my parents, I do not like to hear they miss me, because it makes me feel I have to reply to that emotion [...] without any verbal or language information, I can understand she is missing me, or she understands I am missing her...I think this is great. (Receiver Z)

Finally, she stated that "I like to keep a certain distance in relationships. I do not want to keep too close, and that's why I like your experiment."

This suggests that the experiment or the framework may only work for certain groups of people who possess Sensibility (who are prone to feel nostalgic), for example, people who already appreciate aesthetic nostalgic emotion or people who are comfortable with a non-demanding interaction.

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4.3. Case Study Group 2 (Y and L)

Figure 4.8 Picture from Group 2 Receiver's room

4.3.1 Analysis and Observation

Group 2 is a parent–child relationship. Y (mother) is the sender and lives in China. L (son, 27 years old) is the receiver and lives in Hong Kong.

The experiment lasted for over one month, and the participants continued to use the device even after the experiment ended. Semi-structured in-depth interviews were conducted and lasted for 46 minutes for the sender and 77 minutes for the receiver.

Sender Y and Receiver L usually use WeChat to contact each other. They often use text instead of audio or video chat. They contact each other almost every day via texting and sharing pictures and videos. They are in a very good parent-child relationship and clearly miss each other very much, especially from the mother's side.

Sender Y lives in their hometown. Due to COVID-19, they will likely be unable to reunite for a long time, even for the Chinese new year. Sender Y expresses

Figure 4.9 Picture from Group 2 sender

her missing feelings towards her son, but at the same time, she respects her son's privacy and does not want to interfere too much in his life. She does not like using video chatting, as she feels uncomfortable with the camera on.
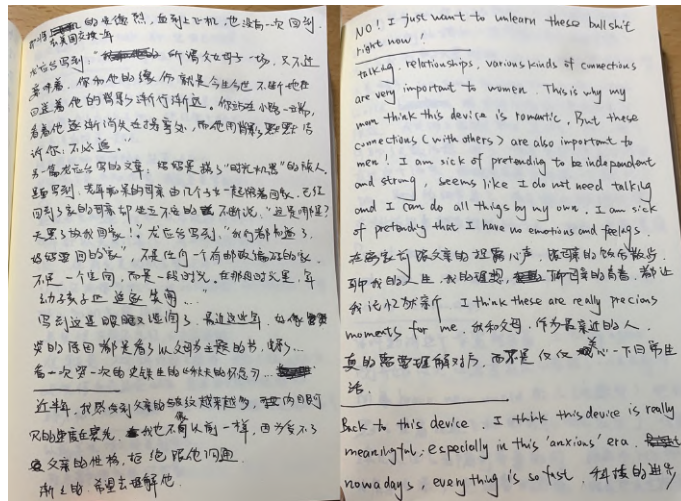

Figure 4.10 Diary note from Receiver L

Receiver L is a PhD student studying urban design. Before the experiment started, he had already taken great interest in the digital impact and communication field. Before the interview, he used the diary method to record his thoughts. He feels that we overemphasize digital communication and sometimes neglect the

people we love in the real world. His interests are slightly different than my focus, which is mediated close relationships; he focused on digital dating, virtual connection, social media, etc. However, we still shared many insights, as we are both concerned about the fast-changing and, in his words, anxious era.

This group is the only group to continue using the device even now. The overall length of the experiment was over one month, and Sender Y keeps sending the moon almost every day. When Receiver L returns home, he turns off the light immediately.

4.3.2 Results and Findings

Semi-structured interviews, in-depth discussion, and the diary method were used in data collection. The overall result shows that both the sender and receiver had positive feelings towards the NostosMoon device. They still use the device voluntarily on a daily basis, which is strong evidence that the NostosMoon device helps them to build an emotional bond. Both participants agreed that this is a "meaningful" connection for bonding in a close relationship and a "poetic and pleasing aesthetic expression" that can be used for deeper emotional exchange. By sending out the moon every night, Sender Y felt she built a poetic, unobtrusive way of connecting with her son that could deliver the caring and missing feelings gently. By noticing the light, Receiver L also felt "warm", as if his mother had been "waiting for me to come back home". Receiver L talked about sensibility many times, and he believed tangibility, subtlety, effort and one-way connection can trigger sensibility and arouse deeper, richer emotions. Further findings from each participant are discussed below.

From Receiver L:

1. Tangible things offer a sense of company and bring a stronger sense of existence

When asked about the overall evaluation, Receiver L's first key word was "tangible connection". He regarded the NostosMoon device as a tangible device, which is

different from digital, text-based communication methods: "Every time I go home and see that the light is on, the feeling of the tangible things is much stronger than chatting on WeChat, chatting on social media." He further explained that the strong feeling came from the sense of existence and co-existence. The entity can be touched and seen and physically exists in the environment, creating the feeling of company: "I feel my mom is waiting for me to come back home. But you won't feel the application is existing in my room. I mean, it is a connection, but you won't call it company."

Receiver L further explained how he felt and thought about tangibility, mentioning that digital objects lacked "real traces" compared to tangible things:

> The time we spend in the virtual world, we leave no living traces. When I checked my online chatting history, I was surprised that I spent so much time chatting with people whose names I don't even remember. I spend hours and hours but later I can't even remember I ever talked with him. However, in the real world I had lunch with a friend, and after two or three years I still remember what we said during that meal.

After a back-and-forth discussion, we defined tangibility as standing for three elements: real traces, uniqueness, and authenticity, which indicates a genuine, spontaneous feeling toward existence.

2. The time and effort invested by the receiver will be paid back with rich sensibility

One interesting point mentioned by Receiver L is that he wanted to spend more time on the device because he believed that the rewards you get will be in proportion to the effort you make. In this case, the rewards mean richness in sensibility: "The more time you invest, the deeper feelings you can get." He gave an example of what he meant by investing time in the device: "If I had to push to open the window, look up at the sky and search for the moon. This action takes more time than if I came home and saw that the light was on. And by investing more time in the experience, I may enjoy deeper feelings in return."

Before this conversation, I typically referred the effort to the sender's side; the more effort the sender makes, the deeper emotions the receiver can feel. However, from Receiver L's point of view, the effort factor can also be considered from the receiver's side. The more effort or time the receiver invests, the deeper feelings – and richer sensibility – can be aroused. Moreover, Receiver L is very willing to spend more time on the interaction, because he thinks "it is meaningful" to "feel with the heart".

Regarding the sender's effort, he comments: "I don't care about my mom's efforts, because I know very well she loves me, she will support me unconditionally without any doubt." I assume that in good parent-child relationships, with the children believing in parents' "unconditional love", the effort is less important than in romantic and friend relationships.

3. Asymmetric interaction can contribute to sensibility

Another factor related to sensibility is the symmetry of interaction. After hearing his critiques of digital connection, I asked Receiver L, "Do you prefer using the NostosMoon device to using WeChat?"

Receiver L replied, "That is not what I mean. I am still happy to have video chatting with my mom, but the feeling of that will be different. I will pay more attention to the interaction, talking with her, instead of feeling and thinking."

Instant communication tools require more attention. Communication is dynamic. There is not much room for people to pause and feel. According to Receiver L, the approaches are simply different rather than better or worse. He suggested that two-way interaction might be better for exchanging, while one-way is better for feeling:

> They arouse different emotions. That is how I understand it. For example, if you talk on the phone, it will make you feel more connected, and you may be happier. These kinds of emotional demands may be the majority. But one-way connection like this is soft, more gentle, more inner-oriented.

For Receiver L, one-way connection or two-way connection do not have to be determined by having feedback or not. He pointed out that as long as the feedback

is not instant, and is in line with the principle of subtle, slow interaction, he regards it as one-way connection. To build emotional-oriented communication, the key is to have slowness and space in interaction.

4. Storytelling with concept helps to cultivate sensibility

When we discussed the moon factor, Receiver L implied that he did not pay attention to the moon because he noticed his mother sending the moon according to her own wishes (always sending the full moon).

He first mentioned that whenever he saw the light was on, he would think of his mother without paying any attention to the moon. He thought the moon display was just a form and could be changed to anything: "It's mainly a form. I think whether the moon is placed in water, or on a table... or even if it is not the moon, I think it would give me the same feeling."

This statement is interesting to me because it is different than what I expected and shows an opposite view to Group 1 who view the moon as a unique signal.

I then asked: "If so, can we change the moon to a toy train or a doll..?" He felt strange, but could not tell why. I explained why we used the moon, including that the idea is about "sharing the same moon" and the moon's cultural meaning of nostalgia.

He then thought a while and replied: "I think you're right, if you told me before, I would pay more attention to the moon. I think this is what I mean about sensibility. I didn't catch the clue. But once you mentioned it, I can get it and I will feel differently towards it."

He also indicated that the device trains his sensibility because it is "a more implicit connection, I have to feel it by myself, feel it with the heart."

