Digital wellbeing: Scale development and integrative model testing

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Abstract

The rapid transition to the digital age hassled to the ubiquitous use of digital technology globally, resulting in both beneficial outcomes and new threats to the digital wellbeing of users. Threats include digital world end-users no longer feeling obliged to control screen use or confined by social ethics. However, there is growing evidence that digital addiction increases depression, loneliness, abuse, and suicidal behaviour. Digital wellbeing is an emerging concept that addresses the impact of screen use on user's wellbeing. In the scholarly domain, research into digital wellbeing has been impeded because of the lack of consensus on the conceptualisation and measurement of digital wellbeing, suggesting the need to further explore digital wellbeing experiences. While some existing studies have examined the impact of digital media use on subjective wellbeing, much is to be learned about how users' digital literacy and their personal and social circumstances foster digital wellbeing, which is a direction pursued in this study in the context of marketing. Drawing on social cognitive theory and social capital theory, this research sought to 1) conceptualise and develop a scale for measuring digital wellbeing, and 2) examine how self-efficacy and online social capital mediate (and digital addiction moderates) the influence of digital literacy on digital wellbeing.

This study adopted a mixed-method design to address the research problem, involving semi-structured in-depth interviews and two online surveys. Study 1 focused on scale development, encompassing a qualitative exploration of the meaning and dimensions of digital wellbeing. This was followed by a quantitative examination of the validity and reliability of the scale. Next, a conceptual model capturing the hypothesised relationships of digital literacy, self-efficacy, online social capital, digital addiction, and digital wellbeing was developed and empirically tested in study 2.

The in-depth interviews of study 1 involved 20 informants, with results suggesting that digital wellbeing is experienced through the cognitive and affective exertions of the users in the online context. Four dimensions were proposed: the state of emotional resilience, the state of agency, the state of communion, and the state of social connections. The quantitative scale purification resulted in a reliable

and valid digital wellbeing scale. The results of study 2 conceptual model testing revealed the role of users' personal and social circumstances in increasing digital wellbeing, the positive moderating effect of digital addiction on digital literacy, and the role of online social capital in enhancing the digital wellbeing of highly addicted users.

This thesis offers theoretical insights into the mechanisms needed to explain how digital literacy affects consumers' digital wellbeing and how a healthy digital community can be created. The study also advances the theoretical understanding of digital wellbeing and contributes a measurement scale, which is currently not available in the marketing literature. The study encourages marketers to tailor their products and services in a way that ensures the digital wellbeing of end-users. The study informs policymakers on the experiential state of digital wellbeing and the need to increase the awareness of digital literacy amongst addicted users. The study also helps end-users gain an in-depth understanding of the balance between online screen use and wellbeing.

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Attestation of Authorship

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

10-02-2023

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Signed

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Chapter One: Introduction

1.1 Background

Globally, smartphone use increased by 1.57 billion in 2014, 2.7 billion in 2017, 3.5 billion in 2020, and 3.8 billion in 2021 (Statista Search Department, 2022). As per the 2022 statistics, the number of global mobile devices stood at 15 billion and is expected to reach 18.22 billion in 2025 with an increase of 4.2 billion (Statista Search Department, 2022). Rapid digital transformation has replaced desktop computers with smartphones and tablets that offer access to the internet. These devices are primarily used by end-users for social and entertainment purposes such as online gaming, accessing social media, surfing the internet, chatting, blogging, and shopping (Peters et al., 2018). Vulnerable users with poor digital literacy are at increased risk of abuse as they are more susceptible to online bullying and exposure to inappropriate and harmful content (Diepeveen & Pinet, 2022). The European Information Society defines digital literacy as "the awareness, attitude, and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyze, and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process" (Martin, 2005, p. 135). Proficient information and communication technology users can safely navigate the digital world based on their digital literacy skills that include technical, social, and emotional skills. These skills protect users from online harm and produce positive wellbeing outcomes in the digital world (Martin 2006; Markauskaite, 2006; Oliver & Tomei, 2000).

Digital information and communication overload coupled with Covid-19 has led to the emergence of a new era of 'digital wellbeing' with new sets of knowledge for the 21st century. The Covid-19 pandemic greatly increased screen use and forcibly integrated technology into the daily routine within a short span of time (Dennis, 2021). This brought changes to the online behaviour of users by shifting their personal life and social interaction to the digital world. The Covid-19 situation also accelerated institution and business plans to speed-up digital transition, resulting in new routines in daily life (Abeele & Nguyen

2022; Dennis, 2021). However, excessive online screen use is likely to affect the digital wellbeing of users. This flags the need to develop a healthy online life.

Owing to the pandemic, rapid digital transformation, changes in lifestyle, engagement patterns, etc., that are occurring in all areas of information and communication technology (social media, internet of things, cybersecurity, etc.), it is essential to advance the theoretical notion of digital wellbeing and to identify what drives it (Dennis 2021; Gluckman & Allen, 2018). Past marketing literature posits digital wellbeing as the state of being content and comfortable with the role that technology occupies in an individual's life (Walker & De Vito, 2019). Some authors theorise digital wellbeing as a subjective experience of achieving an optimal balance between real and online lives (Abeele, 2020; Gui et al, 2017). Based on the existing literature, the working definition of digital wellbeing is a state of optimal balance achieved through cognitive and affective appraisals that contribute to subjective wellbeing. This study further posits that digital wellbeing is an extended version of subjective wellbeing. The existing literature shows that digital wellbeing is dependent on how an individual user manages his/her identity in the online environment and balances daily activities. Connectivity to digital media and devices has increased dramatically and it is anticipated that this trend will persist into the future. Hence, research is needed to first understand the conceptualisation of digital wellbeing and its underlying dimensions before studying the factors that foster digital wellbeing.

Digital literacy and digital wellbeing are relatedly distinct concepts, digital literacy equips users with skills and the knowledge needed to effectively use digital tools and, to safely navigate the digital world (Vissenberg, 2022). On the other hand, digital wellbeing ensures that users activities and engagement are channeled to balanced online experiences, satisfaction and enhanced wellbeing while minimizing the risks associated with unhealthy digital use (Abeele, 2022). The study considers the relationship between digital literacy and digital wellbeing as vital constructs that enable users to thrive in the digital world.

The relationship between digital literacy and digital wellbeing can be influenced by the personal and social circumstances of users. This study draws insights from social cognitive and social capital

theory to explore the role of online social capital and self-efficacy in shaping the impact of digital literacy and digital wellbeing. Social capital is defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 242). Self-efficacy refers to the ability of users to direct information and communication to satisfaction (Bandura, 2001). Earlier studies have shown the positive impact of offline social capital and self-efficacy on psychological wellbeing (Williams, 2016; Priori, 2016). Integrating the two constructs in the study will help understand users' personal and social circumstances that lead to digital wellbeing.

Digital literacy skills can help users process online information. However, overuse and misuse of information and communication technology can lead to mental and physical health problems. The root cause of these issues is digital addiction which is prevalent among end-users (Berthon et al., 2019; Kuss & Griffiths, 2011). Griffiths (1996) initially proposed the concept of digital addiction and defined it as human-machine interaction, which is non-chemical in nature. Originally, addiction was investigated only in the field of medicine. However, recent research maintains that addiction is inclusive of all ranges of behaviours in all spheres of life, including the digital realm. The existing literature defines digital addiction as a conflict in managing behavioural consumptions, whereby an individual is unable to reasonably manage a digital lifestyle, daily routines, and other pursuits (Hirschman, 1992). Research on digital addiction has shown that individuals experience poor mental health, poor cognitive functioning, emotional problems, social isolation, lack of sleep, and disconnection from reality due to increased screen time (De-Sola Gutierrez et al., 2006). Prior research has established that uncontrollable and harmful use of internet technology diminishes users' wellbeing (Alheneidi, 2019; Byun et al., 2009; Griffiths, 1998; Leung, 2004; Young, 1998a, 1998b). To overcome digital addiction and stay well-balanced, end users must be critical when evaluating digital stimuli and steer themselves towards a sense of satisfaction, which is characterised as a state of digital wellbeing (Alavi et al., 2012). This study distinguishes digital addiction and digital wellbeing based on the notion of 'balance.' Digital addiction pertains to the

excessive and harmful digital use that diminishes wellbeing, whereas digital wellbeing emphasises a healthy digital use that enhances the overall sense of wellbeing (Abeele, 2022).

Because digital wellbeing is affected by underlying constructs such as digital literacy, digital addiction, self-efficacy, and online social capital, it is essential to clarify the theoretical understanding of digital wellbeing. Furthermore, to provide empirical evidence of the relationship between these constructs, there is a need to develop a digital wellbeing scale followed by conceptual model testing. The next section discusses the theoretical issues associated with the concept of digital wellbeing.

1.2 Problem statement

Digital networking sites have recently hosted a number of harmful social challenges like the Corona virus challenge, the Back cracking challenge, the Birdbox challenge, the Kiki challenge, the Ice bucket challenge, the Blue whale challenge, and many other harmful activities and abusive viral content that impact consumers' digital wellbeing. While screen use can offer beneficial wellbeing outcomes, harmful use can negatively impact wellbeing. The experiences that affect users' screen time are the core of digital wellbeing research.

From securing a livelihood and establishing social relationships to raising the next generation, we depend highly on digital media (Gluckman & Allen, 2018). The phenomenon of constant connectivity and access to digital media is associated with the overall quality of life. Studies have shown that digital devices like smartphones and tablets are tapped 2600 times per person (Dscout, 2016), and people spend a minimum of three to five hours a day on smart devices (Abeele, 2020). Prior studies have associated increased digital media use with negative wellbeing because it hinders offline social activities and creates anxiety, depression, emotional exhaustion, sleep deprivation, and other health problems (McDaniel & Drouin, 2019; Lanaj et al., 2014). The digital world is not neutral towards harmful behaviours and end-users need special cognitive and affective knowledge to maintain digital wellbeing. Furthermore, past research on digital wellbeing has been criticised for failing to capture the complexity of the relationship between screen use and wellbeing (Gui et al., 2017).

In the marketing literature, research has focused on the frequency and intensity of social media use (Trifiro, 2018). For example, Verduyn et al. (2017) studied active and passive usage patterns and their impact on subjective wellbeing. Existing studies on usage patterns and subjective wellbeing reveal mixed findings (Verduyn et al., 2015; Qian ding et al., 2017; Kross et al., 2017) and there is no clear evidence on how usage patterns might increase/decrease subjective wellbeing. However, while enormous efforts have been made on examining the effect of digital media use on subjective wellbeing, there is much to be investigated about its impact on digital wellbeing. Many earlier studies have probed the motives for staying online (Ryan et al., 2014; Wang et al., 2016; Burns & Gottschalk, 2019; Hillbun, 2019). The findings reveal that motives induce users to stay online longer, creating disparities in wellbeing outcomes. Higher reliance on the digital world and increased screen use have been found to cause poor psychological wellbeing and low subjective wellbeing (Hendry, 2020). Again, the impact of excessive screen use on digital wellbeing is yet to be identified.

Several authors have defined digital wellbeing while focusing on subjective wellbeing and other aspects of wellbeing (Powell, 2020; Wright, 2018; Birnholtz et al., 2019; Abeele, 2022). Digital wellbeing has been studied under various assumptions such as traditional media use effects (Burr & Floridi, 2020). However, other definitions posit digital wellbeing as the long or short-term abstinence from screen use (Allen, 2022) and the optimal balance between the benefits and drawbacks of mobile connectivity (Abeele, 2020).

