Starting a New Life after Crossing the Tumen River: How North Korean Defectors Use Digital Technology in Transition

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ABSTRACT

In a world where digital technology is omnipresent, North Korea stands as an outlier, with most citizens uninformed about its existence. This study explores the experiences of North Korean defectors as they transition to a highly digitally connected society—South Korea. Through 21 semi-structured interviews, we initially investigate the critical needs and challenges they encounter during their transitions. Then, we examine the role of digital technology as they adapt to the highly connected digital environment of South Korea. Our findings highlight that social media serves as a double-edged sword, providing the freedom to construct a desired identity while accentuating the gap between their real and ideal selves. This empirical research offers insights into how an underrepresented population navigates the digital landscape during life transitions, shedding light on the drawbacks and ways to better address their needs.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**.

KEYWORDS

Social Media/Online Communities, HCI for Development, Empirical study that tells us about people, Interview

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1 INTRODUCTION

In an era where digital technology pervades almost every aspect of life globally, North Korea still stands as an outlier. While the rest of the globe rapidly adopts digital tools and platforms, North Korea's citizens largely remain unaware and uninformed of its existence, resulting in the country having the world's lowest digital connection, nearly zero percent of the population using the Internet [144]. Yet, just a few kilometers to the south, there is another nation—South Korea—that shares historical, cultural, and linguistic ties and stands as the world's most digitally connected and technologically advanced country. Within 70 years since the Korean War, these two countries have diverged onto their own paths, with little to no interaction, divided by a mere border line with barbed wire fences.

While these borders have been maintained with virtually no interactions for decades since these two nations parted, there has been a significant shift in the situation in recent years. In the past two decades, the number of North Korean defectors (NKDs) defecting to South Korea has exponentially increased, rising from fewer than 10 a year to roughly a total of 33,000 NKDs living in South Korea, a number projected to grow in the future. While moving to another country away from home is acknowledged as a significant life transition that poses challenges for everyone [38, 47], NKDs face a unique set of challenges during their transitions to South Korea. They not only are faced with adapting to a drastically different physical world but also realize that the world is inseparable from digital technology—a realm that was previously unknown to them.

Life in transition refers to a process where significant experiences impact one's life, leading to a reconstruction of identity, physical characteristics, and more [30]. In the field of Human-Computer Interaction (HCI), various forms of life in transition have been studied, specifically in the context of digital technology and social media [14, 30, 50, 56, 101, 147]. Particularly, HCI researchers explored the digital experiences of marginalized groups such as

refugees and immigrants during their migration and resettlement [30, 147]. These studies emphasize the importance of digital technology in not only staying connected with their home but also assimilating into the new society during the migration process and the resettlement phase. It is important to note that, while NKDs share similarities with refugees and migrants, their relocation differs from these groups based on the definitions of refugees and migrants [26]. Therefore, in this paper, we use the term 'transition' to describe their relocation.

Furthermore, within the realm of digital technology, social media has garnered particular attention for its impact on marginalized communities undergoing significant life changes. Current studies suggest that social media serves as a valuable support tool for these communities, addressing their unique needs during transitions [50, 56, 101]. However, it further suggests the need for a better understanding of the specific needs of various marginalized groups, especially concerning a safe platform for non-normative identities [14, 30, 147].

To the best of our knowledge, this study is the first empirical investigation into the experiences of NKD as they transition to a digitally connected world in South Korea in the field of HCI. Our research is guided by the following questions:

- What are the key needs and challenges that are essential to North Korean defectors' journey? (RQ1)
- What role does digital technology play during the transition of North Korean defectors to life in a highly digitally connected society like South Korea? (RQ2)

Our empirical study aims to contribute to three key areas. First, we seek to enhance understanding of the digital challenges faced by this underrepresented population through firsthand narratives, shedding light on the experiences of those undergoing life transitions such as relocation. Second, we aim to provide insights into the interaction between social media and the physical world as it pertains to identity formation. Finally, our study offers valuable perspectives on the potential unexpected harms of social media for a marginalized and vulnerable group.

2 BACKGROUND

2.1 Prologue: Background to North Korea

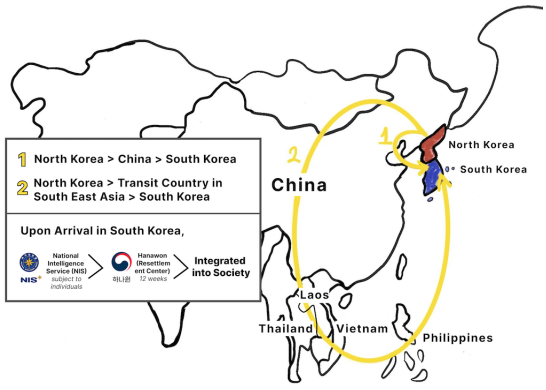

Figure 1: Most Common Routes of Defections

Due to North Korea's secretive nature, global understanding of the country is often limited to its political regime. Moreover, the lives of ordinary North Koreans are seldom the focus of discussion. To provide a more comprehensive understanding of our study's demographic, we offer background information both on North Korea and NKDs.

North Korea is an authoritarian state led by the Kim family for 70 years that imposes a strong totalitarian value around their regime. The citizens worship the leaders and follow their guide in constructing their lives to the extent of deciding their career [78, 102, 103]. The non-existence of the Internet further exacerbates the challenge for citizens to develop a sense of self, as it restricts their access to information beyond the country's borders, including insights into how others think and live [52].

The migration of NKDs to South Korea began to escalate in the late 1990s following the "Arduous March," a famine that led to mass starvation and caused the deaths of 3-5% of the population [83]. Since the number of NKDs in South Korea has surged from around 10 per year in the 1990s to approximately 33,000 NKDs living in total today [105]. Common routes for such defections are illustrated in Figure 1. These defections are often facilitated by brokers, typically North Koreans with Chinese citizenship, who guide defectors through intricate routes for compensation. Due to the high risks involved in their operations, there is limited public information available about them. Initially, many defectors flee to China, before moving to South Korea to avoid the risk of forced repatriation [80, 85, 131].

Upon arrival in South Korea, NKDs first undergo a verification and acclimatization process at the National Intelligence Service. They then participate in a three-month program at Hanawon, focusing on housing, vocational training, cultural education, and basic IT education to aid their integration into South Korea's advanced technological society [75, 79, 88].

NKDs in South Korea represent a distinct group compared to traditional refugees or asylum seekers. NKDs mainly depart North Korea due to poverty and family reunification, unlike refugees who often flee persecution [85, 139]. Moreover, as mandated by the South Korean Constitution, NKDs obtain South Korean citizenship upon arrival at Hanawon bypassing the asylum process [139]. However, once NKDs obtain South Korean citizenship, their door to going back completely shuts down, as South Koreans are banned from entering North Korea [135]. Despite obstacles, many North Korean defectors in South Korea maintain occasional contact with their families back home, typically managing only brief annual phone calls through a broker system. These communication efforts face challenges such as low signal quality, significant broker fees, and the constant threat of being caught [89].

Adaptation to life in South Korea presents NKDs with a plethora of challenges, from basic activities like grocery shopping to more existential issues like finding a sense of purpose [69, 73, 80]. A significant hurdle is the vast digital divide: North Korea has the world's lowest digital connectivity, mostly limited to government officials, leaving its population largely unaware of the Internet [141, 144]. Beyond the Internet, digital technology is limited to state-controlled mobile phones, televisions, and radios [2, 69]. In contrast, South Korea's internet connectivity rate is 98 percent, even higher among younger generations, reflecting its ubiquitous internet access. NKDs

struggle with not just using, but also understanding the pervasive role of digital technology in South Korean life, where even children as young as 4.6 years are accustomed to smartphones [80, 90, 95].

2.2 Related Works

Our study draws upon several major themes in HCI, including the use of digital technology by the itinerant population and sociotechnical adaptation, and most notably, recent research on individuals undergoing significant life transitions and their identity reconstructions. While we do not delve into all relevant themes here, we offer a more in-depth exploration of these topics in relation to our findings in the Discussion section.

2.2.1 Digital Technology Use for Itinerant Populations. Understanding challenges and supporting the needs of the itinerant population, including migrants, refugees, and asylum seekers is an active part of HCI[10, 11, 19, 28, 70, 120, 129, 137, 142]. For example, studies explored how immigrants and refugees can benefit from digital technology, including access to local information [57], fostering cultural understanding [16], and creating supportive communities [34]. Moreover, digital technology is instrumental throughout their entire journey, even before relocating, during the transition, and after resettlement into new societies [6, 7, 77].

Before their journey, refugees often acquire knowledge about their destination country through online social networks, which provide practical support in transitioning to a new country, such as cultural advice and financial tips [3, 33, 45, 49, 67, 119]. During transit, digital technology helps in planning routes, reducing travel costs, and offers reliable emotional support [5]. In the post-transition phase, smartphones are crucial for maintaining connections with family and friends back home, enhancing well-being through digital togetherness with communication and instant sharing of media [93, 134]. This technology helps maintain their self and cultural identity, alleviating homesickness and difficulty of separating from loved ones [112, 124]. Moreover, refugees increasingly use online forums and social media to seek advice and establish connections in their new environments, a practice that facilitates digital inclusion by providing access to essential information and helping them to understand their new homes [7, 51, 77, 81, 82, 87, 114].

2.2.2 Sociotechnical Adaptation in HCI. Hsaio et al. introduced "sociotechnical adaptation" as a concept to explore how recent migrants employ technology in adapting to new societies and cultures [66]. This approach encompasses three key areas: psychological adaptation [121], sociocultural adaptation [121], and economic adaptation [15]. It's particularly insightful in understanding the transition of NKDs from a non-digital to a highly digital society, focusing on their use of technology to address their unique needs. In a related context, the sociotechnical perspective has been applied in Information and Communication Technology (ICT) within HCI to reduce the digital divide, aiding local citizens and economies through technological integration [65, 113, 146]. Consequently, previous studies have identified the technical challenges faced by people from remote areas with limited access to technology and how sociotechnical adaptation serves as a hub for building strong networks [37, 108].