We agreed that sensibility for subtle emotions and implicit aesthetic feelings can be cultivated. In the future design, we may need to illustrate the meaning and the design philosophy a bit more in order to let users better understand and feel the concept.

The following conclusions are from Sender Y:

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1. A customized signal can be adopted in future design

I instructed senders to send the moon phase based on the real moon in the sky. But Sender Y did not follow my instruction, instead, she customized her own signal due to a certain reason.

Before interviewing Sender Y, I had already interviewed Receiver L. According to him, the display of moon phases did not correspond to the real moon phases. Therefore, I asked Sender Y why. Her reply was quite touching: "The full moon represents a family reunion and implies that everything will go smoothly, so I hope to send a full moon to my son. I definitely don't want to send a crescent moon to him."

By the mother's words, I can strongly feel the love from her. At the same time, I am pleased to know that she selected the full moon intentionally, which means that the moon was used to represent her loving wishes. I also asked her what other things could replace the moon. She mentioned that in their hometown, when October comes, the osmanthus flower is everywhere, and every street is full of the fragrance. She wanted to share this with her son.

The natural environment can represent their hometown and reflect their time together. Similarly, the full moon, as a historical-cultural symbol, as well as her wishes, represents her love and missing feelings towards her son. Since the sender expressed a need for her own interpreted signal, user-customized elements can be adopted for future design.

2. Automatic feedback is enough

Regarding the feedback, Sender Y indicated that automatic feedback was enough, as she just wanted to know that her son was safe back home.

I asked "Don't you want more direct feedback from your son? Such as a voice message, his face, etc." She replied affirmatively: "No, I don't need to see him. I know he's busy at school, I don't want him to have a feeling of having to reply. I don't want to bother him. Auto-reply works perfectly for us."

She also mentioned that her son once told her that when he came back home late and saw the light on, he felt very warm. "Since then, I choose to send the moon later in the day."

When I told her the experiment was over, she asked "Does it mean from now on I can't send the moon anymore?" I felt her disappointment, so I let them keep the device. They are the only group who continues to use the device in their real life.

From the mother's perspective, she wants to keep her missing feelings low-key and less obtrusive. She does not care about the response; on the contrary, the lack of feedback can help her keep sending without worrying about interference.

3. Physical objects might have more of a sense of time

Sender Y made it clear that in terms of emotional expression, she prefers physical objects such as paper or printed things rather than digital things, because she felt that such entities have more of a sense of time:

> I always feel that people from our generation, we are more used to express emotions with paper, and writing with a pen. I feel that such paper objects are more capable of expressing emotions. In fact, this is also why I like looking at printed old photos, and I don't want to look at them on my phone.

Sender Y feels that printed photographs are better than digital albums and handwritten letters are more genuine in terms of emotional expression. This is probably partly related to her background, as she was born and raised in a pre-digital era. However, her thoughts on the traces of time in physical objects come to the same conclusions as Sender L's thoughts, who was born in the information age.

The above opinions towards the physical and the digital are personal opinions from users. Since both users mentioned this, I marked it here for open discussion.

Figure 4.11 Testing pictures from Group 3 Receiver's room
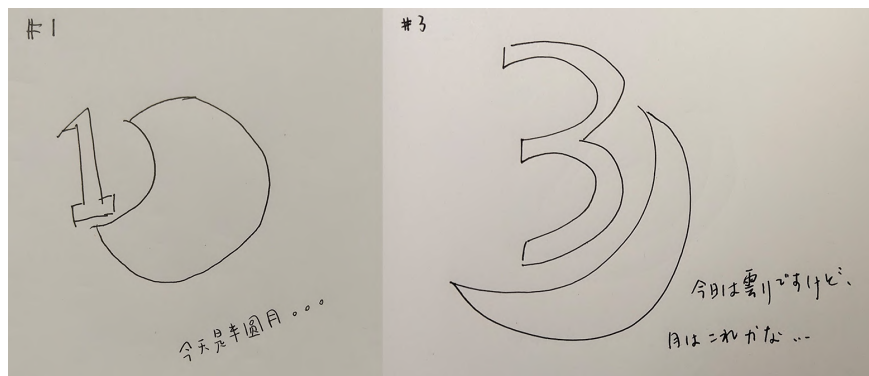
Figure 4.12 Hand drawings from Group 3 sender

4.4. Case Study Group 3 (D and Z)

4.4.1 Analysis and Observation

Group 3 is a friendship relationship. D (female) is the sender and lives in China. Z (female) is the receiver and lives in Japan.

The experiment lasted for two weeks. Semi-structured in-depth interviews were conducted after the experiment. The interviews lasted 61 minutes for the sender and 58 minutes for the receiver.

D and Z are close friends who have known each other for seven years. They used to be roommates, and at that time they were very close and always spent time together. After Receiver Z went to Japan, they lost contact for a while.

However, they have gotten back in touch and maintain frequent contact with each other. They usually use WeChat to text and voice call around three times a week. Sender D described her missing feeling as a kind of "deeper emotion", and from time to time, she had this "deeper missing feeling" toward Receiver Z. However, she seldom expressed it directly. Receiver Z said that when she missed Sender D, she would not express it, nor did she feel any urge to contact her.

During the experiment, Sender D used drawings instead of photography to send the emails, and she added one or two phrases in the drawings. When the light was on, Receiver Z usually waited before turning it off. After the test, Receiver Z indicated that she wanted to keep the device or to buy a similar one to continue using it in real life.

4.4.2 Results and Findings

Overall, both the sender and receiver reported positive feelings towards the NostosMoon device. In the sender's words, it is a "novel, special connection" that provides an "implicit way" that matches better with the missing feeling. The receiver expressed her positive feelings about NostosMoon by saying that she wanted to buy a similar device to continue using it. Both the participants liked the moon idea, and they felt that nothing could replace the moon in terms of cultural connotation and sense of aesthetics. As for improvement, the sender mentioned although this device was enough for expressing missing feelings, she

wanted to add some more functions and hoped it could express other emotions as well.

The sender indicated that the NostosMoon system helped increase their WeChat communication. She felt that it was weird and too dramatic to express missing feelings via WeChat. However, she liked using the NostosMoon device to deliver missing feelings. The receiver mentioned that she enjoyed this kind of connection. When she received the signal, she kept the light on for a longer time because she did not want it to disappear. Also, she could feel her friend's missing feeling by "not only knowing she missed me, but also knowing how she missed me." Both participants mentioned that if they saw the moon in the future they would recall each other and this experiment. To conclude, they felt that the NostosMoon device is different because 1) the emotion it contains is deeper and subtler unspoken emotion and 2) the way it connects people is more indirect and implicit, which matches the emotion.

1. The NostosMoon device can deliver missing feelings and build tacit understanding as a supplementary communication tool

Although the two participants have frequent contact on WeChat with each other, they rarely use WeChat to express their missing feelings. Sender D said that she felt that it was weird and too dramatic to express missing feelings in daily life. The participants use WeChat to exchange news and chat about small things.

Receiver Z mentioned the same thing: "She and I often chat through WeChat, but we rarely say 'I miss you' directly, so every time I see the moon light on, I feel she misses me indeed. This device is like a sign indicating that she misses me."

She further explained that at the beginning of the experiment, the device remained off for a long time. She felt a bit disappointed, a bit "empty in heart". However, when she saw the light on for the first time, she felt thrilled and immediately sent a Wechat message to Sender D. She kept it on for a while on purpose.

Interestingly, when the weather was too cloudy to see the moon, the sender sometimes sent "the moon in her heart", which means that she would send the moon randomly with the idea of checking whether the receiver happened to think of the same moon as her. This idea of sending the moon according to her own

wish is similar to the idea of the sender in Group 2. However, that sender only wanted to send the full moon because she believed the full moon stands for a better meaning, while the sender in this group wanted to choose her preferred moon on a given day.

I asked whether the different moon shapes stand for different levels of missing: "For example, the full moon means I miss you extremely, while the crescent moon means I miss you gently?"

She said no: "It represents the different state of mind when I miss her... and I want to see whether she feels the same as me."

It turned out that Receiver Z understood the sender's thoughts very well: "First, I felt that she was missing me. And then I thought about how she missed me. For example, when the moon was crescent, I felt that she needed my company very much. She was lonely. And when there was the full moon, I knew she was very happy and wanted to share her joy with me. Although they were all about missing me, they were different." Receiver Z understood that sender D's emotional state was related to her, so it was part of the "missing feeling" towards her.

Although the participants already had instant contact before the experiment, they still felt a lack of emotional expression. The NostosMoon device can be used as a supplementary communication tool for delivering the missing feelings and can serve as a symbol for "I miss you". Besides, the device not only delivers the missing emotion but also indicates the different states behind it. Understanding the hidden message also helps them feel they have a tacit understanding, creating a stronger sense of connection.

2. Not every object is appropriate to express missing feeling, the metaphorical object should meet certain criteria such as appropriate cultural meaning, a sense of change, etc.