The general definition of wellbeing refers to the state of optimal psychological experience and functioning (Deci & Ryan, 2008). However, in the existing literature on digital wellbeing, scholars tend to conceptualise digital wellbeing from a negative perspective based on excessive and unhealthy screen use (Abeele, 2020) rather than a neural or positive perspective towards screen use. Therefore, in line with the general meaning of wellbeing, there is a need to conceptualise the state of digital wellbeing based on the aspect of 'balance' between the benefits and drawbacks of digital consumption. Increasing empirical evidence on decreased psychological wellbeing, negative coping styles, functional impairment, multitasking, and poor attention within the digital environment emphasises the need to more accurately

conceptualise digital wellbeing in order to help address the imbalance in online screen use (Abeele, 2022; Gui et al., 2017). A critical review of the existing digital wellbeing literature shows there is no consensus on the definition of digital wellbeing. Furthermore, there is no clear conceptualisation of the underlying dimensions of digital wellbeing in the existing marketing literature – despite being an important academic domain that can contribute to an understanding of this wellbeing.

Digital wellbeing has been observed in two ways: objectively and subjectively. The objective measure of digital wellbeing includes digital tools that assist users in minimising digital distractions. Some studies that have sought an objective measurement of digital wellbeing and focused on the usefulness of digital wellbeing interventions; however, they show inconclusive findings, indicating practical limitations (Thomas et al., 2022; Murray et al., 2016). The subjective measurement of digital wellbeing focuses on the individual-centred approach to managing screen use. It aims to assess the cognitive and behavioural approaches employed to balance screen use. The subjective measurement of digital wellbeing is superior to objective measurement because it focuses on a user's digital motives, habits, and routines (Dadischeck, 2021). Moreover, digital wellbeing is a broad concept comprising subjective aspects including self-perception, personal ideals, social norms, social expectations, and objective material conditions (Gui et al., 2017). Therefore, an effective way to address all these components is through the development of a psychometrically sound instrument that captures individual-centred approaches to screen use that prevent digital addiction.

So far, researchers have used existing general psychological and subjective wellbeing measures to assess subjective wellbeing in the online environment (Bolton et al., 2013; Ryff, 2008; Zhen et al., 2020). However, the measurement issues associated with adapting offline wellbeing scales to the online context have created validity problem and inconsistent findings (Zhen et al., 2020). These issues have received limited academic attention and the lack of standardised measures of digital wellbeing presents a critical gap in the marketing literature in particular.

While personal cognition and social connections are regarded as increasing digital wellbeing, an extensive review of the existing literature reveals a lack of empirical evidence of how digital wellbeing is

influenced by personal and social circumstances. Past studies on digital media use have revealed how personal and social factors can enhance psychological wellbeing, subjective wellbeing, and quality of life (Arezzo & Giudici, 2017; Chen et al., 2010; Vissenberg et al., 2022). However, there is a lack of evidence on how digital literacy, self-efficacy, and online social capital affect screen use and digital wellbeing. Moreover, while digital addiction has been found to diminish psychological wellbeing (Brand et al., 2016; Elhai et al., 2016; Ho et al., 2014; Lin et al., 2014), the moderating effect of digital addiction on digital wellbeing is yet to be identified.

Digital media use and human wellbeing research have been at an impasse for a long time because of conceptual and measurement concerns pertaining to the digital wellbeing construct (Abeele, 2020). This issue of how this construct can be of more use remains unclear. To close the gap, there is a need to consider the subjective experiences of end-users and develop a conceptual model that provides empirical evidence on the experience of digital wellbeing.

Based on the above discussion, the study aims to conceptualise and develop a digital wellbeing scale that assesses a user's approach to screen use. This will be followed by conceptual model testing that examines the relationship between digital wellbeing and digital literacy, self-efficacy, online social capital, and digital addiction.

1.3 Research objectives and research questions

The present study seeks to advance the theoretical notion of the digital wellbeing of end-users. Therefore, the research objectives address the gaps in the existing marketing literature on digital wellbeing. The research objectives are to 1) delve into the theoretical notion of digital wellbeing from users' perspective; 2) develop and validate a multidimensional scale of digital wellbeing; and 3) test a conceptual model to establish the nomological validity. To address the objectives, the present study seeks to answer the following research questions:

1) How is digital wellbeing conceptualized from the perspectives of subject matter experts, academics, and end-users? What are the dimensions of the digital wellbeing construct, and how should it be measured?

2) How does digital literacy influence digital wellbeing, and how is this relationship mediated by self-efficacy?

3) How does digital literacy influence digital wellbeing, and how is this relationship mediated by online social capital?

4) How does digital addiction moderate the relationship between digital literacy and digital wellbeing?

5) How does digital addiction moderate the mediating effect of self-efficacy and online social capital?

1.4 Research design

This thesis used a mixed methods research design to address the research questions. Study 1 included a qualitative and a quantitative phase for digital wellbeing scale development. First, the qualitative study was conducted using in-depth interviews to explore the meaning and dimensions of the digital wellbeing construct. The interviewees included subject-matter experts, academics, and end-users. Thematic analysis was used to analyse the interview data. The item pool developed in the qualitative phase was reviewed by an expert panel to establish the face validity of the scale. This was followed by a quantitative study to assess the reliability and validity of the scale. An online survey was conducted with n=280 participants recruited by MTurk to validate the scale.

Study 2 of the thesis focused on conceptual model testing comprising a quantitative study. This included an online survey, which was conducted with n=500 participants via MTurk. Hayes PROCESS Model was used to assess the direct, mediating, and moderated mediation effect between digital literacy, self-efficacy, online social capital, and digital wellbeing.

1.5 Significance of the study

The conceptual framework developed in the study drew on social cognitive theory and social capital theory. Empirically testing the conceptual framework is likely to extend the potential applicability of the theory in examining digital wellbeing. Tapping into the direct wellbeing experiences of end-users in the study contributes to the body of knowledge in uncovering the multifaceted nature of digital wellbeing and its relationship with digital literacy. The conceptual framework developed in this study offers theoretical insights into the relationship between digital wellbeing and digital literacy, self-efficacy, online social capital, and digital addiction. Establishing the relationship between digital literacy and digital wellbeing is important for dealing with and preventing emotional wellbeing challenges and can form the basis for netiquette and digital citizenship. Taking a digital literacy skill-based approach towards digital wellbeing can reduce social inequalities and promote resilience in online and offline spaces (Yap & Lim, 2023). By incorporating user's self-efficacy and online social capital in the conceptual framework, the outcomes of the study will help build the resilience and knowledge of users to enable effective self-control and meaningful online interactions (Lyngs, 2019), leading to a healthy digital community that precludes cyberbullying, online harassment, harmful challenges, and online addiction (McCallum & Price, 2016). Empirical testing of the conceptual framework offers insights into how user's self-efficacy and online social capital can aid in developing interventions aimed at increasing digital wellbeing.

Theoretically, the findings of the study provide empirical evidence of the positive relationship between digital literacy and digital wellbeing. Further, the mediating effects of self-efficacy and online social capital confirm the role of personal and social factors in increasing digital wellbeing. Specifically, the mediating role of self-efficacy reveals how digitally literate users can balance their screen use through self-belief, while the mediating role of online social capital reveals how digitally literate users can balance their screen use through maintaining online social relationships. Lastly, the impact of digital addiction on digital wellbeing extends the understanding of how users who exhibit digital addiction can manage their

digital wellbeing. Particularly, the moderated mediation effect of digital addiction reveals the importance of digitally literate users' utilisation of their personal and social circumstances to attain digital wellbeing

The study adds to the current debate on the conceptualisation of digital wellbeing in the marketing literature by capturing the essence of the concept and revealing the fundamental states of digital wellbeing. The results of the study extend the existing definitions of digital wellbeing by clarifying the domain of the construct and the underpinning dimensions. Furthermore, existing measures on excessive digital use and subjective wellbeing have failed to accurately capture the circumstances of users in the online context. This study contributes to the academic body of knowledge with a valid scale that measures digital wellbeing in the online context. This overcomes the measurement issues associated with the adaptation of existing scales to a different context by offering a standarised scale that measures the impact of online screen use on wellbeing. Overall, the study offers scope for further research by extending the literature on the digital wellbeing of end-users.

Practically, this research is expected to assist individual users to build a healthy relationship with technology by gauging their level of digital wellbeing in a fast-paced digital life. End-users will be able to assess their level of digital wellbeing by considering their self-efficacy and online social networks. It is hoped that end-users will be able to channel their digital literacy to build healthy digital practices, with or without the use of digital wellbeing interventions. Marketers will be able to tailor their digital products, services, and communication to support the digital wellbeing of end-users. Other relevant stakeholders such as smart device manufacturers and mobile app developers could use the knowledge of what underpins the dimension of digital wellbeing in designing interventions aimed at fostering digital wellbeing. This study notifies policymakers and regulators to bring together media and researchers to produce more prosocial and personally helpful content that has the potential to largely enhance an individual's self-concept. Educators must take note of the side effects of technostress on the digital wellbeing of users and develop programmes that support individual needs. The study will help the Government to advocate proactive policies to prevent accidents and suicides pertaining to the darker sides of social media platforms.

1.6 Definition of the key terms

Digital wellbeing: Digital wellbeing can be defined as a psychological experiential state of optimal balance between the positive and negative effects of digital consumption. Digital wellbeing comprises an individual's cognitive and affective appraisal of digital consumption, which involves the state of agency, state of communion, state of emotional resilience, and state of physical care, which significantly contribute to subjective wellbeing in its hedonic and eudemonic dimension.

State of emotional resilience: The state of emotional resilience is an experiential state of digital wellbeing, in which a user experiences appraisal of positive emotions and copes with negative emotions caused by digital connectivity.

State of agency: The state of agency is an experiential state of digital wellbeing, in which a user experiences a feeling of power, dominance, and competence over digital consumption.

State of communion: The state of communion is an experiential state of digital wellbeing, in which a user feels morality, kindness, and helpfulness in interpersonal connection in the digital world.

State of physical care: The state of physical care is an experiential state of digital wellbeing, in which a user experiences a physically healthy and active lifestyle alongside their digital consumption.

Digital literacy: Eshet-Alkalai (2004) defines digital literacy as the survival skills required in the digital era. It equips users with the skills required to safely navigate the digital world.

Self-efficacy: Psychologist Bandura (1986) defines self-efficacy as an individual's belief in their capabilities to exert control over an event that affects them. Self-efficacy is the foundation for wellbeing and task attainment.

Online social capital: Nahapiet and Ghoshal (1998, p. 242) define online social capital as "[t]he sum of the actual and potential resources embedded within, available through, and derived from the network of

relationships possessed by an individual or social unit". In the current study, it is viewed as a facilitator of the social system that benefits the users and the community (Li & Chen, 2022).

1.7 Outline of the thesis

This thesis is composed of six chapters. Chapter 1 introduces the research it comprises the research background, research objectives, research questions, a summary of the research design, and the significance of the study.

Chapter 2 provides a critical review of the existing literature on digital wellbeing in the marketing and psychological disciplines. The literature specifically focuses on the definition and measurement of digital wellbeing. This chapter includes details on supporting theories and the development of the conceptual framework. The chapter ends with hypotheses development.

Chapter 3 provides a detailed outline of the research design used in the study. This section covers the justification of the research paradigm and the mixed methods research design demonstrated by study 1 and study 2. This chapter also deals with the data collection methods and data analysis including examining the data for validity and reliability. Ethical considerations for study 1 and study 2 are presented at the end of the chapter.

Chapter 4 presents the details of study 1 in the research. Study 1 focuses on digital wellbeing scale development and includes a qualitative and quantitative phase. The qualitative phase includes details on data collection and data analysis. This includes a discussion on the thematic analysis results. The quantitative phase outlines the scale development process followed by the procedure used in conducting exploratory factor analysis and confirmatory factor analysis. The quantitative phase ends with a discussion of the results of the analysis.