Moreover, Hsaio et al. explored how sociotechnical adaptation affects trust development among recent migrants, who generally have lower levels of trust in their new surroundings compared to native-born populations [21, 35, 36]. For example, connecting through a shared identity, such as being a single parent, played a crucial role in building trust [66]. Hsiao et al. emphasized the importance of understanding how social media affordances support (or do not support) trust development and interaction within local communities for these migrants [66].

2.2.3 Identity Changes in Transitions. Life transitions, marked by disruptions where past and present norms lack continuity, significantly influence the reconstruction of an individual's identity [30, 40, 56, 86]. This redefinition of self and self-agency is evident in various life transitions, including migration [19, 66, 115, 138] and veterans returning from military to civilian life [122], which both involve adapting to a new environment with different cultures, societies, norms, and systems. According to Van Gennep, this process occurs in three phases: separation, liminality, and incorporation, known as rites of passage. In this framework, transitions begin with the detachment from the previous identity, moving into an identity-less state during the transition, and eventually incorporating into a new social structure with new rules and norms, thereby forming a new identity [56, 122, 136].

Erikson describes identity development as a period of exploring roles, goals, and values that provide life direction and purpose [40]. Tajfel adds that self-concepts, attitudes, and behaviors are formed through memberships in social groups [127, 128]. In contexts like North Korea, where group identity revolves around the country's leader [100], individuals lack autonomy and decision-making power, their self-identity molded by the group they belong to. This leads to a deprived self-agency and individual control [100, 107]. Therefore, the defection process brings about a significant identity change for NKDs, exposing them not only to different cultural norms but also to a shift in their concept of self.

HCI research on life transitions has examined unique needs in marginalized communities undergoing a significant life transition in relation to identity changes, addressing challenges such as gender transition [56, 57, 147], childbirth [12, 48], relationship changes [25, 58], trauma [13], and [14, 124]. HCI scholars have examined how identity is influenced by digital technology through various lenses, such as identity shifts and fulfills during life transitions [30] and Van Gennep's framework of rites of passage [56, 63, 122]. Building on Van Gennep's concept of liminality, Haimson developed the concept of "social transition machinery", illustrating how different social media platforms, while remaining separate, collaboratively facilitate life transitions [56]. Moreover, Semaan et al. found that veterans use social media platforms and networks to re-establish their identity as civilians [122]. Additionally, studies have identified the needs of populations and explored how social media platforms or identity-based communities can be designed to be more inclusive to support individuals with non-normative identities to foster support and a sense of belonging [9, 14, 16, 30, 56, 57, 62, 147].

2.2.4 Importance of Exploring Digital Marginalization in HCI. While digital technology offers benefits for identity development [17, 31, 116], the HCI community emphasizes the importance of directing attention towards individuals in liminal stages who confront social

isolation and encounter limited access to resources, including digital technology [32, 71]. These individuals, often socially excluded and at risk of digital under-participation, may find that digital technology exacerbates their feelings of social isolation and insecurity, making them vulnerable to social comparison [71]. This aspect becomes particularly relevant when examining the impact of digital technology on the identity and well-being of NKDs.

Furthermore, despite extensive research on refugees and individuals undergoing life transitions, research on populations transitioning from digitally isolated or limited environments to highly digitally connected spaces remains under-explored. Research focusing on individuals who have experienced temporary digital divides, such as during hospitalization, provides valuable insights into their reintegration into digital spaces [41]. Therefore, we believe that understanding the needs and challenges NKDs face when encountering digital technology and examining how technology affects their transition can enhance our understanding of how technology could better support individuals undergoing life transitions.

3 METHODS

In this study, we employed a qualitative HCI approach and conducted in-depth interviews with 21 NKDs who currently reside in South Korea as legal citizens. This study received approval from our institution's Ethics Committee.

3.1 Context

Given the nature of the participants and their high level of privacy concern, we reached out to organizations working closely with NKDs and received assistance in understanding potential considerations for recruitment and interview implementation. We received several considerations and advice from experts including the following: (1) Recruit within internal communities to establish rapport and trust more quickly (2) Ensure complete participant anonymity in every interview (3) Allow remote interviews for those with travel limitations (4) Avoid asking questions related to the traumatic process of coming to South Korea (5) Refrain from asking any personal information that could potentially identify the participant. For example, instead of asking when they arrived, provide a range of periods to choose from.

3.2 Recruitment

Following this guidance, we sought assistance from NKD communities in South Korea that could act as a bridge between us and NKDs. We received help from one of these communities, which is led and founded by a fellow NKD, for the recruitment process. The recruitment details were first shared within the communities internally and then spread to other NKD communities through word of mouth.

To be eligible, participants needed to be aged between 18 and 49, be former North Koreans who are now legal citizens of South Korea, speak Korean, and have used social media platforms such as Instagram, Facebook, Twitter, and TikTok since arriving in South Korea during their adjustment period. Participants aged 50 or above were excluded due to a noticeable decline in social media usage within that demographic in South Korea [34]. Therefore, our focus was on individuals in their 20s, 30s, and 40s, as they represent the most active users of social media. We carefully reviewed each submission for participation and selected a total of 21 participants who met our criteria for in-depth interviews.

3.3 Participants Characteristics

Before the interviews, we collected some personal information, such as gender, age, duration of residence in South Korea, experience of using a mobile phone and Internet back in North Korea, and experience of living in another country before coming to South Korea (See Table 1 for demographic information). Residing briefly in a third country as a transit point to South Korea was not counted as it is a common circumstance due to the complications of defection to South Korea. These factors were considered relevant to gather beforehand, as they might influence their understanding and use of digital technology, particularly social media. Out of the 21 participants, 17 were female which mirrors real-world statistics, where nearly 8 out of 10 NKDs in South Korea are female [39]. The majority of participants (n=18) were in their 20s and 30s, the age groups that constitute the most active users of social media [34]. Additionally, 2 participants were in their late teens (above 18), and 1 was in their 40s. Further details regarding the participants' demographics and previous experiences are provided in Table 1.

Furthermore, none of the participants had experience using the Internet nor were they aware of its existence while in North Korea. Among the six participants who resided in China before defecting to South Korea, they were aware of its existence and had used it, adhering to Chinese restrictions, such as bans on YouTube, Facebook, etc. Mobile phone usage varied among participants; however, it is notable that all their mobile phone experiences involved non-smartphones, which only allowed a restricted number of calls and texts. All of these statistics closely mirror statistics [2, 80, 103]. It is also important to note that this does not indicate individual ownership of the mobile phone, as most individuals have not owned one for themselves.

3.4 Data Collection

The 21 semi-structured interviews were conducted in June 2023. Semi-structured interviews were chosen to establish rapport with the participants and to provide flexibility for conversations to naturally gravitate towards topics most relevant and important to their experiences. The interviews lasted, on average, for 74 minutes (range: 58 to 100 minutes) resulting in approximately 27 hours of recordings in total. Prioritizing the participants' privacy and safety needs and ensuring complete confidentiality, all interviews were conducted only by the lead author both in-person and remotely via video call, based on the participants' preferences. All interviews were conducted in Korean. Interviews were audio-recorded with participants' permission solely for transcription and translation. Only the researcher who conducted the interviews was granted permission to access the audio recordings, which was done to anonymize and transcribe the interviews.

Before each interview, the interviewer introduced the study's goals, assured full confidentiality, and explained safety rules. Additionally, the participants were informed of their rights to obtain any recordings or transcriptions, both translated and untranslated, if they wished, to ensure the transparency of the analysis process.

Table 1: Summary of Participant Demographics

P#	Gender	Age	Duration of Stay (in years)	Mobile phone experience in North Korea	Internet experience in North Korea	Experience of living in another country before South Korea
P1	Female	25	10-15	1	1	X
P2	Female	24	7-10	1	1	X
P3	Female	23	5-7	1	1	X
P4	Female	21	3	1	1	X
P5	Female	21	5-7	2	1	X
P6	Male	33	15+	1	1	X
P7	Female	Mid 20s	3	4	1	X
P8	Male	23	3-5	4	1	X
P9	Female	Mid 30s	10-15	1	1	X
P10	Female	39	15	1	1	China (1-2 years)
P11	Female	39	10-15	1	1	X
P12	Female	24	8	2	1	X
P13	Female	25	7-10	4	1	X
P14	Female	24	3	4	1	X
P15	Male	20	0-3	2	1	China (4-5 months)
P16	Female	45	8	1	1	China (Many years)
P17	Female	Early 20s	10-15	1	1	X
P18	Female	Early 30s	7-10	1	1	China (1-2 years)
P19	Female	Late 20s	7-10	1	1	China (3-4 years)
P20	Male	20	0-3	1	1	X
P21	Female	32	10-15	1	1	China (6 years)

1 = I have no experience of using it.
2 = I used it a few times (less than 5 times a year).
3 = I used it occasionally (more than 10 times a year).
4 = I used it on a daily basis.

The interviews commenced by gathering preliminary information about their past experiences with digital technology in North Korea and/or in another country, such as smartphones and the Internet. The interview then shifted to their transition processes, including challenges (both digital and non-digital), cultural shocks, and support systems or technologies, if any. Sample questions included: 'What were the most challenging aspects when you first came to South Korea?', 'What were some challenges you recall involving encountering digital technology for the first time?', 'What made you decide to use such social media platforms?', 'How did your perception of your identity change when you came to South Korea?'. It is important to note that as each interview was semi-structured, the questions naturally evolved to focus on topics more salient for the participants.

Upon concluding the interviews, the interviewer reiterated their rights to obtain any collected data and their right to withdraw from the study until specified periods. None of the participants requested to withdraw or to obtain the collected data. All participants were compensated with a 50,000 KRW (approximately USD 38) e-gift card from their preferred stores available in South Korea.

3.5 Data Analysis

To ensure maximum confidentiality, only the lead author who conducted all the interviews had access to the raw interview recordings. Initially, this author transcribed all the interviews from the recordings and then proceeded to anonymize any identifiable information. Once all transcriptions were fully anonymized, two additional researchers joined for the remaining analysis phase. Following the standard qualitative analysis approach [117], we read the interviews multiple times to familiarize ourselves with the context, particularly because it contained information that might be new and unfamiliar to non-NKDs. We initiated several rounds of translation, with all researchers fluent in both English and Korean. Following every three translations, we gathered for a cross-checking session to verify the accuracy and cultural appropriateness of each translation.