Both the sender and the receiver mentioned that the moon was the most perfect object for conveying the feeling of missing:

> From the perspective of Chinese and Japanese culture, the moon is a

very good representative of missing feelings. (Sender D)

> I personally like the moon very much, mainly because of the influence
> of Chinese traditional culture. When I was a child, I practised callig-
> raphy and studied ancient poems. The moon is a typical metaphorical
> symbol for missing feelings. (Receiver Z)

Besides the cultural requirements, other elements are included in the criteria:
• It should have small, natural changes.

Both participants mentioned that their missing feelings changed day by day.
Accordingly, they wanted some changes in the device. When I asked whether
they wanted more playful changes, such as changing the numbers or the colours,
they replied that they did not:

> I think this (change of colours and numbers) can represent different
> moods, but it is difficult to express the missing feelings. (Sender D)

> What I want is a natural change. It should not be artificial or dramatic.
> It needs to stay natural and have a reasonable change. (Receiver Z)

Receiver Z further mentioned that small changes could trigger her thoughts and
imagination:

> The clouds could be one choice. Because the clouds are changeable,
> there is room for imagination. I can imagine how she misses me. I
> don't like fixed things, such as stars or the sun. Because I feel that if I
> miss someone...the missing emotion also changes day by day. (Receiver
> Z)

Both participants found that the changing of moon shapes was enough to reflect
their emotions. The metaphorical object should be naturally changed but still

related to the sense of missing feeling. Finally, it should make sense and be reasonable.

- It should keep continuity.

Despite the requirement of change, the unchanging aspect of the natural object is also important. The sender mentioned that the missing feelings change day by day, but are also always present and never stop. Thus, the metaphorical object should be changeable and in the meantime remain continuous. For example, the shape of the moon may change every day, but the moon is always there. Just like Sender D said, "I think the moon itself includes the meaning of 'change'. The feeling of missing may be different each day. But no matter how time goes by, the feeling of missing will always exist. The emotion is continuous, vivid."

3. Insights from the form of letter-writing

Sender D added one or two phrases while drawing pictures. I asked her why she wrote sentences, and we extended the question to her reasons for writing letters. The two participants agreed that writing a letter was the best way to express emotion. Concerning the fact that we seldom write letters to friends anymore, Sender D has a neutral attitude while Receiver Z feels pity:

> It takes a long time to write a letter, and it takes a lot of emotions and stories to write. The emotions carried by the letter are stronger and more complex. . . When there is a strong and restrained emotion, a letter is a good way to express it. But usually, I am very busy, I don't have time to write letters, and I don't have time to collect my emotions. So I rarely write letters now. (Sender D)

> When I was in high school, I wrote letters to my friends. You would wait and expect to receive a reply. You would spend a long time writing, thinking about what you could share with your friends. Personally, I still miss this feeling, but I can't feel it anymore. Now I am very annoyed by others who keep sending me messages. (Receiver Z)

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These responses reflect the fact that fewer and fewer people write letters due to the impact of digital technologies.

Both participants mentioned that the letter was a great form for delivering feelings of missing. While it is unlikely that people will begin to write letters again, we can learn a lot from the form of letter-writing and gain insights on why it is deemed a proper form for delivering subtle and deep emotion. By summarising the interview, I conclude that the features of letter-writing are as follows:

- Effort makes it special

Fewer and less frequent messages make people feel more prepared as the sender and cherished as the receiver. Just like Sender D mentioned, "In a letter, I usually will write about my deep understanding of things and my life. This means that the letter will not be an everyday thing. It requires a period of reflection and polishing before a letter can be sent out...So the letter is rarer."

Sender D mentioned that she had to prepare stories, to reflect, to feel and to have an emotion ready for writing a letter. Receiver Z also said, "You spend a lot of time and energy, you want to write something different." The efforts contained in the letter make it special and meaningful.

Moreover, Receiver Z mentioned that the waiting had meaning. It made you think more, and you would cherish the reply. She compared it with WeChat: "WeChat has so many advantages. But just because of its convenience, everyone no longer cares anymore...We seem to talk a lot every day, but in fact we find that there is nothing new to say."

- Tangibility as a form of accumulation

Receiver Z talked a lot about how the physical form of the letter can bring her a sense of satisfaction and authenticity. First, letters are in handwriting, which has a strong personal characteristic. Moreover, receiving physical things – and seeing them increase over time, like a set of letters – creates a stronger sense of possession than digital data:

> Physical things bring me a stronger sense of satisfaction. By looking
> at these physical things, I can know how much I have preserved. I have
> kept all the original letters at my home. And the feeling of looking at

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something gradually, physically increasing, you will have a strong sense of authenticity. If it's electronic data, although it can be accumulated but you will not have that very real feeling. (Receiver Z)

4. There is a difference between "think of" and "miss"

Both participants described their feelings of "missing". Sender D mentioned that the missing feeling is deep and profound. From time to time, both would "think of" and "miss" each other:

> Because I think missing someone is also a kind of memory. In the long run, our lives will not change so much, but every day is different. If I send the moon to my friend, that day will be a little bit different. We all remember this together, which makes up the bond between us, a feeling of being linked to each other. (Sender D)

Receiver Z described the difference between "think of" and "miss" by noting that thinking is just an association that activates the brain and can be unrelated to any emotional feeling, while missing is a kind of dynamic mood. Sometimes, these two activities are intertwined. Receiver Z experienced "missing" more often when she had just moved to Japan.

> I think if it's just seeing something, relating it to her, it's called "thinking of". And the missing feeling is an emotional state. It is spontaneous and there are dynamic moods. But there is always a bit of crossover...I missed her a lot in the first year when I first came to Japan, but in the later years, more often I just thought of her. (Receiver Z)

Receiver Z's narrative is consistent with an important feature of nostalgia: it often occurs when someone has experienced a transition in life. When someone undergoes a nostalgic experience, different orders of nostalgia (i.e. simple nostalgia and reflexive nostalgia) are usually mixed together.

4.5. NostosWind Design

4.5.1 Design Idea

"My voice tried to find the wind to touch her hearing." — Pablo Neruda

Figure 4.13   window side

One day, I was sitting by the window when a sudden wind blew up the curtain. I turned around, looked at the curtain for a while, and my mind drifted away along with the windblown curtain. The undulating curtains were like waves in the sea. The wind blew a bottle down and blew papers to the ground. I hoped the wind could blow far away, traveling across the oceans and mountains to my parents' side. In the tranquillity and in the gaze, I suddenly felt a kind of primitive, certain connection by imagining the wind traveling along the way back to my hometown.

That is when I decided to use the wind to build a connection. Like the moon, the wind has many poetic associations. The wind has no visual form, but it is rich in tactile and auditory senses. It is more unpredictable and can catch you by surprise. I hope to establish a subtle connection through a shared scenario,

providing a shared breeze that makes people feel relaxed, refreshed, and more importantly, to feel bonding.


Figure 4.14 wind chime

I used a wind chime and curtains to depict the wind. In *The Coming Age of Calm Technology*, Weiser and Brown write that the inner office window is

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a brilliant calm design because it extends our periphery by creating a two-way channel for clues about the environment: a person can easily see whether someone is busy or not without having to interrupt them (Weiser and Brown 1997).

The wind chime is also an example of *calm design*. It provides information about the outside environment without demanding constant focus. The chime's volume and frequency tell about the weather conditions outside. In the meantime, the random musical rhythm it creates triggers attention and a pause for a time of leisure.

I find the scene of a wind blowing a curtain very aesthetically pleasing. Thus I create the design idea which is "to share the same wind". I use the curtain to depict the wind's strength. In the real test, the strength of the wind is displayed by the movement of the curtain and the sound of a wind chime to create the perception of a shared wind.

Sender's Window   **Receiver's Window**
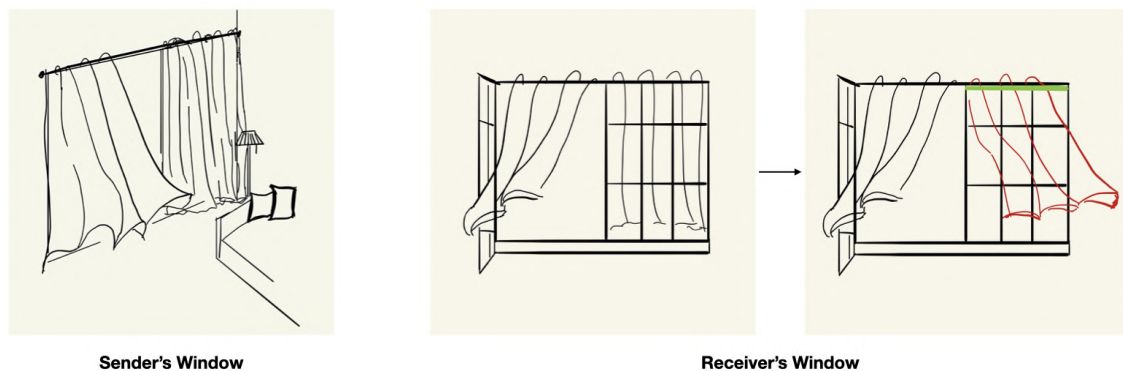
Figure 4.15 Scene illustration

4.5.2 The Prototype

NostosWind consists of a miniature fan, a wind chime, SwitchBot and SwitchBot plug (to remotely control the fan's button), SwitchBot Hub Mini (for the internet connection of the SwitchBot) and a light chiffon curtain in case the receivers do not have one at home. The fan is set behind the wind chime and the curtain.