Chapter 5 presents the details of study 2 in the research. Study 2 focuses on model testing and is a purely quantitative study. This chapter presents the details of data collection and analysis. Specifically, study 2 examines the conceptual model using the Hayes PROCESS. This chapter reports the direct effect, mediating effect, and moderated mediation effect of the main constructs.

Chapter 6 concludes the thesis by discussing the implications of study 1 and study 2 results, the managerial contribution of the research, research limitations, and future research directions.

Chapter Two: Literature Review

2.1 Introduction

This chapter provides a detailed review of the existing literature on digital wellbeing. This includes examining the existing conceptualisation, definitions, and measurement of digital wellbeing and the trajectory of digital wellbeing studies in marketing and related disciplines. This chapter reveals the theoretical concerns and research gaps in online marketing research. This leads to the research objectives that this thesis will address.

The chapter presents a number of digital wellbeing definitions from several disciplines and highlights the significant difference between subjective wellbeing and digital wellbeing. This is followed by a discussion on the need for digital wellbeing scale development in the online context. The literature review leads to a conceptual framework that discusses the significance of the underpinning theories and the hypotheses development.

2.2 Trajectory of digital wellbeing research

A key characteristic of screen users is their frequent exposure to technology. This has advantages and disadvantages regarding cognitive, affective, and social wellbeing outcomes (Immordino-Yang et al., 2012). For instance, screen time offers the opportunity to enhance individuality and social connections, develop a healthy lifestyle through encouraging physical activity, and reduce stress and depression (Donker et al., 2013). However, these positive outcomes of screen use may be accompanied by negative outcomes such as digital addiction (Zhao, 2021). Digital addiction may cause an imbalance in screen use, for example, when screen use interferes with daily activities, reduces productivity, and invokes negative emotions and harmful behaviours (Abeele, 2021).

Past research has examined the impact of screen use on subjective wellbeing. For example, several cross-sectional (Kaur et al., 2021; Roper & Tobin, 2022), longitudinal (Kross et al., 2013, 2021), and experimental (Leep & Barkley, 2022; Przybylski et al., 2021; Sagioglou & Greitemeyer, 2014) studies have assessed the overall usage of social network sites and their impact on subjective wellbeing.

The cross-sectional studies have found a positive correlation between screen use and subjective wellbeing when it is mainly used for online socialising (Kaur et al., 2021; Roper & Tobin, 2022). The experimental studies have revealed abstinence from screen use can neither improve nor deteriorate subjective wellbeing (Przybylski et al., 2021). However, Kross et al. (2012) point out that studies using a rigorous methodological design such as longitudinal research have been able to identify a negative impact on subjective wellbeing. This shows that there are mixed findings in the past literature regarding the impact of screen use on subjective wellbeing. However, the impact of screen use on digital wellbeing is yet to be identified.

Further research on social media usage has focused on the frequency and intensity of usage (Trifiro, 2018). Researchers have examined the active and passive usage patterns of digital media and associated them with subjective wellbeing. Many researchers have focused on how usage patterns undermine or enhance subjective wellbeing (Ellison et al., 2007; Krasnova et al., 2013; Verduyn et al., 2015; Verduyn et al., 2017). Several other studies have targeted the impact of social media engagement on subjective wellbeing (Kross et al., 2017; Qian ding et al., 2017; Verduyn et al., 2015). Passive use has been shown to undermine subjective wellbeing, while active use, including self-disclosure on online platforms, is likely to increase subjective wellbeing (Kim & Lee, 2011). Moreover, gender-based research has identified that female end-users who are active on digital media are more socially skilled and experience less negative impact from their activity (Frison & Eggermont, 2015). Although there are mixed findings, an overall review of usage patterns and subjective wellbeing shows a weak relationship between them. Hence it is clear that active/passive digital usage patterns cannot greatly enhance or undermine users' overall subjective wellbeing. Despite some studies demonstrating how digital media use can impact subjective wellbeing, no attention has been devoted to its impact on digital wellbeing and the situational factors that can foster this wellbeing. Hence, research into digital wellbeing is essential to understand what cognitive and emotional appraisals are required when engaging with the online world.

Further, the potential impact of social media use makes it important to investigate why users engage in various activities on social media. Prior studies have reported several important motives for

social media usage, including escapism, passing time, self-expression, impression management, entertainment, etc. (Ryan et al. 2014). Wang et al.'s (2016) study on motives and social media use concluded that some users consider social media use as a coping strategy for dealing with life problems, while others may only use social media to pass time or for self-expression, which are desires that are unrelated to negative real-life situations and indicative of general interest. Considerable research has been undertaken on users' adoption, motivation, and engagement with digital media in different spheres of life with a focus on the intent and amount of use. It has been found that increased screen time leads to disparities in wellbeing outcomes, for example, increased depression, anxiety, social comparison, envy, and stress (Burns & Gottschalk, 2019; Schivinski, 2020; Qian et al., 2017). Screen use, therefore, can lower subjective wellbeing. For example, social media use encourages upward social comparison, cyberbullying, etc., causing depression. Studies have found that users who depend on social media for feedback are at a higher risk of poor psychological wellbeing (Natalie, 2019). Kross's (2013) review of prior research on users' interaction with social media identified a general decline in affective and cognitive wellbeing amongst heavy social media users. However, other prior research has found that a high level of digital activity does not predict a direct decline in wellbeing; instead, any decline largely depends on the manner of engagement (Bessiére, 2008). Nevertheless, recent evidence shows that balanced screen use can protect users against the negative outcomes of excessive use, for example, sleep deprivation, poor performance in work and education, psychological stress, decreased life satisfaction, functional impairment, and problematic behaviour (Dienlin & Johannes, 2020).

Recognition of the importance of digital wellbeing plays a highly significant role in helping users manage screen use. Digital wellbeing is a condition that is favoured by personal cognition, online social networks, and social support (Gui et al., 2017). Digital wellbeing helps users attain a balance in screen use which is facilitated by users' personal and social factors. Personal cognition is required for task performance, successful navigation, and mutual knowledge sharing (Bandura, 1988). Growing evidence shows that social media networks influence social and psychological wellbeing (Nie, 2001; Valkenburg & Peter, 2007). Social capital is gained by users who are able to connect with others for information and

support (William, 2016). Despite the mixed findings, a few studies have shown that active use increases social capital and connectedness in the digital world (Ellinson & Vitak, 2015). Online social support, interaction, and engaging in activities on social media platforms, therefore, may enhance wellbeing, and much depends on how the personal and social circumstances of users influence their engagement pattern. Hence, it is necessary to uncover the underlying mechanisms that are important to attain balanced screen use.

From the above discussion, it is evident that end-users can have difficulty in managing or balancing their screen use owing to the increasing demands for connectivity. This is where digital wellbeing plays a crucial role and needs to be assessed. In the era of increased connectivity, the need for gauging and fostering users' digital wellbeing has so far received scant empirical evidence.

Earlier research has examined the relationship between digital media use and wellbeing under different assumptions and definitions. These studies have reported findings based on their conceptualisation of digital media use and wellbeing. Some studies have conceptualised digital media use based on social media clicks and likes (e.g., Shakya & Christakis, 2017), while others (e.g., Bekalu et al., 2019) have been based on social connectedness. Consequently, past literature shows no consensus on the conceptualisation of digital wellbeing.

Previous studies have used general psychological measures to assess the impact of digital media on wellbeing. For example, Ryffs' psychological wellbeing scale (Ryff, 2008) and Watson et al.'s (1998) positive and negative affect scale furnish general psychological scores but do not focus on context-specific wellbeing. Owing to increasing evidence on the impact of digitalisation on wellbeing, and the lack of consistency, reliability, and validity among existing scales and their inability to measure the construct of digital wellbeing, there is a requirement to develop a psychometrically sound instrument that can measure the digital wellbeing of end-users. Hence, this study firstly aims to conceptualise and identify the dimensions that define digital wellbeing. Secondly, the study examines how and when digital literacy influences digital wellbeing. In particular, this study examines the mediating roles of self-efficacy and online social capital and the moderating effect of digital addiction on the main effect. The following

section discusses the difference between subjective wellbeing and digital wellbeing, and the rationale for digital wellbeing scale development.

2.3 Difference between subjective wellbeing & digital wellbeing

Subjective wellbeing depends on an individual's self-evaluation of their quality of life (Diener et al., 2018). It includes dimensions such as positive relationships, purpose, and social participation. Research on subjective wellbeing reveals that affective and cognitive satisfaction is important for the individual as well as the community's effectiveness. Subjective wellbeing has previously been measured in terms of cognitive appraisal, such as life satisfaction – and affective appraisal, such as positive and negative affect (Miao et al., 2013). So far, the measurement of subjective wellbeing has not captured the underlying meaning of wellbeing in the digital context (Ong et al., 2021). Verduyn (2015) and Ong et al. (2021) posit the need to measure the subjective sense of overall satisfaction in the balanced use of digital media to improve human potential and societal circumstances. Digital wellbeing and subjective wellbeing are related yet conceptually different (see Table 2.1). Digital wellbeing is defined as an experiential state at a subjective level (Abeele, 2020). More clearly, existing literature considers digital wellbeing as a condition in which subjective wellbeing is maintained. Digital wellbeing is a term used to understand the balance between digital media use and overall satisfaction with life (Gui et al., 2017). Past literature posits digital wellbeing as a term that captures the association between digitisation and wellbeing which refers to moments of satisfaction from digital media use (Abeele, 2021). It operates as an emerging key dimension of human wellbeing that helps in sustaining subjective wellbeing. Hence, digital wellbeing requires reflection on how digital media impacts individuals' emotions, relationships, sense of self, and overall satisfaction in life. This study views digital wellbeing as a category of human wellbeing that helps individual users attain a balance between digital media use and overall satisfaction with life, which will eventually lead to enhanced subjective wellbeing (Jeremy et al., 2019). Based on earlier research, the current study posits digital wellbeing as a growing contributor to subjective wellbeing in its hedonic and eudemonic dimensions (Ryan & Deci, 2001). Accordingly, digital wellbeing pertains not only to the

pleasure derived from digital media use but also users' ability to use technology to achieve life goals. Hence, a digitally well user is able to manage the flipside effects of screen use while also acquiring a range of benefits ensuring enhanced subjective wellbeing.

Table 2. 1 Difference between Subjective wellbeing & Digital Wellbeing

Basis of distinction	**Subjective wellbeing**	**Digital wellbeing**
Definition	An individual's self-evaluation of their quality of life	An experiential state of balance between screen use and overall satisfaction with life
Scope	It relates to the sustaining of hedonic and eudemonic aspects of wellbeing	It is an emerging key aspect of human wellbeing in the online world that helps in sustaining subjective wellbeing
Dimensions	It includes positive relationships, purpose, and social participation.	It revolves around managing emotions, relationships, and a sense of self in the online context
Measurement	It is measured in terms of life satisfaction, positive affect, and negative affect	It aims to measure the state of balance in the online world based on cognitive and affective aspects

Source: adapted from Miao et al., 2013; Abeele, 2020, 2021; Ong et al., 2021; Gui, Fasoli, & Carradore, 2017; Ryan & Deci, 2001.