Next, we began qualitative data analysis using Atlas.ti. We conducted a reflexive thematic analysis [18] employing open coding and axial coding [29, 76] on 21 interview transcripts. Initially, we conducted a separate line-by-line analysis of the first three interviews, allowing codes and themes to naturally emerge from the data. We then convened to discuss the emerging patterns and themes, grouping them into larger themes using axial coding [29, 76]. For the subsequent interviews, we iteratively coded the data, organizing

it into new and existing codes and themes, while collaboratively developing our codebook. This process led us to a consensus when no new codes emerged, marking the completion of the codebook. Our final codebook comprised 85 sub-codes, such as 'Desire to Feel Normal.' These sub-codes were grouped into 23 code groups, including 'First Encounter of Social Media.' These groups were then categorized under five overarching themes, like 'Identity-related Difficulties.' Following this structured approach, we organized the Findings section into two main parts: Section 4.1 details the needs and challenges encountered in a digitally connected South Korea, covering both real-world and social media experiences, and Section 4.2 reports their challenges related to changes in identity and identity crises, detailing the role of social media in facilitating identity reconstruction. We excluded measuring inter-rater reliability [50] as researchers actively communicated and closely collaborated throughout the analysis, meeting at least twice a week to discuss the emerging codes and themes for each transcription throughout the entire process.

Positionality: The authors of this paper include both South Korean and Western researchers, and as a result, our interpretation of our data is naturally grounded in these perspectives. Due to its secretive nature, understanding the North Korean perspective is challenging. To bridge this gap, our researchers sought support from North Korean organizations and a government sector in charge of resettlement in an attempt to increase our understanding. Nevertheless, it is essential to recognize that, despite our earnest efforts, our inherent backgrounds do not include direct experience with North Korea, and we do not possess an insider's view of North Korea.

4 FINDINGS

4.1 Key Needs and Challenges of NKDs

In this section, we present our findings on the crucial needs and challenges that NKDs face during their transition, which are unique to their background, followed by how digital technology played a role in addressing these challenges.

Before delving further, we report participants' initial experiences with digital technology and their journey in adapting to it. Upon their arrival in South Korea, most participants (n=19) acquired mobile phones for the first time after leaving Hanawon. For the vast majority of them (n=18), this marked their first-ever encounter with the Internet. No mentions of other digital devices other than smartphones and computers were made during the interviews. After Hanawon, participants pursued technological literacy through either formal computer classes or self-learning. The pace of adaptation varied widely, precluding a uniform timeline for this process.

In South Korea, popular digital platforms include global ones like Facebook, Instagram, and YouTube, as well as local platforms like Naver (comparable to Google) and KakaoTalk (comparable to Whatsapp). This paper concentrates on these five platforms, as they were most frequently mentioned in our interviews [125].

4.1.1 Adapting to Unfamiliar Territory of South Korea. In the process of adapting to a new culture, accurate and realistic expectations are crucial for effective adaptation and mental well-being [27, 121, 143]. All participants (n=21) had limited and inaccurate expectations and understandings of South Korean society, stemming from the education they received in North Korea. Thus, they experienced considerable initial confusion due to the disparity between their previous perceptions and the actual situation in South Korea, posing significant challenges in adaptation. Participants highlighted that in many cases, South Korea was portrayed in a negative context. Moreover, some (n=7) mentioned that their education in North Korea equated South Korea with the United States, which led to significant confusion upon arrival for P15:

> "When I was there, I lived in a rural area, and they always taught us at school that "people in South Korea are the same as Americans." They implanted the idea that Americans were very bad people. So, they also taught us that South Koreans were the same. So I was so surprised when I arrived because I thought that people in South Korea would mostly be like Americans, but they all spoke Korean."

Additionally, most participants (n=17) reported that when they were in North Korea, they did not know the geographical location of South Korea because the entire Korean peninsula, which includes both North and South Korea, was uniformly marked as 'Chosun (North Korea)'. Due to the lack of familiarity and negative perceptions, most participants (n=17) did not initially have explicit plans to go to South Korea; participants (n=6) had first escaped to China due to poverty and the rest of the participants who directly came to South Korea had come as a family unit or following relatives already in South Korea. P13, who fell into the latter category where her defection was arranged by a broker hired by her mother in South Korea, described her secretive and unwilling journey to South Korea as follows:

> "I was on the route, and suddenly I crossed over the China border and to Laos, so I became curious and confused. So I asked where I was going, and they told me I was going to South Korea. But I really did not want to go to South Korea."

The participants' struggles with adapting to South Korean society were significantly compounded by little to almost non-existent familiarity with digital technologies, which are essential in overcoming key challenges of adaptation during cross-border transitional periods [6, 44, 132]. Their first exposure to digital technologies in South Korea occurred at Hanawon, during computer classes. These classes introduced them to popular South Korean platforms and apps, including Naver (a search engine comparable to Google), Facebook, and KakaoTalk (similar to WhatsApp). Despite this exposure, participants universally struggled with basic digital concepts, such as charging a phone (P9), composing an email (P18), and utilizing search engines (P4). These challenges were often exacerbated by language barriers, as many technological terminologies are in English, a language completely new to all participants. A significant number of them (n=14) equated the process of learning about computers and the Internet to learning English, referring that terms like 'log-in', 'sign-up' 'folder' added another layer to their difficulties.

Despite hurdles, participants collectively acknowledged that digital technologies eventually became pivotal in helping them acquaint themselves with South Korean society, significantly facilitating their adaptation as they grew more proficient in using these technologies.

Learning South Korean culture and lifestyle through YouTube. All participants found YouTube significantly helpful in learning about South Korean lifestyles and cultures, ranging from humor and trends to fashion and language. It was particularly helpful in supporting one of their biggest challenges: transforming their North Korean accent into a South Korean accent. P12 recounted this experience:

> "I searched for standard South Korean pronunciation on YouTube. It taught me how to pronounce standard South Korean. So for a month or so, I practiced every evening."

P8 recounted his initial struggle with not grasping cultural references, like memes and humor when interacting with his South Korean friends. However, he found a solution on YouTube, where he discovered a range of shows significant to South Korean culture. These shows, often condensed into compilations that showcased the most important and popular segments, allowed him to quickly understand the highlights without watching the full episodes. As a result, he was able to catch up on a decade's worth of popular South Korean variety shows, which continued to be common topics among his South Korean friends. This led to more satisfying social interactions with South Koreans, positively impacting his psychological adaptation to the cross-cultural transition [121].

Furthermore, participants (n=8) reported that online shopping was extremely beneficial. It not only helped them grasp the fashion trends in South Korea but also reduced the uncomfortable feeling they frequently faced during in-store shopping. Reflecting on her transition to online shopping, P9 shared the sense of fairness and equality she felt, in contrast to her earlier struggles with in-person shopping:

> "When I discovered online shopping, I finally felt like I was being treated fairly. I could buy the same clothes at the same price with the same quality, just like others."

Search Engines as the Only Source of Answers. Naver was consistently mentioned in all interviews, highlighting its affordance as a search engine. Although Google was also mentioned, participants mentioned that its usefulness was greater in English, leading to their preference for Naver. This platform became especially crucial for those lacking in-situ social support, serving as their main source of learning the culture of South Korea. P9, who came to South Korea alone, reflected on her experience:

> "When I came here at the age of 21, I was very curious about the world. But apart from assigned social workers, I had no one around me. The only place I could ask questions was my computer. I asked everything like, what is a nightclub, what is Seoul like, and how to email."

4.1.2 Lack of "Self" Identity in North Korea. Cultural differences between one's previous background and new experiences in a host country can impede sociocultural adaptation [121]. Participants (n=20) described experiencing numerous differences in the lifestyle of South Korea, with one of the most challenging differences being the development of a sense of self and identity that was not solely tied to the country or a leader. P16 described that her identity in North Korea was centered around serving the country, lacking a sense of her individuality:

> "When I was there, there was no me, and there was no such thing as my life. I don't have a life that is about me. People just live and die like that. They just live and die for the country, for Kim Jong-un."

Several depicted their former lifestyle in North Korea as "passive," in contrast to the constant decision-making in South Korea. P20 reflected on this difference, noting the absence of personal choice in North Korea:

> "There, I had to work in a job assigned to me [by the government]. So I never had to think about what kind of job I should have or want to have. I just live as things happened to me."

P10 also described the sorrow and grief she felt when recounting the first moment of thinking about her dreams at the age of 26 in South Korea:

> "When I was 26, I entered an alternative school [in South Korea], and I had to write a resume [for a job] and think about my dreams. While writing that resume, I just cried uncontrollably. I asked myself and God, why I had never thought about my dreams or what I was good at, and why the only thing on my mind had been how to survive and eat each day. That was the first time I wrote down what I liked and disliked."

Consequently, many participants felt pressured and challenged to make decisions due to the consequences of having "to be responsible for all my choices" (P2). P15 highlighted his newfound understanding of 'decision paralysis' as his choices were now pivotal in shaping his "own destiny."

Digital Space as a Social Support in Identity Development. Many participants noted that digital platform, particularly YouTube, was instrumental in helping them make decisions of their own and develop a new identity in South Korea. In many cases, it alleviated a feeling of social isolation and provided courage and motivation. P15 shared his journey of overcoming challenges in selecting a career path and facing difficulties in decision-making. He described how his perspective expanded through engaging with educational content:

> "I had watched a lot of lectures and discussions on how to set ultimate life goals. Thinking about long-term goals made me choose a career path more thoughtfully instead of rushing into a decision."

Moreover, P7 described how YouTube helped her gain the confidence to establish a new identity and a positive mindset in South Korea:

> "These shows showed how those who succeeded had experienced hardships and difficulties. Yet they still made it. Hearing and watching their stories encouraged me."

Moreover, Naver played a crucial role in providing information essential for the participants' identity development. After their time at Hanawon, many in their 20s or 30s chose to enroll in university, utilizing the government-supported free education for NKDs.

However, since they had never before had the chance to select a career or study field, deciding on these was often a challenge. P18, for example, turned to Naver to explore university majors and the potential job opportunities they could lead to.

Social Media as a Place to Develop New Identities.