According to the signal sent by the sender, the fan will turn on at different

Figure 4.16 Making the NostosWind Prototype

Figure 4.17 NostosWind prototype

levels: level 1 for a gentle breeze, level 2 for moderate wind and level 3 for strong wind. After the fan is turned on, the wind chime will ring and the curtain will flutter.

I also gave a wind chime to the senders and asked them to put it beside a window with a curtain that is light enough to be fluttered by natural wind.

4.5.3 Experiment Procedure

The experiment procedure is as follows. I asked the senders to follow the steps below:

1. Place a wind chime on the window.

2. Download IFTTT and the SwitchBot Application. Set the buttons 1, 2 and 3 for soft, moderate and strong wind, respectively.

3. If the wind chime rings, observe the curtain's movement and decide which wind level it is.

4. Push button 1, 2 or 3 to send a signal matching the strength of the wind.

5. If the sender wants to check whether the receiver has noticed or not, the sender can enter the SwitchBot App to check the status. If it is off, it indicates that the receiver has noticed the signal and turned it off.

I asked the receivers to follow the steps below:

1. Place the NostosWind device in front of a closed window, behind the curtain.

2. If the wind is blowing, turn the device off whenever they want.

4.6. Case Study Group 4 (Y and C)

4.6.1 Analysis and Observation

Group 4 is in a romantic relationship. Y (male) is the sender and lives in China. C (female) is the receiver and lives in Japan. The experiment lasted for two weeks. Semi-structured in-depth interviews are conducted lasting 25 minutes for the sender and 78 minutes for the receiver.

Sender Y and Receiver C have been in an international romantic relationship for over five years. In the early days of their relationship, they used to write letters to each other. Now, they use WeChat to text and video call, communicating almost

every day. They usually have a routine for communication at the same time of the day.

Sender Y seems to be satisfied with their current daily digital communication. It is not as good as FtF communication, but for now he felt that it is enough. He has few nostalgic missing feelings towards Receiver C because he believes that such feelings happen when their relationship is in danger. Now, they are going to move closer soon. Receiver C also has little nostalgic missing feelings towards Sender Y, because whenever she misses or thinks of Sender Y, he gives a timely response which made her feel close to him. There is no "distance" for her to develop nostalgia.

Figure 4.18 Picture from Group 4 Receiver's room

As mentioned previously, although this couple is in an LDR, they are in a stable relationship thanks to digital technology. They have routine communication and they share intimacy; in some sense, they are living "very close".

Although this romantic couple seems not to be the ideal target group, I decided to ask them to join my experiment, considering that qualitative data from the opposite side will also be useful.

During the experiment time, Sender Y had an extremely rigid and busy work

schedule, and so their routine communication was disrupted. According to Receiver C, their "interaction times reached the lowest level".

In total, Sender Y sent the wind signal seven or eight times, including two or three invalid commands due to device disconnection.

4.6.2 Results and Findings

The overall result shows that Receiver C had a relatively positive feeling towards the NostosWind device. She agreed that if it is in an appropriate context (i.e. time and season), the device can arouse her missing feelings. She felt that a poetic connection is built via the wind chime, and it can trigger her thoughts about Sender Y. Compared to instant communication tools, she prefers the slowness, gentleness and lack of pressure to reply of the NostosWind device.

However, Sender Y admitted that he was extremely busy during the experimental period, so he was not in the mood for nostalgia or any subtle emotion. He found the device amusing rather than aesthetically pleasing. A new connection was built, but it was very limited in terms of functionality and playfulness. He regarded it as a kind of remote-control prototype of a smart home device.

1. Wind stimulates nature-mediated empathy

According to Receiver C, the wind, moon and other natural things in daily life can easily trigger her empathetic feelings because they are real elements that exist on earth; no matter where you are or which country you live in, you will encounter them:

> The empathy, or in Chinese we say, you think of someone when you see something related. The wind is a scene I will encounter in my real life, and at the same time wind scenes often appear in literature and art, so you can easily feel the empathy. The poetic or aesthetic feeling is easily triggered. (Receiver C)

Besides the wind, Receiver C also mentioned the wind chimes, because I gave the same wind chime to each of them. The wind chimes alone can trigger her thoughts and missing feelings:

> Even though he didn't send any signal, when I moved the curtain or
> touch the wind chime, it rang accidentally, then I would pause and
> think a little bit about him: I wonder if he also hears such a voice?
> It seems that the ringing from the wind chime is a calling for love
> [laughs]. (Receiver C)

Receiver C appreciated the wind idea. She mentioned that she liked the auditory
stimulation of the wind (wind chime) in the current experiment. She also said
that the wind's features can be displayed in multiple ways.

> I think the wind is not just the sudden drop in surface temperature
> on your skin but is multisensory. The wind can bring a lot of odours,
> and then there are some visual sensations. In your experiment, it is an
> auditory sensation. But we can imagine the breeze on the seashore.
> You can see the waves hitting the shore, which is visually exciting.
> Then your hair will fly up, and then there is a feeling of temperature
> drop, and the wind may bring a little smell of the sea. (Receiver C)

The wind in nature is depicted in so many works of literature and art and is
also a shared environment. Therefore, it can connect people and trigger associa-
tions, imagination, and empathetic feelings. In short, the wind has multi-sensory
features that can be depicted creatively.

2. The idea of FUSION in life

When asked what other things could replace the wind in the experiment, Receiver
C listed several features that I summarise with the concept of fusion.

Fusion means that the thing should be "natural existed and close to real life";
as Receiver C put it, "The important thing is that it needs to be harmonious
with my current life and should integrate with it." According to Receiver C's
description, the keywords are "less obtrusive", "anticipatory" and "naturally".

Emotional design can follow the same natural rhythm in life. What she likes
about the wind is that it exists in a real environment and real life. In addition, it
starts slowly and gently rather than abruptly:

> When the moon rises, you won't feel unnatural, you will just think, oh, it's evening now, the moon surely will rise. I like the quietly changing feeling, and that's why I don't like pop-up messages. It breaks my rhythm. (Receiver C)

Interestingly, Receiver C thought of tangibility as also belonging to her "fusion" idea:

> We are living in a tangible world; no matter how digital technology evolves, our environment is still tangible. That's why we prefer tangible things. They fit in our environment better. (Receiver C)

In her understanding, "tangible" means a better "fusion" with current real life. If one day we lived most of our lives in a completely virtual world, then the tangible may in turn seem abrupt and inappropriate for the idea of "fusion".

3. Soft and slow expression is preferred

Receiver C expressed her yearning for slowness in today's fast-changing world. She also mentioned certain groups of people who are under pressure:

> For people like us who have entered 30, looking for career, family...our daily routine and daily life are actually quite tiring and stressful. So I prefer the interaction to be a little softer. (Receiver C)

She described one time when she was reading at home and the windchime rang:

> It's like the pleasure of walking down the street and suddenly smelling someone's perfume that happens to be the one you like. You can't expect it, but when it comes, it can directly hit your heart. (Receiver C)

The soft musical sound of the windchime came out of the blue, making Receiver C's heart grow fonder:

> I like the feeling of coming in slowly, which makes me more emotional.
> If I was not mentally prepared, when WeChat suddenly vibrated or
> there was a reminder notification sound, my heart is tight: "Oops, I
> have to reply right away." But if this is wind blowing, I know he will
> come, and I know he will come quietly. (Receiver C)

About feedback, Receiver C mentioned that a non-verbal reply is better. "If he sends me the wind and I have to reply to him verbally, then it is no different from WeChat, except the notification is changed to wind."

4. To arouse sensibility requires appropriate timing for both the sender and receiver

Receiver C pointed out that timing is very important for feeling the right nostalgic emotion. Leisure and private time are needed. She added that even when she had such time, if she noted her partner did not, she did not feel aesthetically fulfilled either. For example, Sender Y once tried to experiment with the device in his office in the morning. When the NostosWind device turned on, Receiver C felt puzzled and did not believe he was missing her, noting that "Both of us have to be in a relatively relaxed state."

However, when she heard the windchime ring when she was at leisure and knew that Sender Y was as well, the feeling was totally different: "I was cooking at home and I suddenly heard the 'ding ding ding ding', and I said to myself, oh, my lover is calling me, and I felt a bit happy."