2.4 Defining digital wellbeing

Digital wellbeing is understood as an experiential state that focuses on momentary experiences (Mariek, 2020). These experiences may arise out of interactions between the user, device, and context. The concept of digital wellbeing is receiving attention due to an overabundance of digital communication stimuli that are difficult to manage (Gui et al., 2017). There are several definitions of digital wellbeing that focus on subjective wellbeing; however, there are many other forms of wellbeing and no consensus exists on the dimensions that exclusively explain digital wellbeing. This is most likely because of the exponential growth in the use of the term digital wellbeing over the last five years (Abeele, 2022). Scholars have interpreted digital wellbeing using different assumptions. For example, Burr and Floridi (2020, p. 5) refer to digital wellbeing as "the impact … digital technologies, such as social media, smartphones, and AI, have had on wellbeing". Büchi (2021, p. 4) defines digital wellbeing as concerning individuals' affect, domain satisfaction, and overall life satisfaction in a social environment characterised

by constant abundance of digital media use options. These definitions seek to provide a linear association between digital media use and wellbeing based on traditional media use effects.

Allen (2022) defines digital wellbeing as involving a short break from technology to avoid negative wellbeing outcomes such as stress, fatigue, etc. Digital wellbeing is understanding trade-offs in technology use and not just how/when to use technology. This definition postulates digital wellbeing as a short- or long-term abstinence from technology use and does not mention the underlying elements that comprise digital wellbeing. According to Parry et al. (2020), digital wellbeing requires people to develop a better relationship with technology in their lives by focusing on four areas: understanding habits, focusing on what matters, switching off, and helping families find the right balance with technology. This definition does not say how these four areas should be managed. Hence, there is a need to uncover the dimensions that help build a better relationship with technology.

Abeele (2020) interprets digital wellbeing as a subjective experience of optimal balance between the benefits and drawbacks of mobile connectivity. These benefits and drawbacks are channelled by controlled pleasure and functional support in addition to the loss of control and functional impairment. This definition posits digital wellbeing as a paradox between the benefits and drawbacks of digital consumption but does not distinctly capture the underlying aspects of optimal balance. Birnholtz et al. (2019) consider digital wellbeing as the use of social technologies to enhance an overall mental, physical, and self-perceived sense of wellbeing. This definition conceptualises digital wellbeing as playing a supportive role in sustaining overall wellbeing, however, it lacks clarification on the conceptualisation of digital wellbeing.

Based on a critical review of the existing definitions, digital wellbeing at a narrow level is a personal experience of screen use that requires mindful attention. Digital wellbeing is considered an extended version of subjective wellbeing or a part of subjective wellbeing or just another dimension of human wellbeing (Gui et al., 2017). Authors use words like, ‘mindfulness’, ‘control’, ‘attention’, ‘mental, emotional and physical health’, ‘optimal balance’, ‘state of being content’ etc., to describe the concept. Some existing studies even use the terms ‘digital detox’ and ‘digital disconnection’ in connection with

digital wellbeing (Syvertsen, 2020). Though they are closely related, they are unique concepts in psychological literature. Therefore, in the scholarly domain, there is a need to add to the current debate on the concept and definition of digital wellbeing to assist further research.

It is interesting to note there are emerging digital tools that help users achieve digital wellbeing. Google, Amazon, Apple, and Microsoft expanded its corporate responsibility statement to support the digital wellbeing of android users and defined digital wellbeing as crafting and maintaining a healthy relationship with technology (Hermes et al., 2020). Digital wellbeing is concerned with how technology serves us and moves us toward our goals rather than distracting us, interrupting us, or getting in the way of our personal goals. Tech giants like Google and Apple have developed apps such as 'Offtime', 'Moment', and 'Detox', to enable users to focus on daily routines and gain control over screen time.

In the literature on digital media use and wellbeing, research has so far only suggested the need to make use of digital tools on devices that support wellbeing and discussed the impact of such wellbeing features. However, these digital tools are designed to help users achieve digital wellbeing but are not used to measure digital wellbeing. Vallor (2010) focused on a technology-driven method to support users' state of wellbeing and formulated communicative virtues (patience, honesty, empathy, fidelity, reciprocity, and tolerance) that account for the eudaimonic wellbeing of users. However, Vallor (2010) did not discuss the hedonic aspect in his study, thereby failing to point out the essential need to include both hedonic and eudaimonic elements of wellbeing when analysing the digital wellbeing of end-users. Previous longitudinal research on digital tools has revealed that digital interventions improve screen time balance only for a short duration and, moreover, are not beneficial in online social settings like social networking sites (Hiniker et al. 2016). This is because such digital wellbeing interventions lack person-specific solutions. Interventions are not based on users' personal characteristics and other socio-contextual factors and hence they remain ineffective in helping users manage screen time. This is because existing digital apps or tools help users to balance screen use based on the duration of use alone. Therefore, to provide a robust base for developing objective measures of digital wellbeing, there is a need for more empirical

evidence on the subjective experience of digital wellness. This study aims to uncover the subjective digital wellbeing experiences of end-users.

To add to the current debate on the concept of digital wellbeing and to provide empirical evidence of the subjective experience, there is a need to conceptualise digital wellbeing from users' perspectives to arrive at a unanimous definition that contributes to the academic literature on wellbeing. The current study narrows down the existing definitions of digital wellbeing (Birnholtz et al., 2019; Powell, 2020; Wright, 2018) at an individual level, focusing on the user, context, and device. Further, there is a need to identify the clear-cut dimensions that illuminate digital wellbeing as a valid construct suitable for end-users in the 21st century.

To sum up the digital wellbeing literature, digital wellbeing involves self-perceptions, social expectations, and users' conscious use of online spaces for personal growth and social interaction. Based on the above discussion, the working definition of digital wellbeing is that it is a state of optimal balance achieved through cognitive and affective appraisals that contribute to subjective wellbeing. Further, according to this study, digital wellbeing is an extended version of subjective wellbeing.

2.5 Rationale for digital wellbeing scale development

The existing literature on digital wellbeing states that users must have the capacity to look after their personal health, safety, relationships, and work-life balance in an online environment (Vuorikari et al., 2016). Gui et al. (2017) point out the necessity of developing digital wellbeing measures because of the overabundance of information and choices, the ease of switching from one focus to another, the exploitation of human attention, the convergence of various activities on the same device, and the persistence of the above conditions all day long. Tarafdar et al. (2015) state that the characteristics of information and communication technology, such as reliability, portability, and fast processing, may also undermine users' digital wellbeing in the long run if not monitored. Permanent online engagement may crowd out the time spent on other offline activities that are more conducive to wellbeing, such as physical activities, socialising in person, attaining personal goals, sleeping, etc.

Researchers of digital media use have advocated developing a psychometrically sound measurement scale to measure the balanced use of digital media and practices that support wellbeing in the digital environment, and also to identify how constant digital media usage can deteriorate wellbeing in the long run (Bolton et al., 2013). Ethan et al. (2013) studied Facebook's influence on subjective wellbeing over time and found that it leads to impoverished wellbeing. Other past studies on digital media use have considered its impact on subjective wellbeing and have not identified any precise experiential states of wellbeing in the online environment. Recent research shows the increasing number of global internet users, with 4.95 billion at the start of 2022, comprising 63.1 percent of the global population (Statista Search Department, 2022), which further implies the need to assess the impact of screen use on wellbeing.

So far, subjective wellbeing has been measured with psychometrically sound measures that use self-reporting tools to assess the pleasant/unpleasant effects of digital media use (Trifiro, 2018; Verduyn, 2015; Valkenberg et al., 2005). Researchers have tended to use such existing subjective wellbeing measures to identify the impact of screen use (Ong et al., 2021). However, these offline subjective wellbeing scales cannot render valid results about digital wellbeing as they may fail to capture the nuance of digital use and its connection with wellbeing. For example, studies have employed offline wellbeing scales such as the WEMWBS scale (Tennant et al., 2007) to measure positive affect, and the PANAS scale to measure positive and negative affect (Watson et al., 1988). These scales are used as there are no other existing wellbeing scales that directly measure the effects of screen use on wellbeing. The lack of standardised measures of digital wellbeing presents a critical gap in the marketing literature. Therefore, a digital wellbeing scale needs to be developed as an alternative to existing subjective wellbeing scales that may not serve the purpose of research into online settings.

The operationalisation of digital wellbeing is key to measuring the connection between digitalisation and wellbeing. A multidimensional operationalisation of digital wellbeing is needed to address the research gap. It is important to measure a construct uniquely to get a precise interpretation. As mentioned earlier, there are several scales available to measure wellbeing; however, there is no existing

scale that measures 'digital wellbeing' that distinctly captures various user perspectives across different situations. The aim of developing the scale is to understand users' digital practices in pursuing personal goals that align with hedonic and eudaimonic components of subjective wellbeing.

This section concludes the fundamental rationale for developing a general digital wellbeing scale that recognises the increased imbalance between online and offline activities, the growing evidence of deteriorating subjective wellbeing as identified by other researchers, and the trending self-harm content on social media that is consumed for entertainment without necessarily offering satisfaction but instead leading to digital addiction.

2.6 Conceptual framework

The study adopts two complementary theories, social cognitive theory and social capital theory, to explain how personal and social factors play a mediating role in attaining a balanced use of technology.

Social cognitive theory is grounded on an agentic perspective (Bandura, 1986, 2001b) and is widely used to understand the learning process of individuals (Bandura, 1994, 2001; Compeau et al., 1999; Schunk, 1989). This theory is common in the information systems literature and is one of the most often used theories of health behaviour (Baranowski et al., 2002; Chiu et al., 2006). Social cognitive theory defines the dynamic and reciprocal role of interpersonal factors such as personal, behavioural, and social factors. The vital concepts of self-efficacy and outcome expectancy are the key personal elements in social cognitive theory and refer to the capabilities of an individual to organise and execute courses of action required to perform a task and judgement of the positive consequences (Bandura, 2001). The theory posits self-efficacy as a major determinant of task performance. It has also been found to have psychological and behavioural effects in the domain of human psychological functioning (Tsai, 2014). Human behaviour is determined by the relationship between outcome expectancy and efficacy expectation. In other words, behaviour is driven by the extent to which individuals believe their behaviour will lead to certain outcomes, and the extent to which individuals believe they can achieve the expected outcomes (Bandura, 1989). Among the several predictors of health behaviours emphasised by social

cognitive theory, self-efficacy is the most important in determining behaviour and a significant concept in social psychology. Self-efficacy connects the individual with the external environment and encourages interaction with the wider community. The theory suggests that personal factors influence the attitude of an individual and drive appropriate healthy behaviours (Bandura, 1986). High self-efficacy is linked to enhanced happiness and well-being, as individuals who have confidence in their abilities are more likely to achieve goals and cope with challenges (Tang et al., 2016). Therefore, social cognitive theory is used as a lens in explaining the role of personal factors in promoting digital wellbeing outcomes.

Social cognitive theory also views behaviour as partially constructed by social networks (Bandura, 1989). The theory emphasies that individuals learn by observation, imitation, and modeling and such behaviour suggests trust and respect for one another. Social cognitive theory focuses on the behaviour of individuals in relation to various activities (Bandura, 1989) and argues that an individuals' actions are influenced by social interaction (Miller & Dollard, 1941). Researchers have criticised the application of social cognitive theory because of its comprehensive nature, which makes it difficult to operationalise the theory fully (Munro et al., 2007). It has also been critiqued for restricting researchers to the use of only one or two concepts from the theory to describe behavioural outcomes (Baranowski et al., 2002). Therefore, to address components within social networks and their impact on prosocial behaviour, social capital theory is used to supplement social cognitive theory.

Social capital has been defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Nahapiet & Ghoshal, 1998, p. 242). According to social capital theory, social ties among people, both online and offline, can be productive resources (Coleman, 1988). Social capital is considered to be like other forms of capital and requires maintenance (Agnihotri, 2022). Therefore, it is viewed as a facilitator of the social system that benefits the users and the community (Li & Chen, 2022). Several studies have postulated social capital as a contextual factor that positively impacts health through social support and mutual respect (Lindstrom & Janzon, 2007). Past studies have found that possessing social capital enables information sharing and exchange of knowledge (Lee & Hsieh, 2022; Salimi et al., 2022).