Instagram played a pivotal role in the formation of new identities, allowing participants to conceal and express themselves through online personas and self-presentations. We further discuss how social media played a role in identity formation and reconstruction in 4.2, addressing our RQ2.

4.1.3 A Complete Separation from Home . Transitions to another country include separation from loved ones and leaving behind one's previous life [121]. Family separation poses significant mental health challenges, as reported in previous studies [8, 24, 94]. Likewise, all participants experienced varying degrees of separation from their loved ones, an inescapable consequence of defection. Participants who defected alone experienced complete separation from everyone left in North Korea, and those who defected as a family unit experienced separation from the rest. Participants reported that once they left North Korea to come to South Korea, they knew that there was no going back.

In addition to not having the option to return to North Korea, participants also lacked legal and safe methods to stay in touch; their only option was through a broker system. P9, who managed to make a brief call via a broker despite high costs and an unstable connection, shared her experience:

> "My older sister got caught a few years ago while talking to me on the phone, and she had to go there [labor training camp] and get interrogated for three months. There are many instances of getting caught while attempting to make contact. I've heard they go through severe physical torture to the point where they end up confessing to things they didn't even do."

Most participants (n=20) mentioned that the biggest struggle of the disconnection with families was mainly for two reasons. First, participants were severely worried that their being in South Korea would put their families in danger if the information got leaked to the North Korean government. These concerns continued to shape their lives in South Korea, leading to the establishment of stringent privacy requirements and ongoing anxiety. Second, as participants adapted to South Korea and gained a new perspective on North Korea, the majority felt extremely burdened for families who were left at home. P11 stated that despite her desire to share her experiences from North Korea truthfully, she struggles to do so for her family's safety, as she said,

> "I am afraid that something I say might harm my family's safety."

Digital Space as a Network of Ties.

Following their defection from North Korea, participants faced the need to build a new network of connections in South Korea. For most participants (n=20), this initial network was formed in Hanawon and subsequently maintained through digital platforms. This network plays a crucial role in the early stages of adapting to digital technology, influencing their choice of platforms after leaving Hanawon. Many participants (n=11) reported downloading Facebook on the recommendation of fellow NKDs to stay connected on this platform once they leave Hanawon. Similarly, their motivation to engage with other platforms was greatly influenced by the recommendations of fellow NKDs. While most participants used Facebook as their primary method of communicating with fellow NKDs, a considerable number (n=17) preferred using it more passively due to privacy concerns. They primarily used Facebook to receive updates about these contacts, rather than actively expanding their network by adding new NKDs or engaging in regular activities such as posting, commenting, or sending direct messages. Participants favored Kakaotalk (comparable to Whatsapp) for one-on-one messaging for active communication, aligning with previous studies that show marginalized groups' preference for more private platforms [43].

Participants (n=7) expressed dissatisfaction with Facebook's tendency to primarily recommend NKDs for suggested friends, instead of South Koreans. Therefore, Instagram was used more to establish and maintain social ties with South Koreans. Some participants pointed out that Instagram provided a space to preserve memories with their newly formed relationships in South Korea. This was achieved through affordances such as having a separate private account just with friends (P3), having compilations of stories for a specific event or memory (P8), and attaching journal entries to each photo about their memories (P21). Additionally, a group of participants who were mothers (n=4) found Instagram valuable in forming network ties with other mothers in their neighborhoods through exchanging information on child-friendly locations (P10, P11), thereby enhancing their integration and access to community resources.

Digital Space as a Public Space with Potential Privacy Risks.

Due to the fear participants (n=21) had for their family's safety, many participants showed a very careful way of using various online platforms. In general, a majority of the participants (n=20) expressed a tendency to avoid sharing personal information on public platforms, including public social media accounts. For example, to conceal their North Korean identity, they often posted non-identifiable photos of their backgrounds, such as landscape pictures. This behavior was more pronounced on Facebook, perceived by participants as a platform with greater public exposure, with one reason being numerous direct messages and friend requests from random people. In contrast, on platforms like Instagram, they felt their accounts were visible only to selected friends, thus providing more sense of privacy. P21 described Facebook as a more exposed space, heightening her fear that her background information might be revealed, which discouraged her from using it. Consequently, many participants opted for completely private account settings on all social media accounts yet some still felt unsafe despite these precautions. P6 shared his lack of trust in the system:

> "On Facebook, you have to provide your real age, name, and location. Even if I set it as 'Only Me,' I feel anxious about it. I prefer not to make things public around me."

Several participants (n=3) who defected over 10 years ago reported a somewhat decreased sense of safety and privacy, citing that the North Korean government ceased tracking missing persons after a decade. However, some disagreed, as they continuously

bear the burden and face the ongoing need to protect them from potential harm which involves being safe and private online so no information can be leaked.

4.2 Role of Digital Technology in Identity Reconstruction and Formation

In this section, we present our findings concerning the pivotal role that digital technology, specifically social media, plays in the reconstruction and formation of identity.

4.2.1 Reconceptualizing their World Models: Introduction to the South Korean and Global Perceptions of North Korea . Upon leaving Hanawon and entering South Korean society for the first time, all participants uniformly said that at this stage, they considered themselves North Korean and had no particular resolve to become South Korean. All participants were in a state of having little to no knowledge about South Korea before coming. Due to a lack of awareness about how South Korea perceives North Korea, they did not hide their North Korean identity. However, as soon as they revealed that they were North Koreans, they sensed something odd in the reactions of South Koreans. They also came to realize that the view of North Korea in South Korean news and media is not favorable.

The Internet was pivotal in expanding their perspectives by providing access to extensive information. However, this journey was often difficult and emotional, particularly due to encountering hate speech while exploring South Korea's views on North Korea online [84]. Participants observed that while in-person encounters rarely included blatant hate speech, instead involving more subtle and nuanced forms of discrimination, they frequently faced overt hate speech and direct discrimination online. This prevalence of negative online interactions led some to see these as reflective of "South Koreans' true attitudes and opinions" (P6).

During this phase, as the beliefs and knowledge they had grown up with in North Korea began to unravel, participants started reassessing the ideologies they had learned. They realized that they should not trust everything that North Korea had taught them about the world, and naturally began distancing themselves from their North Korean identity. P16 described reading about the North Korean regime and discovering it to be vastly different from what she had previously learned. Reflecting on this period, P9 noted that it made her feel like "a frog living in a well, not knowing what was outside."

4.2.2 Starting the Process of Adaptation and its Challenges . Responding to the perceptions of North Korea, participants (n=20) described how they felt this diminished the value they associated with their North Korean identity, often describing feelings of inadequacy and shame. Consequently, participants (n=19) sought to distance themselves from their North Korean roots, aspiring to blend in with South Korean society. They made deliberate efforts to adopt South Korean ways by closely observing the lifestyles and thought processes of South Koreans. For instance, P6, struggling to alter his accent despite numerous attempts, ultimately chose silence as a means to conceal his background, stating:

> "I was afraid my dialect might slip out and reveal that I am from the North, so I didn't speak at all for the first two years."

In light of these experiences, participants began to actively mask their North Korean identities, which involved shaping their physical world appearances and behaviors. This led to a second phase of crafting identities, which is discussed in the following.

4.2.3 Crafting Digital Identities: First Encounters with Social Media . The experiences participants (n=21) had in the physical world had a significant impact on how they presented themselves on social media. About 3-4 months after leaving Hanawon, the majority of participants (n=19) started using social media. Since they cannot hide their dialect and accent, it is very difficult for them to hide their North Korean identity and escape from discrimination. At the outset, their primary goal was to hide their North Korean identity and instead create a social media identity that resembled an ordinary South Korean, mirroring their physical world experiences. All but one of the participants described wanting to hide their North Korean identity on social media, based on discrimination they had faced in the physical world. P5 was the exception, who initially disclosed her North Korean identity on social media but eventually deleted her account due to online harassment and discrimination. When she returned to social media, she chose not to disclose her North Korean identity at all. P5 noted:

> "I mentioned my origin on Facebook, and I wrote "North Korea" there. But when people saw it, they left a comment saying that I should go back to my own country. So, I uninstalled it because I was very upset."

Social media provided an advantage in that it did not expose their North Korean identity through their accents or appearances. All participants described finding it easier to hide their North Korean identity on social media because there were no face-to-face interactions where their dialect, mannerisms, or "North Korean" appearance could give them away. Moreover, even without direct interactions with South Koreans, they could benefit from observing and learning from others' behaviors, which they then applied to their online identities. This allowed them to effectively learn about appropriate aspects of South Korean appearances and conventions safely and effectively (n=19).

Nonetheless, there were challenges. P8, for instance, described continuously adjusting his profile picture to appear less North Korean, comparing his own picture to those of random South Korean users and celebrities to eliminate any elements that might make him appear "old-fashioned" or "unrefined." Others, including P1, P7, P12, and P15 also described how they curated their online photos to avoid giving off a "North Korean" appearance. Beyond appearance, P1 used a South Korean pseudonym on Facebook to hide her North Korean name, while P3 selectively curated her Instagram feed with photos at cafes and restaurants that would make her account look more South Korean.

In addition to curating their own content, some participants (n=5) also actively curated their connections with others, such as by disconnecting or deleting comments from NKD friends (P1) and followers who failed to effectively disguise their North Korean identities, or by requesting them to delete specific posts or to change

their photos that could reveal their background (P12). These measures were taken out of concern that their South Korean friends might uncover their North Korean origins through association. P12 described her careful efforts to manage and curate connections:

> "I try so hard not to get outed. I mostly upload posts about meeting South Korean friends only. I don't post pictures when I am with my high school friends (NKDs), and I don't follow friends who are likely to cause trouble like those openly discussing their backgrounds. One time, I asked my friend to take down a group photo on her feed, in case my South Korean classmates could see it."

4.2.4 Feelings of Futility/Frustration with Unattainability of Ever Becoming Truly South Korean . Initially, participants reported believing that, by living conscientiously and conforming to South Korean norms, they could seamlessly transition into becoming "true" or "ordinary" South Koreans who effortlessly live successful and happy lives. However, they faced a paradox: the more they concealed their North Korean identities and imitated South Korean identities on social media, the more they recognized their fundamental differences, making it increasingly clear that becoming ordinary South Koreans was unattainable.