Another issue is the season. Receiver C felt the fan is too related to summer:

> I think it's because the bells and the fans seem to have a summer-
> limited sense, so if you put them in autumn, um, they don't seem to
> match very well...but I don't think it will be too much trouble. If the
> time is right, it could be really aesthetically pleasing. (Receiver C)

Sender Y also mentioned "Once, I pressed level 3. But she said it was cold, so after that I only pressed 1 and 2."

Seasonal elements have their limitations but also have strong memory associations. The next time the summer comes, it can serve as a memory trigger.

5. It can serve as a small connection or as supplementary to instant communication

Sender Y did not treat NostosWind as a nostalgic emotional interaction. Rather, he regarded it as a small connection to connect to Receiver C while he was busy: "Like playing pranks, when I think she's busy, I pushed level 3. Hey, look, she gave me a negative feedback. I thought it's interesting."

He mentioned that if the wind chime rang, he would think of Receiver C. If he had time, he would send a signal out as a greeting. When I asked about nostalgic emotion, he replied: "We have a fixed time every day for chatting; if I miss her, I will talk to her then."

He further explained that unless their communications cannot be guaranteed, or their relationship is in danger, he will not have any nostalgic missing feelings towards his girlfriend.

This reminds me of the premise discussed in 3.2.1: for those couples who are in a stable relationship and determined to be together in the future, their psychological distance is not that obvious which in turn reduces sentimentality and sadness in the nostalgic missing feelings.

4.7. Case Study Group 5 (Q and Z)

Figure 4.19 Picture from Group 5 Receiver, on traval and at home

Figure 4.20 Picture from Group 5 sender

4.7.1 Analysis and Observation

Group 5 is a parent–child relationship.

Sender Q (female) is the sender and lives in China. Receiver Z (male) is the receiver and lives in Japan. The experiment lasted for two weeks. Semi-structured in-depth interviews were conducted after the experiment. The interviews lasted for 37 minutes for the sender and 40 minutes for the receiver. Sender Q and Receiver Z usually use WeChat to text and video chat with each other. They usually have a fixed video chat time, which is every Thursday night. They are in a very good mother–son relationship. Before Receiver Z went to Japan, he lived with his parents. This is the first time he left home to study abroad, and due to COVID-19, he did not go back home for over one year. Receiver Z expressed his missing feelings towards his parents and hometown. Sender Q also expressed her missing feelings, and sometimes she expressed them directly while video chatting. Both participants like using digital communication, and they think this is the most efficient method of family bonding.

This experiment is unique because in the first week, Receiver Z was travelling

and brought the device along with him. In the second week, he went back and set up the device at home.

During the experiment, Sender Q sent the wind signal quite often, sometimes late at night. Receiver Q usually kept it on (with the wind blowing) and turned it off after a while.

4.7.2 Results and Findings

Overall, both participants expressed their positive feelings towards the experiment in words like "I felt very engaged", "a meaningful thing" and "original, creative connection". Although the experiment ended, Sender Q still keeps the wind chime hanging over the window as a memorial. Receiver Z mentioned that he hoped the experiment can continue being used in real life. Both of them mentioned that a new connection was built. From the receiver's point of view, he understood the signal as nostalgic missing because it has no other purposes: "It cannot be anything but an emotional signal". Although he sometimes heard from his mother that she missed him very much, he still felt touched, especially when the wind was late at night. He appreciated the device as "using limited technology but successfully delivering emotion". From the sender's side, she felt it can deliver her feeling of missing. In the meantime, she also felt a sense of participation in her son's daily life. Both participants like using WeChat and video chat, but they admit that instant communication has limits. For example, video calls take too much time. In addition, while they are always happy when chatting with each other, after hanging up, some emotions like nostalgic missing are hard to express.

1. The wind can change the environment by delivering emotional signals

In the field of emotional design, high-quality technology is not the key element. A design's technology can be very simple but still effective. During the first experimental week, Receiver Z was on a trip and stayed in a hotel room. He mentioned that he felt surprised during his travel because this small ordinary device changed his feelings:

> To be honest, when I saw the device, I felt quite ordinary. I know

how it worked and I see through the technology behind it...When I returned to the hotel, I found that the wind chime was ringing and the wind was blowing the curtain, like it's waving at me. I suddenly felt very touched. This little thing with such simple technology can still make me feel closer to my family. All of the sudden, the hotel seems more lovely and warm... (ReceiverZ)

After noticing the wind signal, Receiver Z felt that the strange room became warm and affective. The important thing is that he understood that the wind signal represented his mother's missing feeling:

At 23:50 in the evening, suddenly the windchime rang. I have never received a message from my mother at this late hour, and I rarely think of her at this time. But when I suddenly received this I felt very touched. Even with such a one-way design that does not require me to reply to her, she still keeps sending me signals. She must have been missing me very much. (Receiver Z)

The above narrative indicates that Receiver Z understood his mother's missing feelings through the simplicity and one-way nature of the design. I further asked why. He replied: "When there is not much information contained, the only explanation will be that she's missing me."

From Receiver Z's eyes, the wind is not just an air flow made by a machine; it stands for the love message from her mother. "It creates an original, creative connection...I felt very touched. I felt that her missing feelings reached my side." (Receiver Z)

2. Non-verbal and abstract clues contribute to sensibility

When I asked about an alternative choice to wind, Sender Q replied: "Maybe rain? It should be something abstract." She further explained that nature is good because it creates aesthetic feelings: "It's extensive and beautiful. I don't want to send him a picture of noodles every day."

Receiver Z believed that elements should have non-verbal characteristics that do not rely on language for expression: "If you can't express it, you can only feel it with your heart."

He further explained that this experiment changed his feeling towards the wind:

> I didn't have any special feeling towards natural wind. I prefer electric
> fans and air conditioners. But my mom once shared her experience
> with me: one day, she was taking a walk with my dad, and there
> was suddenly a strong wind. They didn't bring their phones, so they
> returned home and sent me the signal. "There's a big wind", said my
> mom...after this experiment, sometimes when there's wind, I will stop
> and feel it a bit more. (Receiver Z)

By the story, Receiver Z understood the wind was like an "excuse" for his mother
to have a kind of connection with him. He felt his mother's missing feelings. The
wind is no longer just a wind, but an indication. "Since then, when I feel a wind,
I always think of this story, and thus think of my mother." (Receiver Z)

The connection built by the wind and the emotion hidden behind it changed
Receiver Z's perception of wind, which helped deepen sensibility and could serve
as a potential trigger for nostalgia in the future.

3. A new chance to reach out, weaved into the daily routine

Receiver Z mentioned that he and his mother never had a video chat late at night
because his mother did not want to interrupt his sleeping. Once when he received
the wind late, he was not busy, so he made a video call to his mother. The
NostosWind device thus can also serve as a small greeting that creates alternative
opportunities for communication.

I asked Receiver Z if he wanted to give any direct feedback. He replied that he
did not want a feedback setting in the NostosMoon device:

> If I want to give feedback or reply, there are alternative ways. After
> all, we still use WeChat and the video connection; I prefer to connect
> with them when I have time by using video. (Receiver Z)

Receiver Z believes that one-way connection is better because it can trigger
pure emotional feelings without thinking of any reply. Sometimes when he saw
the wind was blowing and he was free, he would pick up the phone and begin a

video chat with his mother, even if it was not Thursday. If he was busy, he would just ignore it.

Sender Q said that she was aware that with just one press of a button, the curtain would move and the windchime would ring on the other side. Knowing this let her feel that she was participating in her son's real-life routine.

As for feedback, she would go to the application and check the status: "The first time when I sent it, my son immediately sent a message and asked if that was me. I said yes. From then on, I understood that he could receive it. That's enough." She does not need any more feedback.

4. Tangible things as future memory triggers

After the experiment was over, Sender Q still kept the wind chime hanging over the window. She mentioned the wind chime as a tangible memory. "I still let it hang up there. When there's wind, it rings and reminds me of this experiment, and of course, my son as well."

For tangibility, she expressed her preference for physical things. She mentioned that the satisfactory feelings they bring last longer than digital things.

> The physical things can live in my memory for a longer time. Like the wind chime, whenever I see it, I remember my son, I feel very satisfied. I feel happier when I hear it ring. It is more like an existing thing. But for the digital things, I can't feel their existence. (Sender Q)

She last mentioned handwritten letters, saying that "It is a pity that people seldom write to each other. If I could receive a letter from my son, I would be thrilled. I would definitely treasure it." When I asked why, she explained that:

> I can feel the love and caring through handwriting. It is more sincere. I can imagine, he needs to choose the envelope, prepare the writing paper and pen, sit by the table, think for a while and start to write, all the preparations...It's more formal, is made with great effort. (Sender Q)

To conclude, in this context, "tangibility" by her definition mainly refers to

1. Future triggers for memory;
2. Tangible existence and company;
3. Effort of preparation.

4.8. Evaluation of Framework

I conducted in-depth qualitative interviews using phone calls with a total of 10 participants. Over eight hours of voice recordings were made.