Further, having social capital potentially increases social participation, social trust, and interpersonal reciprocity and these are believed to have health protective effects (Nummela et al., 2008).

Putnam (1995) found that social capital simplifies coordination and cooperation for shared benefit. Building on the theoretical framework of Putnam, Williams (2006) differentiated the operationalisation of online and offline social capital and produced social capital measures for both the online and offline environment. Williams (2006) presented the distinct operationalisation differences between offline and online social capital. William (2006) developed social capital measures for online and offline environments by adopting Putnam's (2001) bridging and bonding concepts. Putnam's theoretical framework includes bridging and bonding capital that are essential to one another. Bridging social capital is inclusive and occurs as a result of social interaction with diverse users (Williams, 2006). Although bridging capital provides a worldview through social interactions, it is deprived of emotional support. Bonding capital, in contrast, is exclusive, offers social and emotional support, and provides access to rare resources (Ellinson et al., 2017). Bonding capital is considered a strong tie among close relationships like family and friends (Ellinson et al., 2017). According to the theory, individuals with strong ties may experience considerable support compared to those with weak ties (Putnam, 2001). However, some studies have confirmed that weak ties are made substantial through online social networking (Huang et al., 2021; Zhao, 2021). This is because the online world provides infrastructure for the development and maintenance of various forms of social capital. Therefore, bridging and bonding capital are studied in an online context to understand their impact on the enhancement of digital wellbeing. Empirical studies have identified the positive influence of online social capital on psychological wellbeing, emphasizing the role of social factors in producing wellbeing outcomes (Ostic et al., 2021). The study views the conceptual model through the lens of social capital theory which emphasises the significance of social connections, trust, cooperation, access to resources which supports the maintenance of online social networks that enhances the overall wellbeing. Using this theory highlights how online social factors can create a positive impact on digital wellbeing.

Drawing on social cognitive theory and social capital theory, the current study examines the association between the personal factors and social factors that foster digital wellbeing. The following section explains the main constructs in the conceptual framework.

The conceptual framework developed for the study (see Figure 2.1) is underpinned by digital literacy and its relationship with digital wellbeing. Glister (1997) was the first researcher to reveal the concept of digital literacy. Glister and Martin (2006) view digital literacy as a life skill that is not associated with formal education and varies between individuals; for example, much depends on the individual's life circumstances, attitudes, personal qualities, knowledge, and skills.

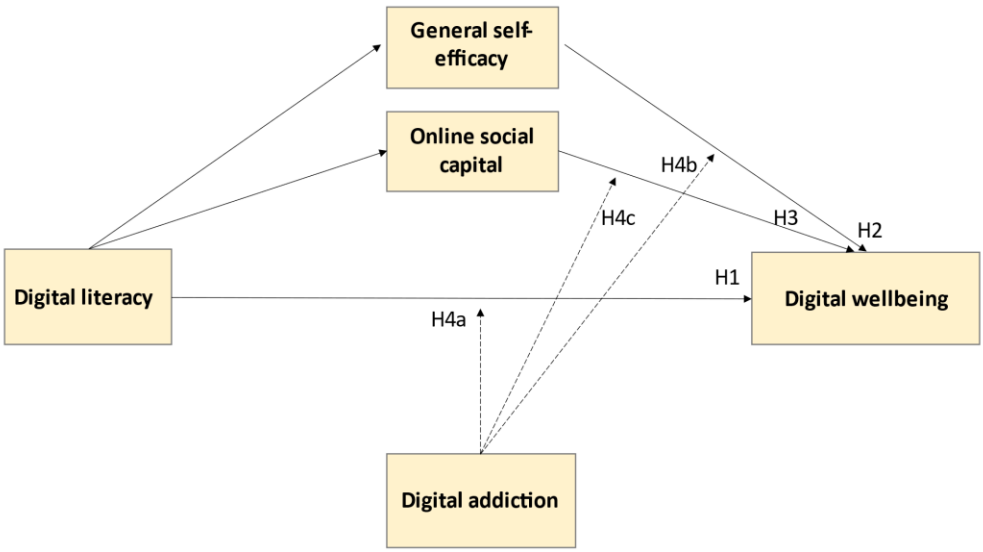

Figure 2. 1 Conceptual model

Eshet-Alkalai's (2004) brief definition of digital literacy encompasses the survival skills required in the digital era. The current study draws on Eshet-Alkalai's (2004) five digital literacies: photo-visual literacy, reproduction literacy, branching literacy, information literacy, and socio-emotional literacy. Building on Eshet-Alkalai's five digital literacies (2004), Ng (2012) developed a digital literacy framework encompassing three dimensions: technical, cognitive, and socio-emotional skills. The current study adopts this framework established by Ng (2012) to explain the role of skill-based digital literacy

and its relationship with the digital wellbeing of end-users. Ng's framework (2012) includes the technical dimension, which broadly means possessing the operational skills to use digital media for everyday activities. For example, the technical dimension includes the successful operation of technology through an understanding of its functions and uses, such as knowing the key features of software programmes, using social networking tools, etc. A digitally literate individual should be able to adequately understand the operation of digital tools (Kim et al., 2019; Van Laar et al., 2017). The cognitive dimension explains the ability to think critically and to evaluate and handle digital information (Ng, 2012). A digitally literate individual should possess ethical, moral, and legal knowledge of digital content – for example, the ability to decode images, videos, audio, etc. The socio-emotional dimension means the ability to use the internet responsibly for socialising and learning (Ng, 2012). For example, it includes skills necessary to observe netiquette as in offline communication, safeguarding privacy and responding to threats, etc.

Past research has linked high digital literacy to the adoption of new technology and safe navigation in the digital world (Lepore et al., 2019). Jeffrey and Kinshuk (2014) identified that digital literacy is inversely related to anxiety and depression aroused in online settings and enhances psychological wellbeing. Vissenberg (2022) found a positive association between digital literacy and wellbeing, and concluded that digital literacy produces beneficial wellbeing outcomes whilst protecting users from encountering online risks. Nevertheless, the relationship between digital literacy and digital wellbeing is yet to be fully identified.

This study seeks to highlight the negative impact of digital addiction on the relationship between digital literacy and wellbeing. While technology can support users in everyday activities, addictive usage undermines their physical and psychological wellbeing (Odaci & Celik, 2016). Past literature has consistently explored the concept of digital addiction in studies relating to excessive screen use and has revealed that digital addiction creates social-relation disturbances that are not conducive to wellbeing (Berte, 2018). Likewise, it is essential to explore how digital addiction can influence the digital wellbeing of users.

Existing studies have identified that problematic internet use and social media addiction are negatively associated with wellbeing (Duradoni et al., 2020). Researchers have studied the addictive use of digital media in online gaming, online surfing, fear of missing out on social media content, etc. They regard addictive use as problematic because of its adverse effect on the subjective wellbeing of users (Byun et al., 2009; Griffiths, 1998; Griffiths and Hunt, 1998). The key antecedents of addiction include engagement patterns, motives, and self-regulation (Stockdale, 2018). Research has shown that users with poor attention and low self-control are more vulnerable and may be susceptible to addictive use (Cha, 2018). Prior studies have shown a link between digital addiction and negative consequences such as stress, fatigue, depression, anxiety, disconnection from reality, lack of sleep, etc. (Lin, 2018). This study regards digital addiction as moderating the main effect. Researchers who have investigated the phenomenon of why users are addicted to digital media have developed internet-related addiction measures (Griffiths, 1999; Griffiths et al., 2016; Andreassen et al., 2016). To address its objective, this thesis adapts the Bergen Facebook Addiction scale. Griffith (2005) developed his scale based on the core criteria of addiction: salience (i.e., screen time controls thinking and behaviour), mood modification (i.e., using screen time to improve mood), tolerance (screen time is needed excessively), withdrawal (unpleasant feeling when screen time is interrupted), conflict (screen time interferes with daily routine and relationships), and relapse (tendency to return to excessive screen use). These dimensions are all related to an increase in imbalanced usage. Studies have adapted this scale to fit various contexts such as social media use (e.g., Andreassen et al., 2016; Allahverdi, 2022; Chegeni et al., 2022). The current study adapts the scale to the context of screen use (Duradoni et al., 2020). To understand the digital wellbeing of digitally literate users, this study will assess the moderating effect of digital addiction.

The study posits self-efficacy as a key personal element that is likely to mediate the relationship between digital literacy and digital wellbeing. Empirically, self-efficacy has been found to be an important determinant of a user's perceptions of digital media use (Bernard et al., 2004; Chu, 2010, Chu & Chu, 2010; Venkatesh & Davis, 1996). It is also considered an important part of their self-concept. High self-efficacy is associated with autonomy and self-regulation which enhances wellbeing in an online

environment (Bernard et al., 2004; Chu 2010). In past literature on internet and computer use, self-efficacy has been considered an important element in predicting behaviour in the digital environment (Berte et al., 2021). The concept of self-efficacy has been used to study technology users' level of confidence and usage intentions (Pan, 2020). Further, many studies have identified the positive effect of self-efficacy on perceived ease of use of computer technology (Hasan, 2007; Ong et al., 2004). Recent research has adopted social cognitive theory to investigate the relationship between self-efficacy and the attitude towards technology usage, and several studies have investigated the role of self-efficacy in leading internet behaviour (Niu et al., 2021; Pan, 2020). Research into online communities has examined both personal cognition and social networks because self-efficacy is influenced by other individuals and environmental factors (Bandura, 1978). Hence, the current study uses self-efficacy as mediator to explore the relationship between digital literacy and users confidence in their abilities to navigate the digital world.

This study posits online social capital as a key social element that is likely to mediate the relationship digital literacy and digital wellbeing. The research examines the significant role of social factors in enhancing digital wellbeing and developing an understanding of the potential resources embedded in social networks. For example, past studies have revealed that social interactions on digital media are rooted in trust, norms, reciprocity, sense of community, and identification (Andrews et al., 2002; Bock et al., 2005; Churchill & Snowdon 1998; Dholakia et al., 2004; Hars & Ou 2002; Kankanhalli et al., 2005; Ridings et al., 2002; Wellman &Wortley 1990; Yoo et al., 2002). The online digital environment helps users with mutual goals and interests to engage in social interactions that help them gain information and knowledge. Bandura (1989) maintains that a person's behaviour is a product of social networks. This is because social interaction increases the potential for mutual knowledge sharing. Hence, research needs to incorporate both personal cognition and social interaction when studying the digital wellbeing of users.

Recent social capital studies have focused on whether digital media helps or hinders the development of social capital (Ferruci, 2020; Hopp, 2019; Mcloughlin, 2019). Studies on social capital

have found an increase in the adoption or adaptation to digital media, which means that online users who make use of bridging and bonding social capital resources can attain a sense of satisfaction (Zhai, 2019; Lin, 2001). Bonding capital refers to close relationships with strong ties, whereas bridging capital refers to relationships with weak ties (Putnam, 1995, 2000). The following are the sub-dimensions of online bonding and bridging social capital: outward looking, contact with a broad range of people, view of oneself as part of a broader group, reciprocity, emotional support, access to scarce resources, and the ability to mobilise solidarity (William, 2006). Several studies have examined how social activity on digital media can build stronger bonding and bridging capital than offline social activity; for example, online users from different backgrounds develop capital by engaging in online gaming (Hampton, 2003; Pinkett, 2003). Other studies have found that online bridging and bonding capital may be shaped by the appropriate use of digital media (Ferrucci et al., 2020; Hopp & Vargo 2019; Lee & Hallak 2020; Mcloughlim, 2019; Tiwari et al., 2019; Zhai, 2019).