The most significant challenges included language and cultural barriers. Regardless of their dedication, they felt that they were never truly seen as "true" South Koreans. P15, who constantly tried to dress like South Koreans, experienced futility in fully transforming from North Korean to South Korean:

> "Whatever I wore, I still looked a bit outdated. Even when I try to dress neatly [like South Koreans], a crab that sheds a shell is still a crab."

Moreover, the majority of participants (n=20) shared that forming connections with native South Koreans was challenging, as conversations often lacked common ground. Moreover, despite social media's affordances for supporting identity curation, it also provoked feelings of futility by encouraging constant social comparison. On social media, South Koreans seemed to live carefree and glamorous lives. This fostered feelings of fundamental difference and amplified depression that they could never truly become South Koreans, regardless of their efforts. P7 described how these comparisons on Instagram resulted in a decrease in self-esteem:

> "I felt depressed when I saw other people's social media like Instagram. When I first came here, I had no friends, and my thoughts were quite complicated, so I had some level of depression... And I felt depressed when I saw beautiful people showcasing their luxurious belongings on Instagram. These people seem to have everything going for them. It really lowered my self-esteem, and at that time, I tended to view things negatively. I had thoughts like, "How will I survive here?" and these thoughts made me even more depressed."

These social comparisons often stirred deeper emotions beyond envy or jealousy. P3 described it as "a sense of being fundamentally different from others." Their emotions originated from their personal life experiences, struggles, and their North Korean identity. This was often brought about by reflection and introspection about their lives, which included questioning what their lives would have been like had their pasts been different, through counterfactual "what if" questions. As P18 expressed:

> "I wondered, If I had come here earlier or if I were born here, would I have been different?"

As a consequence of these feelings, several participants chose to discontinue their social media activities, expressing that abstaining from social media was the only viable solution for them. P8 explained his decision to stop using Instagram, citing the lack of significant benefits beyond the challenging comparisons it posed:

> "There is a sense of comparison on Instagram, and that was one of the main reasons why I stopped using it. I find that there aren't many ultimate benefits I can gain through Instagram, except for simple amusement."

Similarly, P18 discussed her use of Facebook, initially to observe how others lived, but eventually realizing it led to comparisons with herself and changed her thoughts:

> "Facebook showed me how people lived here. It was like, "Oh, this is how they live." But then, comparisons started to arise. I compared myself to others and wondered why they were doing so well while I wasn't. Over time, I became quieter and less engaged in using Facebook."

4.2.5 Realization: Social Media Is a Performative World, Not Reflective of Reality . When participants first used social media, many (n=12) took it for face value and found it challenging to distinguish what was "fake." However, they later noted that even the same person could exhibit a gap between the way they appeared on social media and how they presented themselves in the physical world, highlighting how South Koreans often wore a "mask" and carefully crafted their online personas. For instance, P6 described the noticeable gap he observed between his friend's physical world personality and online persona:

> "There was one friend who appeared to be very friendly, outgoing, and used a very kind tone in their posts on Facebook. However, when we met in person after first connecting through Facebook, his image was different from what I had perceived. He wasn't friendly, and the image I had of him on Facebook didn't match with reality. It felt like he was a virtual persona created on Facebook. So, I was a bit confused in such situations."

Over time, participants described realizing that social media was actually highly curated and performative, rather than a reflection of people's genuine lives. P18 came to this realization as she observed South Koreans and recognized that they, too, face challenges in the physical world while portraying only the positive aspects on social media:

> "When I looked at posts from South Koreans, I realized that they showed only the good aspects and didn't reveal the bad sides. It was something I learned later. When I met them in person, I found out that they were all facing similar struggles and hardships, regardless of where they came from or their background... Knowing it wasn't true made me think I

> shouldn't compare. So, after realizing that, I felt a bit better."

4.2.6 Crafting an "Acceptable" and a Desired Identity. The realization that social media operated as a performative world didn't offer an immediate escape, but it reduced some feelings of inadequacy and futility, gradually steering participants towards helping them use social media to craft new identities. These identities were based on what would be deemed "acceptable" by others, but which also aligned with their desired identity. During this period, participants made a clear distinction between social media and the physical world. This separation allowed them to craft their desired identity on social media more freely, whether it was a South Korean persona they initially wished to adopt or a more specific South Korean identity like a reader (P11). P11 described:

> "I began to use it in a way that felt distant from my actual life. I wanted to post pictures that are pretty. One time, I wanted to be the person who reads books during autumn at a cafe although I usually like to read alone, away from people and noise. But I wanted to be that person, so during lunchtime, I took a book to Starbucks, posed for a photo, and posted it as if it was my daily routine."

4.2.7 Recognizing the Difference between Social Media Identity and Physical Identity. However, during the process of creating their new social media identities, several participants mentioned that they continually went through a phase of verifying whether their social media identity diverged too far from their physical world identity. They then proceeded to notice the differences between their identities in social media and the physical world, both within their self-presentation and in observing others' social media accounts.

One participant, P18, who recognized the negative impact of the disparity between their social media and real-world selves, made adjustments to their online identity. She decided to reduce overly positive portrayals, feeling a "duty to show the real side," even if it meant posting unflattering things. This shift in perspective came after P18 experienced the loss of her close NKD friend, whose Instagram depicted a stark disparity between her bright, happy, and successful online persona and her depressing experiences in the physical world. This incident prompted P18 to reevaluate her own social media approach, refraining from posting photos that deviated too far from her authentic self and using social media more authentically.

The disconnection experienced in both social media and the physical world was not merely about shifts in the participants' social media identities; it was apparent that substantial changes in their thoughts and behaviors were also taking place in the physical world. P8, while describing the influence of the "Instagram lifestyle" on his physical world, articulated that no matter how meticulously one curates their online persona, it must always be grounded to the person in the physical world:

> "It feels like the Instagram lifestyle keeps pulling me towards that direction in my physical life. Since my true self still plays a significant role on social media, I need to change the present reality the way I want to express it. For example, if I want to become a person with a lot of muscles, I can't achieve that with photoshopping. I have to start working out. If I want to take photos in beautiful clothes at beautiful places, Photoshop won't do the trick; I have to go there. Overall, it's about keeping myself in line with the direction I want."

4.2.8 Acceptance and Integration of their NKD Identity into their New Identities in South Korea. Eventually, all participants realized and started to embrace that, no matter how hard they tried, they could not erase their pasts; but instead of becoming discouraged, they came to a re-conceptualization of their identities that accepted the fact that they came from North Korea, as something that could not be changed. In this process, they started to embrace the identity of "North Korean defector" as part of a new identity within South Korean society. P9 also accepted her NKD identity by recognizing the difference as a natural consequence:

> "After some years, I started thinking about how long I would keep hiding my identity and pretending to be someone else. Saying that I was born and came from North Korea was not wrong. I felt like I had confined myself, even though being from North Korea was actually not a big deal. So, from then on, I changed my mindset to think that it was natural not to know certain things, and the things I didn't know in North Korea could be learned here. And little by little, I openly talked about being a North Korean defector."

Similarly, several participants realized that being a North Korean defector is not shameful, and they understood that they are distinct from the North Korean government. P10 expressed that this newfound perspective helped her well-being:

> "Being a North Korean defector is not a crime. It's not something to be proud of, but I feel grateful. I've experienced both aspects of life here, so I feel thankful for it. That's how I see it now."

The process of embracing a defector identity also entailed accepting a South Korean identity for some participants (n=5). In this case, they balanced the significance of acknowledging, rather than concealing, their North Korean identity as it is an unchangeable, inherent part of themselves, but also that they were living a new life in South Korea. P1 described her approach to accepting both of her identities:

> "I *am* a North Korean defector, but I pretend I am not and that I am now a South Korean. I can't change my true nature. Since it's true that I came from there, if I were to deny it, it would feel like I'm denying my own existence. So I accept it, and now I've lived here for about 13 years so that's part of who I am as well."

Integrating their former North Korean identity into their new South Korean identity, many participants experienced an improvement in mental well-being as they moved away from the internal denial of the North Korean heritage and the idealization of South Koreans as flawless individuals.

5 DISCUSSION

In this study, we examine how digital technology influences the integration process of NKDs into South Korean society. The subsequent section delves into an in-depth analysis of our findings, with a particular emphasis on the impact of social media platforms during their transition to South Korea. We also discuss potential approaches to meet the unique requirements of NKDs.

5.1 Phase-based Model for NKD's Journey of Identity Reconstruction

The proposed model builds on Van Gennep's rites of passage to describe the identity reconstruction journey of NKDs in South Korea, influenced by both physical and digital realms. The process aligns with Van Gennep's three stages: separation, liminality, and incorporation [136]. In addition, we integrate previous HCI research by Haimson (2008) and Semaan et al. (2016), to contribute to the understanding of rites of passage for NKDs [56, 122]. Note that we use social media in a broader term to encompass different platforms NKDs used where interactions between users exist to any extent, such as YouTube, Naver, and Instagram.

We include experiences, identity change, and effects (that were led by experiences or identity change) to explain this journey in each phase.

Phase 1: Separation: Detachment from the previous identity

The separation stage is the period that follows a life disruption, such as defecting to South Korea, during which individuals begin to distance themselves from their previous identity of North Korean identity [136] In this stage, NKDs encounter nuanced discrimination in person and hate speech on various online sites regarding their origin (experiences), which encourages a concealment of identity (effects) and dissolution of identity (identity change) [136], making the first step in Separation.

Van Gennep's research indicates that in this stage, individuals often find themselves physically separated from their former social networks. However, as Haimson points out, in the realm of social media, this disconnection isn't entirely absolute since individuals can keep connections alive through platforms like Facebook [64, 136]. In contrast, NKDs face physical removal and lack the means to stay connected via social media, since it wasn't a part of their life before. Although some NKDs maintain connections for a time through high-risk and unstable methods like a broker system, relying on fragile phone networks for only a few minutes of a phone call, this hardly amounts to a substantial connection.