According to the overall feedback from the participants, nine of the 10 participants gave a positive assessment and one gave a neutral assessment. In the following, I will use the interview content to evaluate the three design factors: Nature-mediated Metaphor in Content, Aesthetic Distance in Interaction, and Ubiquitous Tangible Medium with Time Traces.

Coding is an interpretive way of drawing out meaning from data (Manning and Kunkel 2013). As Johnny Saldaña states in The Coding Manual for Qualitative Researchers, a code means "a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data"(Saldaña 2021). Based on that definition, I implemented coding to better analyse the large amount of descriptive data. The codes consist of "nature", "implicit", "slowness", "effort", "less" (feedback), "tangibility", and "time traces" (future nostalgia).

1. On nature and implicitness (evaluation of content)

Implicit expression and metaphorical language are preferable elements in nostalgia design. Some subtle emotions that are not easy to express directly in words are more suitably expressed in an indirect manner. Specifically, in this study's experiments, the design of the content is to use the changing moon phases or a puff of wind to send signals. The receiver will receive these natural metaphors instead of any practical, informative message.

According to the interviews and observations, the moon and the wind performed the task of conveying missing feelings very well in the experiments. For example, in Group 1 (friendship), the participants regarded the moon as a symbol of the

feeling of missing, calling it "unique", "romantic" and a kind of "spiritual company". The participant from Group 4 (romantic relationship) who received the wind mentioned that this kind of method (using nature to express emotion) was "touching" and "necessary".

The participants from Group 3 (friendship) indicated that the moon was a "perfect metaphor" to express the feeling of missing, especially from the perspective of Chinese traditional culture. Moreover, they feel that nature can build a sense of connection because "we share the same nature".

Also for the wind design, in the experiment of Group 5 (mother–son relationship), the mother felt the breeze outside and then thought of her son, who was far away. After she sent the signal, her son, whether travelling or at home, felt the breeze. He used the words "warm", "close" and "touched" to describe his feelings. He liked to let the wind blow for a longer time because he wanted to "feel the company". On the other hand, when the mother discovered that her son had closed the experimental device, she felt satisfied and had a feeling of "participation", which I understand as connection.

Most participants agreed that the implicit method of expression is in line with the subtle aspect of the feeling of missing. A participant from Group 1 (friendship) mentioned that it is good to feel it without any verbal clues. A participant from Group 2 (mother–son relationship) indicated that the implicitness of the interaction can trigger sensibility and encourage you to feel with the heart. He mentioned that the signal did not make any sense at first and he did not understand why his mother kept sending him the same signal every day. However, after a while, he felt the subtle connection and emotion behind it. Similarly, a participant from Group 5 (mother–son relationship) also mentioned that the seemingly meaningless interaction made him feel the emotion: "It cannot be anything else [but emotion]".

2. On slowness and effort (evaluation of the method of interaction)

Slowness was well appreciated by the receivers. Waiting made them feel intrigued and increased their happiness when they received the signal (Group 1, Group 3). Some senders mentioned that they had to wait for the moon to appear or the wind to blow, which made them feel more attentive to natural beauty (Group 1, Group

5). The receiver from Group 4 (romantic relationship) expressed her preference for slowness in interaction, which gives her time and allows her to be prepared to feel the emotion.

In the experimental setting, I required all the senders to observe the moon and wind, and all the content of the message (moon phase, wind strength) should be based on observation. Most of the participants had to go outside to observe the moon or feel the wind before sending the signal. This undoubtedly reduced the speed and increased the effort of communication. However, the extra step did not cause any negative feelings; in the interview narratives, many of the participants said that they liked to "find the moon" (Group 1, Group 2) or that the extra step triggered a special emotion (such as nostalgia for childhood) and poetic feelings. In addition, a participant from Group 2 (mother–son relationship) indicated that the effort should not only be considered from the sender's perspective, but that it would also be beneficial for the receiver to feel the emotion by investing extra effort. In this "effort" process, more reflections on the relationship are invited. The meaningless turned out to be rich in meaning.

Participants from Group 3 (friendship) mentioned that ease of communication makes people feel less cared for or cherished.

With the development of modern technology, the means of communication are becoming more and more creative. In subtle emotional design, adding slowness and effort invites – or in one participant's word, trains (Group 2) – sensibility and reflection. This does not mean designing additional obstacles, but rather paying attention to the meaning of interaction and making emotional communication softer.

3. On providing less feedback (evaluation of the method of interaction)

In common sense, communication usually refers to a two-way interaction, sending and receiving responses repeatedly. However, in the case of nostalgic emotion, the aim is not exchange; rather, it is to express an emotion in a proper manner. In that sense, the responsive mode is not always necessary. Sometimes, less is more. If there is no need to reply, the receiver can save energy on replying but concentrate more on feeling the signal. Likewise, if senders are truly missing someone, they would not care or have a strong demand for a reply.

In the experiments, some receivers (Group 2, Group 3, Group 5) did not turn off the fan or lamp as soon as they noticed the signal, instead waiting for some time. When asked about this in the interviews, they explained that they wanted to keep it and feel it a bit more. They said that if they needed to give an instant reply, it would spoil the experience. From the senders' side, some senders (Group 2, Group 3, Group 5) were not interested in whether there was a feedback function. One of them specifically emphasised that she did not need any feedback from her son. She explained that she just wanted her son to know that she was missing him, and she did not want to impose an obligation to reply nor to disturb his life.

A participant from Group 1 (friendship) clearly stated that she preferred that no reply be required. Likewise, both participants from Group 4 (romantic relationship) felt enough pressure to reply in real life. Thus, for the communication of subtle emotion, it is better to stay quiet, gentle and undemanding.

A participant from Group 3 (friendship) complained about the overwhelming messages of instant digital communication tools, which already caused them to feel pressure to reply. Both participants indicated that the feeling of missing is private and that replying should not be compulsory.

In addition, a participant from Group 5 (mother–son relationship) indicated that if they indeed had a need for feedback, there are numerous channels to be used for contacting each other. Our nostalgic design works as a supplementary tool for communication, and it is specifically used for pure emotional connection. This also echoes the discussion I made in 2.2.1: abstracted presence may constrain communicative meaning and rely too much on users' own interpretations, but in the same time, it may inspire and trigger further communication through other channels to search for deep interpersonal sharing.

4. On tangibility (evaluation of medium)

Tangibility is a favorable element in ideal nostalgia design. Things in a real physical form can help participants to focus on the sensuous feeling and the reality inside it. In addition, the most important thing about tangibility is that it can be preserved and it is unique in terms of "time traces" - Even it was from masspro-duction, it would be marked with personal features as time goes by.

A participant from Group 5 (mother–son relationship) kept all the experiment-

related devices even after the experiment ended. For her, the experiment was a lovely memory of participating in her son's life. Keeping the physical objects made her feel fulfilled. Besides, most of the participants mentioned that the handwritten letter could convey richer and more genuine emotion than any other communication method. Participants from Group 2 and Group 5 (mother–son relationship) expressed their feelings of pity about how fewer and fewer people write letters in this digital age.

The participants agreed that in terms of emotional expression, tangible media work better than digital media. They reached this conclusion based on different reasons. A participant from Group 1 (friendship) commented on the natural atmosphere created by the experimental device. She liked the grass on the device. The whole device was in a DIY style, and she felt a sense of craft from it. The craft, the handmade represented by the tangible medium created a nostalgic feeling of warmth.

A participant from Group 2 (mother–son relationship) stated that tangible things can bring a stronger sense of existence and company. There is a sense of authenticity in tangible things that can be touched and seen.

A participant from Group 3 (friendship) mentioned that by collecting physical things and watching them increase, she felt great satisfaction. The physical amount visualised the past emotion, brought her a stronger sense of authenticity and reminded her of the passing of time.

A participant from Group 4 (romantic relationship) indicated that tangibility is important because it is better integrated into our reality, as it naturally exists in the ambient environment.

A participant from Group 5 (mother–son relationship) mentioned that tangible things can serve as a future memory trigger. She still keeps the wind chime hanging on her window after the experiment, and she loves to hear it ringing because it reminds her of this experimental time. A continued sense of connection from the leftover tangible thing is built even after the experiment is over.

5. On future nostalgia (evaluation of both content and medium)

The nostalgia-inspired designs that I created are not aimed at making people remember the past. Instead, they are for creating an organic trigger for future

nostalgia to encourage long-term emotional bonding. Therefore, in the experiment, I designed steps for all the senders to observe and be involved with nature. I hope to engage them with a real interaction with nature before sending the signals. Moreover, the signal received by the receiver is also displayed in the form of the moon or the wind. I encourage the receivers to observe the moon and to feel the wind as well. In this way, the two people involved in the experiment will build a shared memory involving the moon and wind, which will become the basis for future nostalgia.