According to social capital theory, digital users can have strong tie versus weak tie experiences in terms of the emotional and moral support they may gain from their online social networks. Some past studies have addressed whether digital media hinders or promotes the development of social capital and found that online networks are insufficient for such development (Nie 2001; Nie & Erbring 2002). However, as the 21st-century progresses, connectivity has become ceaseless and increasing evidence shows that digital media or the digital environment alone can help in the development and accumulation of online bridging and bonding social capital resources (Ellison et al., 2011; Ellison et al., 2014).

To sum up, the conceptual framework in the present study seeks to understand how personal cognition along with online social ties help a digitally literate individual attain a balanced use of digital media by drawing on social cognitive theory and social capital theory.

2.7 Hypothesis development

Digital literacy is regarded as a 21st-century skill and is a prevalent topic of interest in the existing literature (Voogt et al., 2013; Vavik & Salomon, 2015). The existing literature on digital literacy shows

that it relies on self-perceived skill measures to assess one's own abilities. Digital literacy includes skills that help individuals communicate effectively through digital devices and make the most out of digital resources that contribute to their wellbeing (Vissenberg et al., 2022). These skills allow users to safely and effectively use digital media to achieve positive ends (Reynolds & Parker, 2018). The current study considers digital literacy the key antecedent that helps users find the right balance with technology.

Ng's (2012) framework on digital literacy shows the basic life skills required to thrive in the digital era. Ng (2012) adopted the cognitive load theory to highlight the need for digital literacy in order to eliminate the cognitive overload associated with digital media multitasking (Sweller, 1988, 2005). Past research has found users with digital literacy skills have the ability to thrive in a digital world that demands constant adoption or adaptation to existing/new technologies (Zan et al., 2021). Digital literacy skills are vital in managing digital wellbeing challenges. For example, some end-users are susceptible to online bullying, cyber aggression victimisation, engaging in harmful content etc., which are related to poor digital literacy and higher rates of social isolation (Schoffstall & Cohen, 2011). Digital literacy helps people navigate the commonalities and differences between their digital and real lives by avoiding negative health issues associated with abuse or overuse of digital technology (Nguyen, 2021). Studies have stressed the importance of digital literacy, particularly in enhancing digital wellbeing due to the increasing consequences of digital distractions, mental overload, the societal impact of cyberbullying, technical issues with cybersecurity, and the addictive use of digital media (Royo et al., 2019). Soundararajan et al. (2022) found that digital literacy has an indirect positive effect on the quality of life and sense of wellbeing. So far, empirical evidence shows that negative online experiences undermine wellbeing, while only limited research has been undertaken on the protective role of digital literacy in enhancing wellbeing (Vissenberg et al., 2022).

Prior research has found that engaging in any internet activity (email, surfing, gaming, chatting, etc.) does not predict a decline in wellbeing (Bessiére et al., 2008), with much depending on the level of users' digital literacy. Digital wellbeing is a personally obtainable state based on users' skills and abilities and addresses the imbalance caused by increased use (Rad & Demeter, 2019). Hence, the current study

argues that end-users need to possess higher digital literacy that embraces technical, cognitive, and socio-emotional skills to handle digital wellbeing challenges (Burns & Gottschalk, 2019; Gottschalk, 2019). Based on the above argument, it is expected that digital literacy will have a positive effect on digital wellbeing.

Hypothesis 1: End-users with greater digital literacy will likely experience a higher level of digital wellbeing.

In general, the concept of self-efficacy is a key personal factor of social cognitive theory. It has been widely used to measure an individual's capability to organise and execute courses of action required to manage prospective situations (Bandura, 1995). Bandura (1992) asserts that individuals' self-efficacy advances over time as they acquire skills, understanding, and experiences. Users with higher self-efficacy are likely to undertake difficult tasks and put more effort into an activity, and are persevering and resilient in difficult situations. In the current study, self-efficacy is considered a construct that assesses users' optimistic self-belief in coping with a range of difficult situations in life (Bandura, 1978).

Self-efficacy is a deep-rooted concept in the field of psychology and has been adopted by researchers studying computer and internet use (Corston & Colman, 1996; Eastin & LaRose, 2000; Torkzadeh & Van Dyke, 2002; Whitley, 1997). Past studies have linked several types of literacy and the ability of users to thrive in the digital world (Prior et al., 2016). Studies have found perceived self-efficacy to be a predictor of physical and mental wellbeing (Chu, 2010). A strong sense of self-efficacy is positively related to positive media experiences and psychological wellbeing and is inversely related to anxiety, stress, fatigue, and depression (Bandura, 2006; Chen et al., 2010; Eastin & LaRose, 2000). This establishes that feeling efficacious is favourable for wellbeing and highlights the need to feel competent in using digital media.

Digital literacy and self-efficacy are two distinct and well-established constructs in the literature that explain an individual's ability to successfully navigate through ambiguous situations and produce outcomes that are conducive to wellbeing. Digital literacy is more skill and ability-based, and self-efficacy relates to self-belief and perceived capability (Prior et al., 2016). Digitally literate users engaging

in digital activities possess a greater sense of self-efficacy while users with poor digital literacy engaging in digital activities have low self-efficacy (Li, 2016). The fundamental nature of a digitally literate user includes the ability to understand and interpret digital stimuli in a manner that enhances wellbeing (Ng, 2012). Digitally literate users have the ability to access technology appropriately and responsibly and possess greater critical thinking and cognitive skills that enable them to safely navigate through the online environment (Martin, 2008). Users with high self-efficacy have a strong ability to handle difficult and unpredictable situations (Gredler, 2017). Further, they are considered to be more adventurous in taking on tasks and tend to be persistent in accomplishing these tasks. Users' self-belief, abilities, and skills drive them towards attaining balanced screen use. High perceived self-efficacy has been linked with numerous benefits to daily life, such as resilience to adversity and stress, healthy lifestyle habits, improved employee performance, and educational achievement (Chen, 2010). Empirical studies have identified that digitally savvy consumers that possess higher technical skills have high self-efficacy, and are empowered, assertive, leading to increased well-being (Macdonald & Uncles, 2007). Past study has also found that digital literacy skills equips users with skills and abilities that influences and strengthens their efficacy beliefs to regulate the course of action (Kuo et al., 2013). This link between digital literacy and perceived self-efficacy suggests a positive relationship with digital wellbeing. Hence, the current study hypothesizes that the effect of digital literacy on digital wellbeing will be mediated by perceived self-efficacy.

Hypothesis 2: The effect of digital literacy on digital wellbeing will be mediated through self-efficacy.

The conceptual framework also provides a social perspective to the study, i.e., online social capital. Online social space has emerged as a ground for social interactions and support and is considered an extension of offline social life (Williams, 2006). In general, social capital is said to exist in social networks when resources are embedded in the networks and are accessible (Lin, 1999; Nan Lin, 2001; Putnam, 2001).

Past studies have identified that online social networks ease loneliness and depression and have a positive effect on the psychological wellbeing of users (Bargh & McKenna, 2000, 2004; Shaw & Gant,

2002). Social capital is a well-established construct that measures social behaviour and has been proven to affect overall wellbeing (Arezzo & Giudici, 2017). In the literature on online social capital, it has been identified that online social networks increase social capital, which in turn enhances the wellbeing of individuals (Lee et al., 2018). Traditionally, wellbeing has been associated with individuals' quality of interactions and the perception of social capital obtained from networks that have a positive influence (Coleman, 1988). Empirical studies have consistently shown that social capital impacts health states and subjective wellbeing. For example, Nabi et al. (2013) claimed that online social interactions decrease stress triggered by social media use, thereby proving their health benefits. Later, Guo and Chen (2022) and Hussenoeder (2022) found that online communications and social capital promote the mental health of users. Research highlights the benefits of online social capital in enhancing social participation and social inclusion and reducing social isolation (Cheng et al., 2019). End-users who achieve bridging and bonding social capital resources can attain a sense of satisfaction and can find a better balance between online and offline activities (Nan Lin, 2001; Zhai, 2019).

Social capital is further associated with the capacity and skills of individuals to respond to social catastrophes, events, and trends, with a shared purpose to act effectively and cooperatively (Warburton et al., 2013). Digitally literate users are able to channel their digital literacy skills to maintain online social relationships that support individuals to thrive in the digital environment. Research has identified that digital literacy skills leads individuals to effectively engage in online social interactions, build relationships, and leverage the opportunities in the digital community (Gomez, 2021). Previous research revealed that digitally literate users can navigate various platforms safely, responsibly, and contribute meaningful information to the digital community, thus enhancing their online social capital (Micheli, 2016). To understand the mediating role of online social capital in enhancing digital wellbeing, the present study focuses on online bridging and bonding social capital as it is observed to enhance the overall wellbeing of users (Steinfield et al., 2008). Thus, the current study hypothesises that the effect of digital literacy on digital wellbeing will be mediated by online social capital.

Hypothesis 3: The effect of digital literacy on digital wellbeing will be mediated through online social capital.

Addicted digital media users have been reported to stay online longer than intended and continue their online activities by ignoring their real-life situations (Young, 1996). The imbalance between online and offline lives needs to be addressed. Digital addicts rely on digital media to regulate their emotions, alleviate negative emotions, and express/share emotions with others. Past studies have investigated that addictive use of digital media platforms leads to fatigue, poor physical performance in work and education, anxiety, depression, and poor emotional conditions due to the lack of consciousness and awareness about the digital engagement (Brand et al., 2016; Elhai et al., 2016, 2017; Lin et al., 2013). Past research has found that addicted users have the habit of constantly checking their smartphones when not necessary, which leads to anxiety and obsessive use (Oulasvirta et al., 2012; Lee et al., 2014). Studies have identified that as the levels of addiction increase, wellbeing also decreases, especially in terms of psychological wellbeing components such as autonomy, environmental mastery, and purpose in life (Mahadevaswamy & D'souza, 2017).

When digital media use is aided by higher digital literacy, it positively impacts digital wellbeing, whereas addictive use results in negative wellbeing outcomes (Guan & Subrahmanyam, 2009). Digitally addicted users often face personal vulnerabilities and are often disadvantaged at socio-economic and cultural level (access to digital resources and oppurtunities) which affects their digital engagement (Helsper & Smahel, 2020). The positive relationship between digital literacy and digital wellbeing can be weakened by addiction and problematic use, including exposure to hateful and harmful content, privacy risks, cyberbullying etc. Therefore, the personal vulnerabilities and lack of awareness of addicted users may weaken the relationship between digital literacy and digital wellbeing (Ko et al., 2018). The present study analyses the moderating effect of digital addiction on the relationship between digital literacy and digital wellbeing.

Hypothesis 4a: The direct effect of digital literacy on digital wellbeing will be moderated by digital addiction.