Phase 2: Liminality: Social Media as a Space for Exploring

The liminality stage, a transitional period described as "neither here nor there," is a time when individuals fluctuate between their old and new identities. We called this as Fragmented identity, following Haimson's findings [64]. While Van Gennep viewed this stage as neutral and identity-less, Haimson challenges this that it is more multifaceted and complex, and viewing it as neutral or identity-less can be dehumanizing [64]. Van Gennep's perspective overlooks the ongoing, strenuous efforts of NKDs to explore a new identity, a process that can be daunting and have significant implications for their mental well-being.

During this liminality phase, as their original identity fades, NKDs start to shape a new identity, sparking a period of exploration. Social media serves as a 'testing ground for identity' [22], where they can embody multiple identities and undergo rites of passage, supporting Haimson's lens of social media as social transition machinery [64]. Specifically, Instagram and Facebook become a social transition machinery for identity concentration and transition work, while other platforms like YouTube and Naver facilitate identity exploration that supports this journey on Instagram [64]. Although this transition stage often includes outlets for identity disclosure, such as documenting their journey [60, 64], or accessing identity support infrastructures [122], NKDs frequently lack these outlets, since they struggle to disclose their previous identity on social media.

At first, social media is less about engagement and more about observation (experience), providing NKDs with a frame of reference for their impending transition across sites. Similar to returning veterans who use ICTs to relearn social norms and adapt to civilian life, NKDs utilize online resources to understand the expectations of dressing, speaking, and behaving in South Korean society [122]. Instead, their exploration and observation often spiral into a detrimental cycle of social comparison (effects), exacerbating the turbulence between their severed past identities and their aspirational ones (identity change). This results in a muddled representation of themselves on social media, presenting challenges in defining their identity, which cannot be reduced to identity-less but rather perplexed and complex [64].

Phase 3: Incorporation: Incorporation of the previous identity into a new identity

In the incorporation phase, NKDs recognize a disconnection between the polished lives displayed on social media and the nuanced challenges of everyday reality (experience). For instance, even South Koreans who appear flawless online are grappling with their own difficulties. This critical insight leads NKDs to reevaluate the role of social media, seeing it as an imperfect lens rather than a true reflection of society. This newfound understanding enables them to incorporate their North Korean heritage into their evolving identities, fostering self-acceptance as NKDs rather than aspiring to be South Koreans (identity change). In line with Semaan et al.' research, NKDs experience identity crises, caught between their North and South Korean identities [122]. Their adjustment contrasts with veterans who externalize adaptation through socialization and lifestyle changes. NKDs often internally navigate their identities, choosing to hide their North Korean background. Haimson's study on transgender individuals highlights a similar journey, noting that many no longer disclose their trans identity as they face less misgendering during the incorporation stage [64]. However, NKDs' experiences differ, with factors like accents influencing their physical world interactions even in this stage, whereas on social media, they can more readily blend in as South Koreans. Despite this, even those long settled in South Korea feel a stronger connection to their North Korean roots, leading them to embrace their NKD identity over a fully South Korean identity.

Diverging from Van Gennep's concept of rites of passage, this stage for NKDs is less about publicly disclosing their new identity and more about an internal journey. It involves them seeking a new sense of normalcy within their distinct identity and finding a

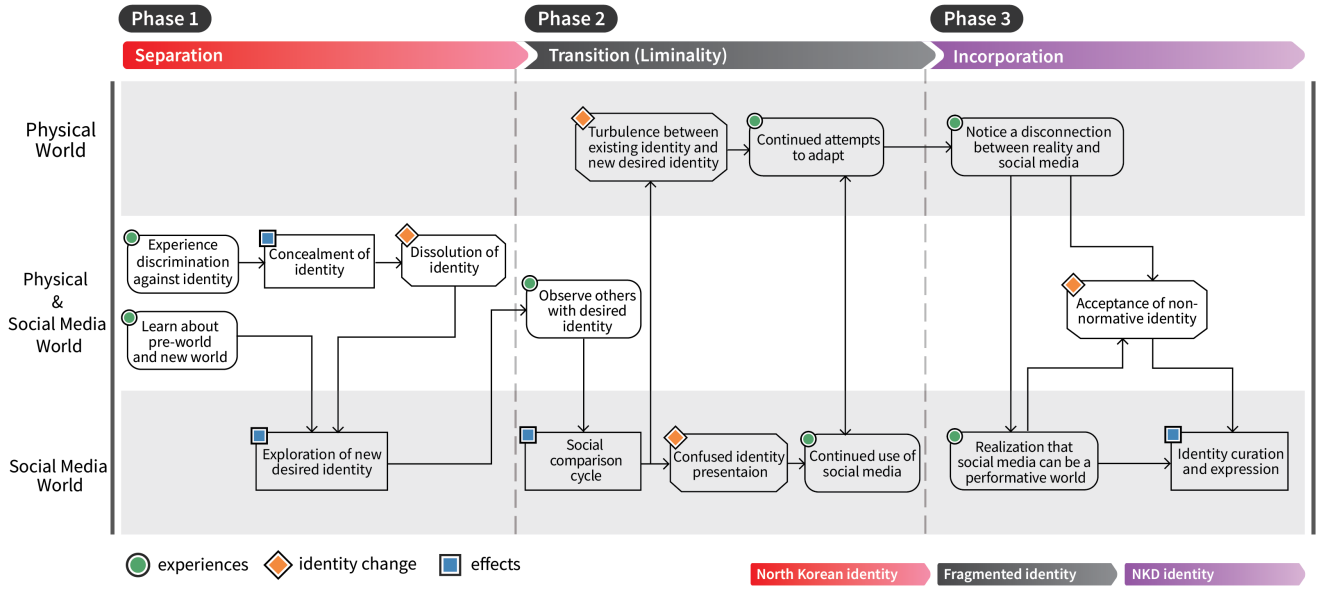

Figure 2: Phase-Based Model for NKD's Journey of Identity Reconstruction

degree of freedom from social comparisons, allowing them to use social media to express their idealized selves (effects) [98]. While Van Gennep does not explain beyond this stage, we discovered many NKDs continue to face difficulties in adapting to life in South Korea, often reminded of their past and the unresolved pain of family separation.

5.2 Identity Fulfillment and Identity Maintenance in NKD's Identity Journey

In this section, we situate our analysis of findings to their framework in aim to further understand the identity journey of NKDs in the context of major life events and social media's role in it. Corvite et al. examined how people's identities were seen to change during major life events, which included a variety spanning physical relocation, health, career, and gender identity changes among others, describing the differences in ways people undergo identity fulfill and maintain their new identities [30].

Our findings suggest that identity maintenance and fulfillment can occur during NKD's journey of identity transitions, especially during the social comparison cycle [see Figure 3] and during Incorporation phase of identity acceptance. Instead of one event leading to the fulfillment or maintenance of identity, this may be repeated in NKD's case, as NKD constantly repeats the process of exploring identities that measure up to the norm of society, to be seen as a normative identity.

In particular, the repetition of fulfillment and maintenance can be seen during the social comparison cycle, when NKDs repeat the process of presenting their desired identity and bridging the gap through imitation. However, as this is a detrimental social comparison cycle, neither identity fulfillment nor maintenance serves as an activity to effectively develop their desired identity in the long term. Instead, it can be seen as the part of the reconceptualization of identity on social media.

Moreover, in Incorporation phase, their acceptance of NKD identity can be explained as a form of identity fulfillment, as embracing the salient part of their previous identity leads them to fulfill their current, new identity. Additionally, extending into the digital world, it can be seen that NKDs fulfill their desired identity as well, by curating their desired identity freed from burdens of comparison and disassociation.

5.3 Social Media and Social Comparison

Several studies have illuminated the negative effects of social media on individual well-being, linking its usage to symptoms of depression and anxiety [123, 130, 140]. Often, this negative impact on well-being is attributed to the phenomenon of upward social comparison, a recurring event on social media platforms that tends to decrease self-esteem and consequently, psychological well-being [23, 140]. Upward social comparison occurs when individuals compare themselves against those they perceive as superior [1, 140].

Marginalized individuals are one of the most vulnerable groups of social comparison since they often grapple with a sense of geographical and cultural exclusion from mainstream society [4]. The heightened self-uncertainty that accompanies transitions drives them to seek social validation from the majority [87, 126, 145], which occurs when one's identity is affirmed and accepted as a member of society [106, 126, 128]. This process of social comparison is particularly pronounced on social media platforms, where individuals constantly compare themselves to the idealized images of others on social media.

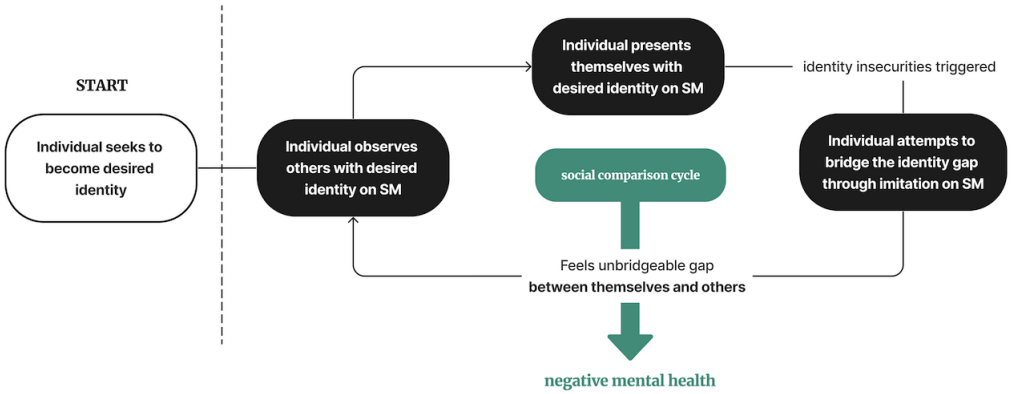

Figure 3: NKD's Social Comparison Cycle

Our findings align closely with previous studies. We discovered that participants frequently engaged in social comparisons via social media, leading to detrimental effects on their mental health. Participants felt markedly inferior to South Koreans, who have always lived lives characterized by "abundant food" (P4), "uninterrupted electricity" (P15), and "fair labor compensation" (P9). This sense of inferiority preexists any interaction with social media, positioning NKDs as already disadvantaged in terms of their psychological well-being. Moreover, studies of social media suggest that a user's subjective well-being is also a factor that can heighten the negative consequences of social comparison [42, 54, 140]. Many NKDs frequently face severe mental health challenges upon their arrival in South Korea–a time often coinciding with their initial use of social media—rooted in the traumatic experience of defection [72, 91, 99, 104].