During the interview, most participants indicated that even once the experiment was over, the moon or the wind chime blown by the natural wind would remind them of their partners and they would remember the special experimental period when they connected through nature (Group 1, Group 2, Group 3, Group 5). When the experiment was over, I, as the third party in this experiment, received several messages sending me the moon pictures or telling me the moon was beautiful that night. This indicates that the experiment left special memories in the participants' hearts and continued to influence their emotional bonding.

Chapter 5
Conclusion

5.1. Summary

This dissertation encompasses nostalgia theory, aesthetics, LDR and media design. Its goal is to build a deeper understanding of how to use nostalgia as a new way to approach LDR emotional design.

The research topic of aesthetic nostalgia in LDR-mediated design is an interdisciplinary and underdeveloped field. Indeed, the emotion of nostalgia alone is notorious for its complexity and ambiguity. The most frequent objection to my research approach is to note that LDR seems to be distinct from nostalgia, as nostalgia usually refers to the feeling of missing past times. However, as I mentioned in Chapter 1, the nostalgic experience usually focuses on key people; it is our loved ones who trigger the strongest sentiments. Besides, nostalgia has different categories, each of which emphasises a different meaning. This dissertation targets the aesthetic distance and sensibility of nostalgia rather than its memory-related attributes. What's more, by casuistically stretching the concept of nostalgia, we could go beyond stereotypes of nostalgia design and dig deeper into its potential.

As the literature review shows, technology-mediated designs largely focus on presenting togetherness through bodily information and physical contact. While the goal of such designs is "bringing people closer", they ignore basic questions about the meaning of closeness and distance. As a result, few designs target more complex and subtle affective cues or a specific type of emotional experience. There is a gap between what is needed in research and what has been implemented for LDR in practice. Nostalgia has long been treated as a memory trigger and a retrospective topic that is equivalent to simply recalling the past. However, it has different definitions other than remembrance, and it has been shown to be beneficial for emotional bonding. As Sedikides and colleagues note, "nostalgia

serves three core existential functions: self-enhancement, alignment with the cultural worldview, and fostering of close relationships." (Sedikides et al. 2004) The subtlety, wistfulness and genuineness of the emotion provide a unique power that can guide design. It is thus worthwhile to establish effective means of delivering this subtle emotion across distance.

Drawing on nostalgia theory and the study of LDR design, I propose an aesthetic nostalgia-driven design framework for LDR-mediated design. I have validated the concept with qualitative methods: functional prototypes, observation, the diary method, and in-depth interviews have been used for evaluation. The key findings of this dissertation are listed below and more details of the findings are provided in Chapter 4:

- Nostalgia can be re-examined from an aesthetic perspective thus stimulating alternative nostalgia designs to go beyond "making an old-looking design outcome".

- Nostalgia design should not only focus on designing a memory trigger, especially a trigger with explicit signals that have a direct link with the past or memory but fully exploring other possibilities.

- Nostalgia's aesthetic essence lies in "distance" and "sensibility". There is design space for considering how to facilitate the Sensibility, and how to design the Distance, in order to develop new design approaches for LDR nostalgia design.

- Nature-mediated metaphor, aesthetic distance in interaction, and time traces in the medium show positive effects and potential in mediating emotional communication for LDRs.

- The emotions in LDR are not always orienting toward "getting together", especially when it comes to the topic of "nostalgia" which is enamoured with "distance" factor. Interaction featured with "distance", such as slowness and effort, can be preferred in LDR groups.

- Minimal communication can be seen as a trigger for deep interpersonal sharing. The design work in this dissertation creates a special emotional connection that can be served as a connection itself but also as a trigger of other connections

(via other channels).

The contribution of this dissertation is two-fold. First, it provides theoretical
and empirical insights and findings derived from in-the-wild user studies with two
original design prototypes. These studies represent novel contributions to help
develop an understanding of LDR nostalgia-mediated emotional designs. Second,
it provides a generative design framework that is derived from the concept of
aesthetic nostalgia as an intermediate-level contribution to knowledge. Follow-
ing a concept-driven approach, I identify opportunities, design space, and design
considerations to inspire, inform and enrich the understanding of the potential
of nostalgia and interactive technology to create experiences that support LDR
emotional bonding.

Nostalgia towards distant loved ones is a tacit emotion that is difficult to de-
scribe with a rigid, clear-cut definition. Each individual's nostalgic feelings and
modes of expression are different, and it is difficult to address them with a one-
size-fits-all solution. The design and framework developed in this dissertation may
work for some groups of people while seeming boring and pointless to others. As
I mentioned in Chapter 4, the designs presented here are more fit for people who
already have and appreciate this kind of subtle emotional communication. Be-
sides, my aim is to inspire other designers by capturing the breadth of the design
potential in nostalgia-LDR design rather than to identify a solution to specific
problems in LDR communication.

According to Roland Robertson, nostalgia studies can be divided into nostalgic
theory, which refers to research and study constrained by nostalgia, and the theory
of nostalgia, which refers to studies that are peripherally related to nostalgia
(Robertson 1992). I define my research as the latter, as it features nostalgia
aesthetics, is "related to nostalgia" and is described "in terms of it" rather than
featuring nostalgia evident in the design itself. I advocate understanding nostalgia
as not only a taste for styles that connotes "pastness" but also an emotion that
is driven by longing or loss caused by distance. This allows us to see nostalgia as
an aesthetic awareness, a reflective observation and an affective feeling layered in

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cultural, social and relationship dynamics that can be explored as resources for design innovations.

Instead of using a narrow definition, I stretch nostalgia's meaning to a rhetorical concept. As Kurlinkus notes, by adapting, modifying and redefining the word "nostalgia", we stretch its meaning from a theoretical concept to more practical uses that can serve as design resources for more inclusive innovations (Kurlinkus 2018). This is exactly how design works in the real world. Design is "fundamentally rhetorical" because all products are "vivid arguments about how we should lead our lives", and nostalgic designs are "arguments about how users should relate to the past (Kurlinkus 2018) When we look back, we are always also looking ahead to futures we could be a part of.

5.2. Limitations and Discussion

1. Nostalgic missing feelings among LDRs are predicted to contribute to closeness in relationships and foster emotional bonding (Sedikides et al. 2004). However, they may also cause overwhelming sadness and rumination, thus decreasing feelings of peacefulness and calm (Newman et al. 2020). Such feelings can impair relationship maintenance after controlling for the effects of negative experiences, especially if a person is unable to accommodate the potentially overwhelming sentimentality. To be sure, numerous studies show that nostalgia has positive effects on well-being, which has led some researchers to conclude that "nostalgia is considered an emotion, and a predominantly positive one at that" (Newman et al. 2020, Sedikides et al. 2015). Nevertheless, nostalgia can also have a dark side depending on how people handle the emotion personally. Thus, there is a heightened need to consider the target users and provide a balance between distance and closeness.

I would like to note that I consider nostalgia a mixed emotion. As such, it is not my goal to either promote or inhibit nostalgia. Rather, I seek to identify the design potential of nostalgia, even with its "negative" features. Particularly in this dissertation, I focused on the so-called dark sides of nostalgia, which are "distance", "loss" and "incurable longing" (though I ended with positive notes from a design perspective). I take "distance" as a chance to understand that

there is a fear in intimacy, and nostalgic LDR design serves well in terms of its "understated manner".

2. There is a deep connection between nostalgia and Eastern aesthetics, and the concept seems to be embedded in Eastern culture. Though I believe that the aesthetics of nostalgia share many similarities with Eastern culture, I do not intend to exclude Western perspectives. In any case, a discussion of the differences between Eastern and Western cultures is not the focus of this dissertation. How to define what is East and what is West, and whether there is a clear dividing line, is a complex topic beyond the present dissertation's scope. However, as Dominik Schrey points out, "the distinct sense of nostalgia that Western societies have developed has to be understood as an integral aspect of the Western culture of preserving and storing" (Schrey 2014), and the Western attitude towards "bygones (nostalgia)" is more inclined to restoration and preservation itself. In contrast, I find that Eastern culture (which is my own cultural background) shows a lot of acceptance, reconciliation and even gratitude towards the "bygone", which is intriguing. This is why I choose to depart from Eastern aesthetics to interpret the value and potential of nostalgia.

The other related concern is about the attitude towards nature. Some scholars have analysed the difference between Eastern and Western attitudes towards nature. They mentioned that since old times, the West's attitudes towards nature have been more about confrontation, struggle, conquest and a people-oriented (people-centred) attitude. Nature is often associated with rhetorical words such as "awe" and "vastness". By contrast, the East treats nature more with a humble attitude of harmony between man and nature, emphasising coexistence and the unity of man and nature. They describe nature more often using terms like "tranquillity" and "away from the hustle".

I have not explored the literature on Western and Eastern cultural differences thoroughly. However, since all of the users in my user study come from an Eastern cultural background, and nostalgia is always contextual and cultural, such cultural differences may affect their perspective (i.e. their impressions of nostalgia and

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nature). I would like to explore this possibility in future research.