Bandura defines self-efficacy as users' self-belief in their ability to complete tasks. Empirical evidence suggests self-efficacy has an influence on emotional health, life satisfaction, decision-making, and coping with negative situations (Berte et al., 2021; Bandura, 1993). Past studies have suggested that personal factors are significant predictors of digital addiction (Hawi, 2012; Young, 1999). Self-efficacy serves as a means of coping with obstacles and aversive experiences. Several studies have investigated the relationship between perceived self-efficacy and addiction and found that individuals with low self-efficacy engage in digital addiction-like behaviours (Caplan, 2010; Gunn, 1998; Khang et al., 2012; Young, 1997). Studies have related higher self-efficacy to cyberloafing at workplaces (Lee, 2007; McCoy, 2010). Users with high self-efficacy have been found to have higher levels of computer self-efficacy and technological competence (Berte et al., 2021). Hence, there is a great chance of excessive digital use amongst highly competent users (Gökçearslan et al., 2016). This is because self-efficacy relates to the perception of control over life events (Bandura, 1993). Self-efficacy is beneficial to individuals in task performance and attaining goals only when they can manage their emotions in the online world (Prior, 2016). Moreover, self-efficacy can foster overall wellbeing when the individual adopts positive coping strategies which help in controlling behaviour and emotions in the online world (Freire et al., 2020). Other studies have identified that users with poor self-efficacy are more vulnerable to digital harm and adopt negative coping strategies leading to digital addiction (Helsper & Smahel, 2020). Previous studies on self-efficacy and overall wellbeing have linked low self-efficacy to social anxiety and social dissatisfaction (Bakioglu, 2020). Addicted users with low self-efficacy are likely to mishandle the emotions evoked by the digital world, which subsequently leads to poor performance in daily life activities. Many studies have identified the increase in internet addiction as self-efficacy decreases (Berte et al., 2019; Ebrahim et al., 2022). Past studies found digital addiction facilitates lack of control over digital use, constant social comparison, and negative consequences, which in turn influences the belief system and the ability to navigate the digital world (Lee et al., 2001; Yao & Zhong, 2014). Moreover, digital addiction and self-efficacy are two distinct concepts that relate to psychological wellbeing. This study distinguishes digital addiction as a condition characterised by compulsive digital use and loss of

control over digital engagement that entails negative consequences. On the other hand, self-efficacy is a positive personal factor that can enhance resilience in the face of challenges, improve task performance, motivation, and goal achievement (Li et al., 2020). From the existing literature, it is evident that there are mixed findings regarding the level of self-efficacy in addicted digital users. However, the mediating effect of self-efficacy on digital wellbeing when moderated by digital addiction is yet to be identified.

Hypothesis 4b: The mediating effect of perceived self-efficacy on digital wellbeing will be moderated by digital addiction.

Earlier studies have identified that using digital media has positive effects such as reducing isolation and increasing social support (Bessiere et al., 2010; LaRose et al., 2001; Selfhout et al., 2009; Shaw & Gant, 2002). However, in addition to the positive outcomes of social capital, studies have identified the negative consequences of addictive use arising from social interactions. Existing studies have provided empirical evidence of the positive impact of online social interaction ties on digital addiction (Yeh et al., 2008). While social capital can build social behaviour in the online world, social support from online communities indicates a high level of internet addiction (Yeh et al., 2008). Some studies have posited online social interaction to be an antecedent of digital addiction (Kuss & Griffiths, 2011). Active end-users possess an overpowering urge to stay online longer, checking the online status of others frequently (Stieger et al., 2013). End-users may try to maintain an online social relationships, which in turn leads to psychological dependency on the digital community (Wan et al., 2013) and negatively impacts psychological wellbeing, including increasing anxiety, depression, stress, and fatigue (van den Eijnden et al., 2008). Most studies have identified the impact of online social interactions on wellbeing in general (Horwood & Anglim, 2019; Sun et al., 2020). Less attempt has been made to assess the impact of digital addiction on online social capital and digital wellbeing. Previous studies on internet addiction have shown that highly addicted users tend to use the internet more deliberately for information sharing and social connection which facilitates cognitive understanding of communication tools, leading to improved online learning outcomes (Arness & Ollis, 2022; Dağhan & Akkoyunlu, 2016). It is expected that the intended digital use for social connection will influence the direct relationship between

digital literacy and social connection. Hence, to assess the effect of digital addiction, the study hypothesises that the effect of online social capital on digital wellbeing will be moderated by digital addiction.

H4c: The mediating effect of online social capital on digital wellbeing will be moderated by digital addiction.

2.8 Chapter conclusion

This chapter extensively reviewed the existing literature on digital wellbeing in the psychological and marketing research. Specifically, this chapter reviewed the likely origin of digital wellbeing, existing definitions, and the need for digital wellbeing scale development. The literature review reveals the lack of consensus in defining digital wellbeing, as well as the absence of a psychometrically valid scale to measure digital wellbeing and the existing empirical evidence related to the main constructs.

The next chapter will present the research design and methodology adopted to address the research objectives. The main aim is to conceptualise digital wellbeing, determine its measurement, and test a conceptual model to provide empirical evidence.

Chapter Three: Research Design

3.1 Introduction

This study draws on social capital and social cognitive theory to study the digital wellbeing of end-users. Firstly, the study aims to conceptualise and define digital wellbeing in an online setting. This will help in differentiating digital wellbeing from other components of wellbeing such as subjective wellbeing. Secondly, the study aims to unpack the dimensionality of digital wellbeing. This will help in understanding the theoretical underpinnings of balanced screen use. Thirdly, the measurement instrument for digital wellbeing needs to be established based on the proposed dimensionality. Therefore, a digital wellbeing scale must be distinctly developed and validated. This will provide a standardised and reliable measure in the marketing disciple to measure the impact of screen use on online wellbeing. Lastly, the study aims to test a conceptual model depicting the relationship between the potential constructs related to digital wellbeing. This will help in establishing the nomological validity of the scale.

To sum up, the research objectives address the gaps in the existing marketing literature on digital wellbeing. The research objectives are to 1) delve into the theoretical notion of digital wellbeing from users' perspective; 2) develop and validate a multidimensional scale of digital wellbeing; and 3) test a conceptual model to establish the nomological validity of the scale. To address the objectives, the present study seeks to answer the following research questions:

1) How is digital wellbeing being conceptualised from the perspectives of subject matter experts, academics, and end-users? What are the dimensions of the digital wellbeing construct, and how should it be measured?
2) How does digital literacy influence digital wellbeing, and how is this relationship mediated by self-efficacy?
3) How does digital literacy influence digital wellbeing, and how is this relationship mediated by online social capital?

4) How does digital addiction moderate the relationship between digital literacy and digital wellbeing?
5) How does digital addiction moderate the mediating effect of self-efficacy and online social capital?

The research adopted a mixed methods research design to address the research objectives. The first study on scale development included a qualitative phase to address the research objective of conceptualising digital wellbeing followed by an intermediate quantitative phase to develop a digital wellbeing measure. The second study on model testing was a purely quantitative study that addressed the research objective of establishing the nomological validity of the digital wellbeing measure by testing a conceptual model.

This chapter consists of the following sections: a discussion on the research paradigm and its justification, the overall research methodology used, a discussion on the qualitative research phase and the research method used, and the quantitative research method used in studies one and two. The details of the research aim, sample, data collection method, and data analysis method in studies one and two are presented. Further, the ethics requirements and considerations for the whole study are provided, followed by the chapter conclusion.

3.2 Research paradigm

To address the research objective and questions, an appropriate research paradigm must be chosen to achieve the desired results. There are four competing paradigms used in marketing research to inform and guide inquiry into the phenomenon of interest: positivism, post-positivism, critical theory, and constructivism (Lincoln & Guba, 1985).

A mixed methods design has its own philosophical assumptions and methods of inquiry (Creswell & Plano, 2011). Positivism is the most used research paradigm in business and management disciplines. The study adopted positivism because it adheres to the view that only factual knowledge gained through the senses or observation is trustworthy (Bryman, 2012). Positivism follows an objective route and

advocates that knowledge is gained through gathering objectively verifiable facts. Under positivism, the researcher takes an objective stance in data collection and analysis. Positivists differentiate between scientific and normative statements. It is believed that normative statements cannot be confirmed via observation, therefore scientific statements are considered to be the true domain (Bryman, 2012). Positivism as a philosophy is in accord with the empiricist point of view that knowledge stems from human experiences (Wilson, 2010). The ontological view of the world comprises discrete, observable elements that interact in an observable and regular manner (Collins, 2010). Positivists investigate the objectivity of the phenomenon and consider findings to be most likely true.

The positivist approach can be used in both qualitative and quantitative methods of research. Traditionally, positivism depends on quantifiable observation leading to statistical analysis. The use of positivism in qualitative research is justified by applying a narrow definition of positivism. The narrow definition of positivism (a) views the world as independent, (b) confirms science to describe the world in the theoretical model, (c) utilises theories that reflect the link between the variables, (d) tests and evaluates the theoretical hypothesis (Ashworth, 1997, 2000).

The nature of the research questions in the present study incorporates a qualitative approach towards conceptualising digital wellbeing, and a quantitative approach towards developing a measure and model testing. Based on the positivism principle, the researcher used objectivity in interaction with participants followed by testing the theoretical model. The study is dominated by quantitative research and qualitative research was conducted to inform and guide the inquiry into a greater quantitative study (Creswell, 2013). Thus, a mixed method design using a positivist paradigm was used to achieve the desired results.

3.3 Research methodology

The purpose of the research is to investigate the scholarly meaning of digital wellbeing and its underlying dimensions. Therefore, an exploratory sequential research design incorporating qualitative and quantitative approaches was used (Cresswell & Plano, 2007). First, the researcher collected and analysed

the qualitative data, followed by an intermediate step of building the qualitative data, i.e., developing an instrument that was used for model testing in the quantitative phase. The primary intent of using the exploratory sequential design was to develop and apply a quantitative measure that is grounded in the qualitative data.

Qualitative research is an appropriate method to delve beneath the digital consumption experiences of end-users, allowing the researcher to capture the understanding and dimensionality of digital wellbeing (Creswell & Poth, 2018). The study aims to develop an instrument for digital wellbeing. To address this research objective, a quantitative method was adopted to validate the measurement and to test the nomological validity of the constructs under study (Amaratunga et al., 2002).

The rationale for adopting exploratory design is that it allows the researcher to explore the relationships between unknown variables and helps in instrument development, generalising qualitative findings, and developing theory. Thus, an exploratory sequential research design is used to address the research questions (Cresswell & Plano, 2007). In this case, first qualitative in-depth interviews were employed to develop the domain definition and item pool. This was followed by an intermediate quantitative phase of scale purification that involved item analysis, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and assessment of scale reliability and validity. The final phase employed a quantitative method to test the scale validity and establish nomological validity of the digital wellbeing with existing constructs. Thus, the study benefits from utilising the strength of each approach through mixing methodologies. An overview of the research methodology is presented below, outlining the research phases. Study 1 of the research incorporated qualitative in-depth interviews to gain the digital consumption experience of users and a quantitative method to purify and check the validity of the newly developed digital wellbeing scale. This was followed by study 2 model testing, in which a quantitative method was used to establish nomological validity.