Additionally, our study reveals that for many NKDs, social media serves as an initial step toward integration into their new society. This makes it difficult for them to disengage from social media, even when it turns into a detrimental cycle of social comparison. This cycle was common for our participants, and we illustrate it in Figure 3.

We believe addressing social media's harmful effects, particularly for marginalized newcomers in new societies who often feel isolated, is critical. Our participants find YouTube effective in depicting challenges in the physical world, with less focus on crafting an ideal persona, unlike Instagram. We advocate for fostering greater transparency and embracing diverse identities on social media as a long-term goal, while emphasizing the need for immediate support through in-situ, on-platform emotion regulation techniques and insights into others' experiences, reassuring users that they are not alone. We need to approach the implementation of features like content warnings cautiously, as the nature of these harms is subjective, and they could inadvertently lead to other unintended consequences by limiting individuals' freedom of expression. Therefore, providing an understanding of the nature of social media, particularly platforms like Instagram, could be an important first step in helping to reduce feelings of low self-esteem and isolation, recognizing these issues as common among new technology and social media users.

5.4 Identity-based Online Communities

Previous studies highlight the benefits of identity-based online communities serving as venues where individuals can find like-minded peers, access resources and support, and build connections [30, 96, 111]. Our study suggests that while identity-based communities can offer valuable resources and information, there are two main hindrances for NKD in comfortably participating in these communities: potential hindrance in their integration into South Korean society and the risk of compromising their privacy.

Suggested identity-based online communities generally adhere to the principles of identity-based attachment, prioritizing group cohesion over individual relationships and aiming to facilitate connections among members through shared experiences [30, 96]. Although our participants reported a deep and "indescribable" (P6, P10) affinity with other NKDs—indicative of bond-based attachment, which centers on individual connections—most were reluctant to engage in NKD-specific communities. They feared such involvement would impede their assimilation into broader South Korean society, leading to feelings of "stagnation" in their adjustment process (P2, P6, P8), despite the benefits of learning new information from the precedent NKDs [111].

In addition to inhibiting their assimilation process, identity-based communities present heightened privacy risks for participants with families still in North Korea. These participants expressed concerns about revealing their NKD identity online, noting that "online actions leave more evidence than offline ones" (P8). While some participants acknowledged the advantages of anonymous online communities for asking questions, our findings reveal a tension: despite recognizing potential benefits, these individuals remained hesitant to disclose any aspect of their NKD identity online even anonymously due to fears that such information "could somehow still be leaked" (P6). For instance, P18 expressed concerns that sharing specific information like her hometown with other NKDs could lead to that information being leaked back to North Korea, potentially harming her family.

Therefore, while identity-based online communities could provide essential information, the potential risks of anxiety and privacy concerns may currently outweigh these benefits for individuals transitioning from North Korea. This situation calls for alternative design considerations. Building upon the design recommendations by Ren et al. (2007), we suggest that online communities for NKDs should incorporate certain features of bond-based communities [111]. This approach would foster the development of personal relationships that extend beyond the confines of the online platform. Encouraging bond-based interactions within the scope of an identity-based community can promote a sense of belonging in a new country and provide practical support for acquiring new information [111], while also addressing concerns about privacy and safety related to revealing one's identity to a broader, potentially unknown public.

Moreover, in the context of social media platforms, where communities can be either identity-based or bond-based, our findings align with Haimson's suggestion regarding the importance of maintaining separation between social media sites [56]. This perspective is particularly relevant for NKDs, who often segment their social networks. For example, they might maintain a network of fellow NKDs on Facebook while connecting with South Koreans on Instagram. This practice supports the separation between networks, akin to how time and space separate networks in the physical world, and facilitates the development and presentation of multiple, sometimes audience-specific identities on social media [64].

5.5 Digital Literacy Intertwined with Lingual Challenges

Our study discovered that NKDs who had never used digital technology found the language barrier to be the most formidable obstacle to digital literacy in the utilization of digital tools. For most participants, the challenges went beyond merely understanding how to use digital devices; the widespread use of English in interfaces and operating systems added another layer of complexity to their struggles [55].

The concept of digital literacy has been extensively discussed across various fields [46, 53, 92, 109, 110, 133]. For instance, Pyae and Scifleet found that native English speakers had a better user experience with smart speakers, while Guo highlighted how non-English speakers encountered barriers when learning programming, including reading instructional materials, technical communication, and writing code, as they had to simultaneously learn English alongside programming [53, 109].

Given that English is the dominant language in computer systems, with most computer terminology being in English and 58% of web content in English [97, 125], South Korea has widely adopted English computer jargon like 'log-in', 'folder', 'log-out', 'ID', among others. This integration stems from decades of exposure to American culture and the government's emphasis on English education since the division of the two countries, making such terms culturally normalized within South Korea. However, for NKDs, who have had minimal exposure to English before coming to South Korea, adapting to this technology landscape dominated by English is particularly challenging.

Our research highlights the urgent need to address digital comprehension challenges in the HCI field, particularly for marginalized individuals unfamiliar with English or digital technologies. While simply changing system languages or quickly mastering English is not immediately practical, there is a need for specialized, intuitive tools to ease the transition to digital technology. These tools should blend familiar practices (calling, texting, watching videos) with new digital concepts (online personas, privacy settings, online anonymity), supporting their unique needs and fostering socio-technical adaptation. This approach transcends language barriers and narrows the digital literacy gap, promoting a more inclusive digital landscape [56, 74].

5.6 Expanding HCI Research to Include Non-Users

In conclusion, we emphasize the importance of HCI and CSCW researchers to broaden their study on digital spaces, including both users and non-users. While existing studies have addressed the positive and negative impacts of social media and proposed design changes to mitigate harm and empower users [41, 59, 68, 122, 147], we recommend investigating the socio-cultural aspects [63] and social and economic inequalities [44] of technology non-users. Understanding the experiences of those disengaged from social technologies, whether permanently or temporarily, will provide a more comprehensive perspective. For example, although anonymity on social media can alleviate stress and promote solidarity [12, 13, 20, 62], our findings suggest NKDs may feel heightened risk due to safety concerns. Thus, addressing the specific challenges of these groups, and avoiding one-size-fits-all solutions is crucial [61, 118, 122]. This approach will foster a more inclusive and empathetic digital environment, particularly beneficial for populations experiencing identity shifts, cross-cultural transitions, and sociotechnical adaptations.

6 LIMITATIONS AND FUTURE WORKS

Our study has several limitations that should be considered when interpreting the findings. While our framework captured recurring themes from our participants, we do not claim these observations to be universally representative of all NKDs. Our study sample primarily consisted of individuals in their 20s and 30s who had integrated into South Korean society shortly after their arrival. This demographical skewness potentially limits the generalizability of our findings. For example, the role of social media in identity formation could manifest differently among older generations of NKDs and may also vary based on the level of integration within South Korean society. Additionally, there may be NKDs who, due to limited social interactions with South Koreans, have more stable perceptions of identity without the influences of social media. Some NKDs might also have differing attitudes toward social comparison, which were not fully explored in our study.

Future research should focus on developing technology, spaces, tools, and methods to assist NKDs' socio-technical adaptation to a digital world. We plan to use participatory design workshops to include their perspectives and address their needs, specifically exploring how digital technology and social media can facilitate

smoother onboarding and assist in less challenging identity reconstruction.

7 CONCLUSION

The number of NKDs is expected to rise, presenting a unique case study contrasting two cultures—one of the least digitally connected and the other among the most. Our findings suggest that digital technology can support NKDs' transition, despite the numerous challenges they face. We discovered that NKDs' identities undergo significant reconstruction during their transition to South Korea, viewed through van Gennep's rites of passage framework. Additionally, we underscore the importance of improving socio-technical adaptation, particularly to improve the onboarding of newcomers to social media and digital technology, especially those undergoing life transitions like relocation, where digital technology plays a crucial role.

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Appendix A: Identified daily struggles in relation to technology (Section 4. Findings)

Daily Struggles	What They Did	How It Affected	What They Wish They Knew
Not knowing where to buy clothes and underwear	Did what they did back in North Korea - went to a traditional market	Lowered self-esteem	Online shopping (fair opportunities for everyone)
Not being able to speak up about prices due to language barrier	Accepted the price the store owner offered	Felt disadvantaged	
Difficulties in communication due to North Korean dialect	(1) Didn't speak out in public for years (2) Practiced to change the dialect	(1) Caused severe isolation (2) Lowered self-esteem (3) Became self-conscious when speaking	
Not knowing how to get places	Wandered aimlessly until they came across a similar location	(1) Failed to reach the destination (2) Wasted time (3) Feeling incompetent	(1) A platform where they can ask questions (2) Maps (mobile applications)
Not knowing how/where to look up for information	Spent a long time on gaining the information	(1) Felt burdened (2) Lost confidence in learning all information	(1) A platform where they can ask questions (2) Capabilities of search engines
Not knowing digital-related (mostly English) terminology	(1) Tried to pretend understanding the term (2) Asked for other North Koreans	(1) Not being able to fully use technology (2) Felt the anxiety of not knowing (3) Felt excluded from the society	
Not knowing how to dress	Looked up for information about fashion trends online	Tried to embrace what they learned, but felt awkward and self-conscious	(1) Youtube "Lookbook" videos (2) Trends on Social Media (3) Online shopping websites
Not understanding South Korean humor	(1) Actively watched contents to learn (2) Accepted the difference and moved on	(1) Felt confused (2) Felt the gap between two cultures	(1) A guide to basic South Korean and world culture 101
Not understanding commonly known cultural references	(1) Actively watched hundreds of movies that are "classics"	(1) Felt anxious (2) Felt excluded	
Feeling excluded from the South Korean communities	(1) Cut off contact (some superficially) with the North Korean community	(1) Disclosed their North Korean identity (2) Felt sense of longing (3) Felt incompetent	(1) True South Korean friend (2) Anonymous chat where they can share their stories
Felt discomfort in using their North Korean name	(1) Legally changed their names (2) Used "nicknames" and not disclose the real name	(1) Felt more at ease (2) Felt empty for giving away the only thing their parents gave	