3. Personal attitude towards the virtual (digital) and the real (physical or tangible) Some scholars argue that there is no difference between the virtual and the real. In this view, the virtual is no less real than whatever happens in the so-called real world. I personally disagree with this stance, and some users expressed opinions echoing my own in the interviews for this study. In particular, they described a preference towards physical things when it comes to emotional and relationship-related areas. There may be many reasons for this; for example, as corporeal beings, tangible objects offer a stronger sense of companionship. From another point of view, preparing physical objects takes a longer time and requires more energy than virtual messages, which in turn reflects more care and consideration.

I believe that the answer to this interesting question may depend on individual experience. As I mentioned in Chapter 1, for my grandfather, video chat means less compared to my parents; he would not even call a video chat a connection. Similarly, the meaning of paper (or works created with paper) is different for different people. Looking back at my own life, my generation still has nostalgia for paper (and maybe for physical things in general); as a millennial, I grew up with these materials. My family got our first family-shared desktop when I was in junior high school, and I got my first personal computer at university. However, "digital natives" who have grown up in the information age might feel differently towards the digital, and they may feel more nostalgic for digital devices. This is an example of the importance of considering differences in personal experience in design.

Nostalgia is fickle. What you feel nostalgic for also marks your own experience to a certain extent. For me and for many users of my age or background, the virtual is not as real as the physical, which creates a strong sense of presence.

4. There is a concern related to translation. As all my users in the user study used Chinese in the interviews, I have to translate their narratives into English. This causes difficulty and sometimes ambiguity issues in expression; for example, I translated all the phrases "Xiang NianHuai NianDian JiQian Gua" as "nostalgic

missing feelings". While there are slight differences in tone between the Chinese phrases, I find it difficult to find the exact word in English. Nevertheless, in-depth interviews are very dependent on verbal expression, especially when related to inner emotions; words matter. I have tried my best to be objective (e.g. by double-checking with users to confirm) and mitigate the language issue, but the problem of translation may still exist.

5. In this dissertation, I only considered LDRs involving two parties (A to B). However, I was reminded that a third party may also be involved. For example, this can occur when two sisters recall their father or grandfather to bring the sibling relationship closer.

6. There are other concerns related to the limitations of the design experiments.

• The experiment did not consider the user difference factor. Some people seldom feel nostalgia or missing feelings, and the experiment is not likely to affect them.

• Although the test is designed for "nostalgic missing feelings", obviously people cannot be forced to miss someone. Therefore, many of the senders in this test were not in the exact right emotional state.

• Device setting is troublesome, and it still relied on the stability of the network. Thus, the presence of digital technology can be felt. Also, for the NostosMoon device, the Moon's reflection should be more obvious.

5.3. Future Directions

I intend to explore the following areas in future research:

A broader sense of LDR

In the future, I would like to explore LDR design for relationships that are less explored in the research field. This includes extended, distributed family members,

including connections between grandparents and grandchildren and adult siblings. I am also interested in how to maintain connections between old friends. As we grow up, leave home, meet new people and build our own families and social lives, we still have the need to be connected with existing family members and friends. Finding new sources of inspiration is always important, as designers need to stay creative. In the meantime, however, looking back and designing for the old can also be inspirational and meaningful in terms of designing a more humane, inclusive world.

Creative nostalgia

In the future, I would like to keep exploring the potential of nostalgia design, including but not limited to the following areas: analogue nostalgia, anticipated nostalgia and the digital effect, the meaning of craft in the digital era, mediated memories, and cultural differences in nostalgia.

Cultural differences in design

Regarding my future research directions, I would also like to explore the cultural differences between the East and West. Assuming that the East and West have a significant difference in the concept of "nostalgia", I would like to explore whether this difference will lead designers to make different choices when designing. Will a given design change (for example, the design of the iPhone) if we apply Eastern aesthetics to product design? What about other aspects of communication technology applications?

Finally, I would like to end with Boym's words:

> Creative nostalgia reveals the fantasies of the age, and it is in those fantasies and potentialities that the future is born. One is nostalgic not for the past the way it was, but for the past the way it could have been. It is this past perfect that one strives to realise in the future. (Boym 2008)

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Appendices

A. Interview Questions for Moon Pilot Study

For all participants:

1, During the test, did you pay more attention to the moon than usual? Will you increase the observation of the moon in the future?

2, Does the moon itself make you feel beautiful?

3, How do you think about modern communication methods?

4, Do you wish to establish a new connection?

5, Do you think we provide a new connection for this test? Do you feel that you have passed on your thoughts, love, missing feelings to your partner? or do you have any special feelings in your heart?

If not, why?

6, Do you like to use metaphors to express inner emotion? Do you think it is too implicit and unnecessary?

7, When you see the moon phase changing, do you feel the passage of time?

For sender:

1, Why did you forget sending out the picture of the moon? Is it because not receiving any feedback?

2, If the other person likes it very much, do you think it's worth sending even without feedback? Do you want to be reminded before sending?

3, If you can't see the moon due to weather condition, do you wish the other person can still be able to see the moon sent by you? Or is it better to synchronize with you?

For receiver:

1, Do you feel anything from the other one?

2, Will you think of him or her after seeing the moon sticker?

3, Do you hope he can receive or see the moon too?

B. Questionnaire for Moon Pilot Study

Scoring: 1-5 points

1. How do you feel your engaged feelings of the emotional interaction between you two in this experiment:

*Example: Very is 5, general is 3, and no feeling is 1

2. How do you feel about the innovation degree in this experiment

3. How do you feel about the aesthetic experience of this experiment

4. How do you feel about the intimate connection of this experiment

5. Do you like this mode of connection in this experiment

6. Will you use similar products (definitely-absolutely not)

C. Interview Questions for the NostosMoon and the NostosWind Experiment

Before

1, What is your relationship?

2, How and how frequently do you contact with each other?

3, Will you miss your partner? What would you do?

4, Do you have the moments you miss your partner but somehow can't tell or don't want to tell?

5, If so, why you can't (because of distance, communication tool, etc) or don't want to? (it's too personal, feel awkward, etc)

6, How do you feel about current communication, digital connection? Do you think it can cover all the emotional needs?

If yes, why we need any real/face to face connection?

If no, what is the emotion you think hard to be expressed and delivered via current digital connection?

Overall

1, How do you feel about the test? Anything good, or bad, or any suggestion?

2, Did you feel a new connection was built via the experiment? If you did, could you describe the feeling? If no, why?

3, How do you feel when you first successfully sent / received it?

4, Are you looking forward to sending / receiving it?

5, Do you think this has helped you to deliver/to feel the missing feelings?

6, Compared our device with daily communication tools like video chat, and texting, do you notice any difference? Which one do you prefer and why?

For Nature-related Metaphor in Content

Nature:

1, How do you feel about the nature / using nature (the idea of connecting by the moon / wind) to connect each other?

2, Have you had any special feelings towards the nature (the moon, the wind)?

3, How do you feel when you look at the moon / feel the wind? Any emotional thoughts?

4, Will you think of / miss your partner when you see the nature? In what kind of mood?

5, Do you think we can change the moon / the wind to other things? (Stars, a toy, a food, people who wear yellow T-shirts, etc)

6, If we can change, why this one is okay while others are not? what is your criteria?

Implicit:

1, How do you think about / perceive this connection? Do you feel unnecessary?

2, How do you feel about the implicit expression? How do you like it?

3, Do you feel your thoughts/missing feelings can be delivered by this connection?

For Aesthetic Distance in Interaction

Slowness

1, How do you feel about this kind of non-instant, slow connection?

2, In real situation, have you contacted your partner about the test by using other communication tools?

3, Do you like this limited way of communication and connection, and why?

4, How is this different from other digital connection?

5, When will you send it, any particular reason? (for sender)

Effort

1, Do you think this is time and effort-taking and they're unnecessary especially when you can reach the other one by one touch of your phone?

Less (feedback)

1, Will you check the auto-replied email? Will you check immediately? (for sender)

2, Do you care there's no direct reply from your partner and do you want a reply? (for sender)

3, Will you turn it off immediately or later, why? (for receiver)

4, Do you want to send a reply by yourself? If so, what kind of reply you want to send? (for receiver)

5, Do you think we can add richer functions, like HD camera, real-time, etc?

For Tangible Medium with Time Traces

Tangibility

1, How do you feel about using email / using buttons on the phone to send a signal? (for sender)

2, Will it be better if it's completely a new tangible device, so free you from the screen, phone, etc? (for sender)

3, Do you like the device? Which part you like the most and which part need revise? (for receiver)

4, How do you feel about a real hand-written letter? Any comment on digitalized hand-written letter (such as using a digital pen to write a letter on screen)?

Time traces (future nostalgia)

1, Have you noticed the moon/wind changes?

2, When you see the moon in the future, will you remember this test or will you think of your partner?