Appendix B: Identified use of struggles (Section 4. Findings)

Platform	Purpose	What They Liked	What They Disliked	Change in Action (if any)
Facebook	Keeping up with the trends	Being able to blend in with South Koreans	Feeling pressured to join the platform	Used applications that increase the number of followers
	Adapting to the South Korean culture	Being able to disclose their North Korean identity	Friends with North Korean names leaving comments	(1) Used nicknames for IDs to hide the North Korean names (2) Deleted the North Korean friends' comments (3) Unfollowed North Korean friends
	Connecting with as many people as possible	(1) The sense of being connected to others and being cared for (2) Having someone to have conversations with	(1) Receiving inappropriate messages from followers (2) Followers stealing and misusing photos they uploaded (3) Feeling lonely because they are not meeting offline	(1) Received shock (2) Blocked inappropriate followers
	Connecting with other North Koreans in South Korea	Getting to know other North Koreans	(1) Facebook automatically recommends only followers from North Korea (2) Concerns that their backgrounds would be revealed (3) Concerns that the family back in North Korea might be affected	
	Expressing themselves	(1) Receiving likes and attention from other followers (2) Being able to show that their lives are similar to those of other South Koreans	(1) Becoming addicted (2) Being sensitive about people's reactions (3) Concerns that the family back in North Korea might be affected	(1) Learned which photos receive more likes (2) Posted photoshopped selfies (3) Deleted posts when they later felt it was out of fashion
	Viewing others' posts	(1) Helpful in learning South Korean culture (2) Not having to share personal information or posts of selves	(1) Starting comparing self with others and feeling envious (2) Felt pressured to react to others' posts	(1) Cut off contact with the ones they felt different to (2) Stopped commenting (3) Stopped using the platform
	Communicating with friends without contact information	Connecting to acquaintances they could not contact otherwise		

	Accessing Facebook community information	Helpful in adapting to South Korean culture	(1) Feeling pressured to join the platform (2) Feeling that their personal information is exposed	
Kakao Story	Expressing themselves through photographs	Receving likes and attention from other followers	Being sensitive about people's reactions	
	Viewing others' posts	Helpful in learning South Korean culture	Felt pressured to react to others' posts	
	Learning South Korean culture to keep up with trends	Being able to understand South Korean culture on their own		
Instagram	Keeping up with the trends	Being able to blend in with South Koreans	Feeling pressured to join the platform	Used applications that increase the number of followers
	Accessing helpful or interesting content and information	Being able to easily access contents of interested subject	(1) Feeling confused and fatigued by overflowing information (2) Spending too much meaningless time	(Temporarily) Stopped using the platform
	Expressing themselves through photographs & Creating a space to store memories	(1) Showing others that they could do as much things as others (2) Being able to curate their impression (3) Showing the 'pretty sides' of self	(1) Not knowing how to make desirable posts (2) Felt fatigued and empty uploading photos (3) Concerns about personal information being exposed (4) Being perceived solely by the images on social media	(1) Deleted posts when they later felt it was out of fashion (2) Decided not to upload too much photos of self (3) Felt the need to be careful about what they share (4) Became conscious of what they do in real life (whether they could post it on Instagram)
		Being able to hide North Korean identity	Concerns that others might find out their backgrounds	(1) Deleted the North Korean friends' comments (2) Unfollowed North Korean friends
	Exhibiting social relationships	Feeling well-adjusted to South Korea	(1) Suspecting differences in the way people treat others in real life and on the platform (2) Being conscious of the number of followers	Felt disappointed or skeptical with real(physical)-life relationships
	Viewing friends' posts	Being able to look into peer South Koreans' lives	(1) Accessing unnecessary and excessive information (2) Starting comparing self with others and felt envious	(Temporarily) Stopped using the platform

			(3) Spending too much meaningless time (4) Decrease in self-esteem	
	Seeing motivational videos or success stories	(1) Feeling encouraged and empowered (2) Being able to access the stories of influential people		
YouTube	Learning to hide North Korean identity and adapt to South Korean culture	Being able to change the North Korean dialect and way of speech on their own	Feeling the changes were not enough	Felt discouraged
	Learning South Korean culture to keep up with the trends (humors, fashion, make-up, idol music videos)	(1) Being able to understand South Korean culture on their own (2) Being able to blend into conversations with peer South Koreans	Not being able to fully apply what they learned	Felt incapable
	Learning practical information necessary for adaptation (hospitals, childcare, educational)	Being able to get the information through videos without having to read		
	Relieving stress when feeling down	(1) Watching videos without having to think (2) Being able to rely on the platform	Being overly dependent and spending too much meaningless time	
	Uploading videos	Easily sharing the contents with friends	Receiving hate comments	Stopped uploading
Naver	Learning practical information necessary for adaptation through searches (news articles, vocabulary, maps, education)	Being able to learn very fast without having to ask others		
	Learning South Korean culture to keep up with the trends (humors, fashion, make-up, idol music videos)	(1) Being able to understand South Korean culture on their own (2) Being able to blend into conversations with peer South Koreans		
	Receiving emails with friends	Being able to connect with fellow North Koreans		

Appendix C: Flowchart detailed supplemental figure description for Figure 2

Figure 2. Phase-Based Model for NKD's Journey of Identity Reconstruction

The flowchart has the following elements:

Phase 1: Separation of the North Korean identity.

1. Experience: experience discrimination against identity in the physical and social media world.
    a. Flows to 2.
2. Effect: concealment of identity in the physical and social media world.
    a. Flows to 3.
3. Identity change: dissolution of identity in the physical and social media world.
    a. Flows to 5.
4. Experience: learn about pre-world and new world in the physical and social media world.
    a. Flows to 5.
5. Effect: exploration of new desired identity in the social media world.
    a. Flows to 6.

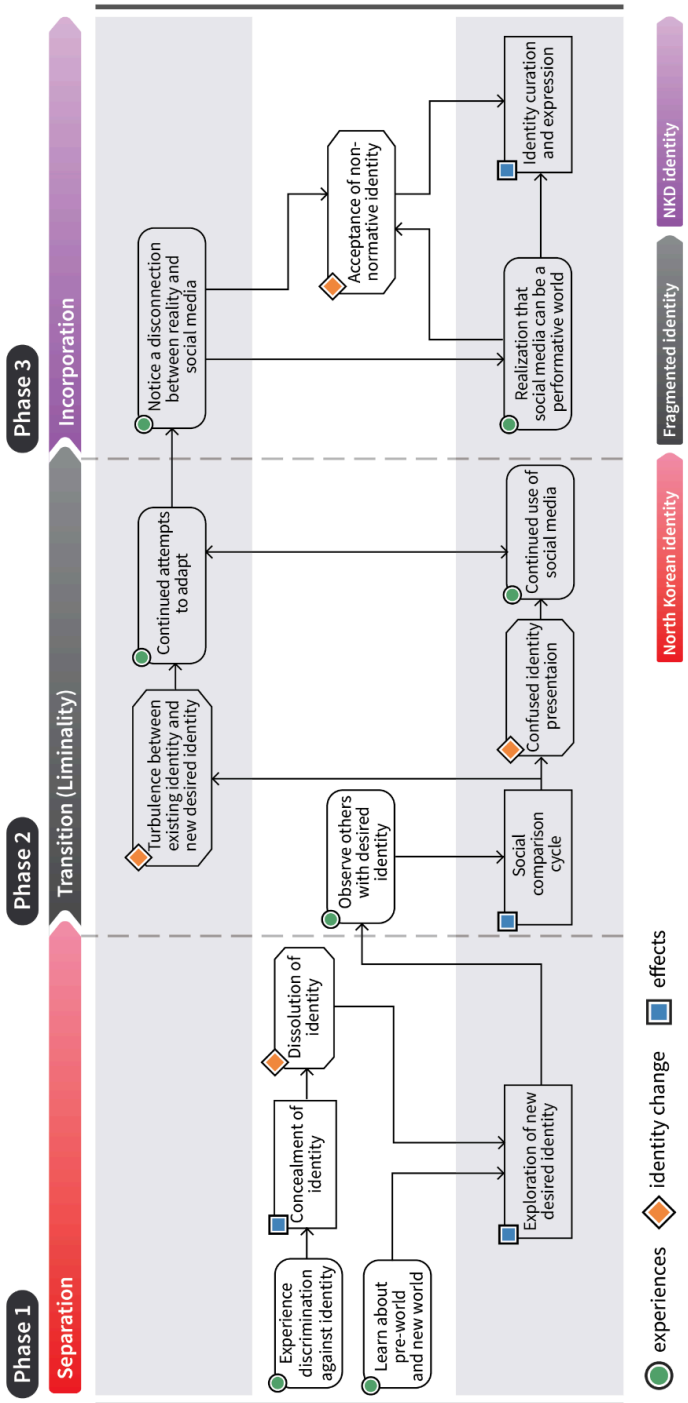
Phase 2: Transition (liminality) of the fragmented identity.

6. Experience: observe others with desired identity in the physical and social media world.
    a. Flows to 7.
7. Effect: social comparison cycle in the social media world.
    a. Flows to 8.
    b. Flows to 10.
8. Identity change: confused identity presentation in the social media world.
    a. Flows to 9.
9. Experience: continued use of social media in the social media world.
    a. Flows to 11.
10. Identity change: turbulence between existing identity and new desired identity in the physical world.
    a. Flows to 11.
11. Experience: continued attempts to adapt in the physical world.
    a. Flows to 9.
    b. Flows to 12.

Phase 3: Incorporation of the NKD identity.

12. Experience: notice a disconnection between reality and social media in the physical world.
    a. Flows to 13.
    b. Flows to 14.
13. Experience: realization that social media can be a performative world in the social media world.
    a. Flows to 14.
    b. Flows to 15.
14. Identity change: acceptance of non-normative identity in the physical and social media world.
    a. Flow to 15.
15. Effect: identity curation and expression in the social media world.

Appendix D. Phase-Based Model for NKD's Journey of Identity Reconstruction



Appendix E. NKD's Social Comparison Cycle