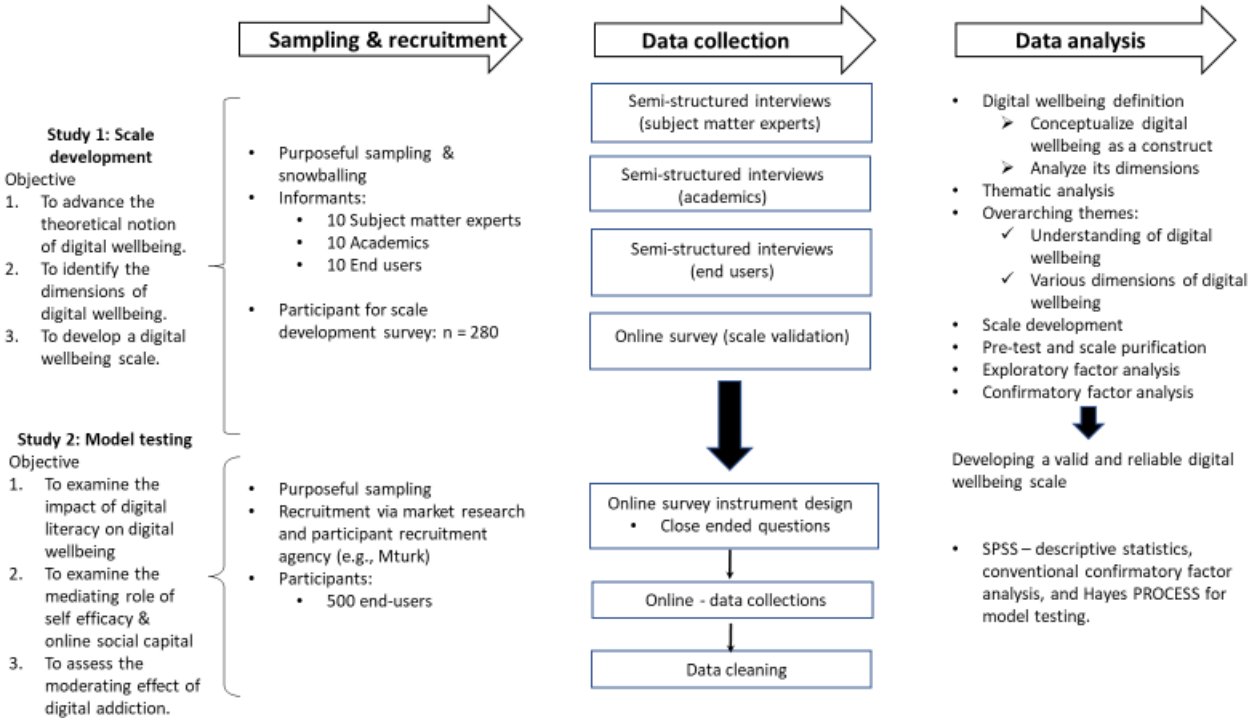

Figure 3. 1 Research methodology overview

3.4 Study 1 – Scale development

3.4.1 Qualitative research enquiry – scale development

The qualitative phase in study 1 aimed at addressing the first and second research objectives and the first question. Study 1 of this thesis aimed to understand the theoretical notion of the digital wellbeing construct and to identify its underlying dimensions in order to facilitate the development of an instrument to measure digital wellbeing. The scale was intended to inform the inquiry into study 2 model testing.

3.4.2 Qualitative research method justification

According to Creswell and Poth (2018), a qualitative research method must be used when a research problem needs to be explored. The current study used an abductive approach in the qualitative phase that aimed to understand the theoretical notion of digital wellbeing. The abductive approach helps in finding a logical solution and practical explanation for the phenomenon (Coffey & Atkinson, 1996; Pierce, 1974). Qualitative research was used in the study as it enabled the researcher to extract the unspoken feelings and experiences of end-users related to screen use. Digital wellbeing is an emerging

concept that needs a scholarly conceptualisation in the marketing literature (Abeele, 2020). The existing definitions and understanding of digital wellbeing are broad and need to be narrowed down to an individual user level to assist further research. Using a qualitative method in this study to discover the feelings and experiences of end-users was aimed at rendering contextual depth to the phenomenon (Guba & Lincoln, 1994). Moreover, qualitative research is appropriate when the research questions address variables that are not measurable and when the researcher needs detailed clarification to capture the construct of the study (Creswell & Poth, 2018). In this case, the qualitative method paved the way to directly interact with individuals to uncover the depth of the digital wellbeing concept. Hence, for the purpose of the study, a qualitative research method was regarded as appropriate.

3.4.3 Data collection

The study 1 qualitative research phase incorporated in-depth interviews with end-users of various digital devices. The following section presents details on sampling, recruitment, and data collection for the qualitative phase of study 1.

3.4.3.1 Participants

To arrive at relevant findings, end-users of various digital devices were targeted. The inclusion criteria to participate in the study were to have some online presence and digital consumption experience. Purposeful and snowballing sampling techniques were used to pool diverse perspectives on the construct until data saturation (Creswell, 2013; Glaser & Strauss, 1967). A conscious effort was made to include a diverse range of participants in terms of ethnicities, racial identities, ages, and gender, to obtain the subjective meaning of digital wellbeing. A total of 20 informants participated in the research interview and this was considered sufficient to allow them to share their views and daily experience of screen use. There were three groups of informants: six subject matter experts, seven academics, and seven end-users, which were deemed to be able to offer in-depth opinions and a multidimensional view of the construct. Subject matter experts are people with expert knowledge in a specific field. Subject matter experts for the study included CEOs of Artificial Intelligence (AI) companies, professional software designers, and

developers who advised companies on technology adoption and prescribed best practices for using technology (Chris, 2020). Academics included researchers and professional educators who specialised in topics such as human wellbeing, online consumer behaviour, and digital marketing. Academics were mainly recruited from Auckland University of Technology, New Zealand. Interviewing end-users helped in drawing direct insights into their experiential states, digital practices, and satisfaction with digital lifestyles. For this purpose, active and passive users of digital networking platforms were interviewed (Michael, 2018). Users below 18 and those who were not daily users of digital devices and online platforms were excluded from participating in the research. Subject matter experts contributed to the commercial understanding of digital wellbeing, academics contributed to the theoretical understanding of digital wellbeing, and end-users shared their daily experiences and the impact of screen use. This helped the researcher to see the nuances in describing digital wellbeing and in arriving at a unanimous definition of digital wellbeing.

3.4.3.2 Interview

The researcher conducted in-depth interviews with 20 informants. An in-depth interview is an established method of data collection in qualitative research and is mainly used to explore the informant's perceptions, feelings, opinions, and context (Kvale, 1983). An in-depth interview provides a deep understanding of daily life experiences (Johnson, 2011). In the current study, semi-structured in-depth interviews were used to gain an insightful view of digital wellbeing. In-depth interviews were conducted based on the interview guides developed for the study. There were three different interview guides that targeted the three different groups of interviewees. The researcher used the interview guides as a reference to ensure the relevance of the questions asked. The interview guides were structured with open-ended questions that also included probing questions. The three different interview guides were pre-tested with two informants from each informant group who were recruited via private contacts. The interview guide for subject matter experts include questions on the best practices to achieve balanced screen use, recommendations on the amount of time to stay online, engagement patterns, digital habits, and the experiential states of digital wellbeing. The academic informants' interview guide included questions on

wellbeing experiences, managing digital overload, strategies to cope with digital overload, healthy screen use, expression, and opinion of online wellbeing. The end-users interview guide included questions on digital consumption and engagement routines, managing digital stimuli overload, expressions of the experiential state of digital wellbeing, feelings and attitudes towards digital stimuli overload in daily life, and possible ways to find the right balance in digital media use. At the end of each interview, the informant elaborated on their understanding of digital wellbeing by using words and phrases to describe it. Each interview guide started with broad questions that initiated the flow of conversation on the concept. More specific questions, such as those targeting participants' experience of online wellbeing were placed at the end. Further, probing questions were used wherever necessary such as, 'Could you say some more about it, please?' 'What do you mean by that?' 'Can you please tell me more about this?' 'Can you please describe this?' All interviews were conducted over Zoom and Teams and lasted for about 60 to 90 minutes each. All informants who were interviewed were offered $30 as a token of appreciation after the interview session was over. The interviews were conducted online and were audio recorded for the purpose of transcription and data analysis. Audio recording and transcription were done by the researcher using the transcription feature in the latest Microsoft Office version of Microsoft Word. The following section details the data analysis process.

3.4.4 Data analysis

The data was transcribed and read for analysis. The interview data were analysed using thematic analysis to arrive at the overarching themes that reflect digital wellbeing. The qualitative data analysis was done using NVivo 12 software, a qualitative data tool that provides easy access to unstructured data and helps in conducting a deep level of analysis.

3.4.4.1 Thematic analysis

According to Braun and Clarke (2006), when conducting qualitative research, thematic analysis should be the foundational method of data analysis. Thematic analysis is a process widely used in qualitative research across a range of epistemologies (Boyatzis, 1998). Thematic analysis is considered an

easy yet rigorous method to identify, analyse, organise, describe, and report themes in a data set (Braun & Clarke, 2006). The current study used the thematic analysis method of analysis as it was a useful method to examine the perspectives of various research informants, indicating the similarities and differences, and producing unanticipated insights (Braun & Clarke, 2006; King, 2004).

The present research aimed to unpack the underlying dimensions of digital wellbeing. Thematic analysis helped in discovering the dimensionality of digital wellbeing based on the themes and codes. The present study used abductive thematic analysis which uses a theoretical parameter that prevents the exploration of arbitrary results (Coffey & Atkinson, 1996). The study adopted a reflective approach, which offers a theoretically flexible interpretation of interview data in order to identify patterns in the interview dataset (Braun & Clarke, 2012). The dataset was coded on the meaning-based pattern and then the overarching themes emerged.

The researcher adopted the following steps for thematic analysis (Braun & Clarke, 2006): (1) becoming familiar with the data, (2) generating codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) writing the report (see Table 3.1). The researcher followed a recursive process of analysing data rather than a linear process (Ely et al., 1997). The themes were classified according to the frequency and patterns that appeared throughout the interview data. The data analysis was carried out until no new themes emerged. The insights gathered from the thematic analysis were used to develop the item statements for measuring digital wellbeing.

Table 3. 1: Thematic Analysis Process (Braun & Clarke, 2006)

Phases of thematic analysis	Means of establishing trustworthiness
Phase 1: Becoming familiar with the data	Prolonged engagement with the data Documentation of theoretical thoughts Documentation of reflective thoughts Documentation of potential codes and themes Storing records of all interview data including notes and transcripts.
Phase 2: Generating initial codes	Using an abductive approach of coding
Phase 3: Searching for themes	Thematic mapping Detailed notes on the development of themes and codes
Phase 4: Reviewing themes	Examination of themes by the primary supervisor Test for referential adequacy by returning to raw data
Phase 5: Defining and naming themes	Peer debriefing Team consensus on themes Documentation of team meetings regarding themes Documentation of theme naming
Phase 6: Producing the report	Report on the theoretical, methodological, and analytical choices adopted in the study.

As suggested by Braun and Clarke (2006), the first step in the thematic analysis process was becoming familiar with the interview dataset. The researcher carefully listened to the interview audio recording and checked the transcripts that were generated by Microsoft Word. A few punctuation and spelling errors were spotted, and the researcher doubled checked the audio recording while concurrently editing the transcript. After finalising the transcripts, all transcripts were repeatedly read in order to become familiar with the breadth and depth of the data. The researcher made notes of the highlights in each transcript to inform subsequent steps. Throughout the process, the research questions served as the background for understanding the data.

The second step in the thematic analysis was to generate codes. An abductive approach was followed to understand the meaning throughout the dataset. The researcher used as many codes as possible to identify the meaning-based pattern of the data (Bryman, 2001). To arrive at the latent themes, the researcher looked for conceptual meaning beyond the data and used theory to explain the findings.

The third step, searching for themes, began when the dataset had been fully coded. The researcher developed multiple codes across the dataset to theoretically explain the phenomenon. In abductive thematic analysis, the themes and codes are distinct; codes are specific, while themes are complex (Guest

et al., 2012). The codes were sorted into potential themes and the relevant codes were collated under emerging themes. A thematic map was used to ponder the relationship between codes, sub-themes, and themes. The researcher arrived at a compilation of candidate themes that were coded based on the aim of the research.

The fourth step was reviewing and refining the themes. At this step, the researcher considered internal homogeneity and external heterogeneity for judging the categories (Patton, 1990). Data within each theme blend meaningfully. The researcher also confirmed the distinction between the themes. The candidate themes adequately reflected the nuance in the coded data. The themes were discussed with the primary supervisor to gain more clarity on the analysis. This helped the researcher to bring relevance and precision to the scope of the themes. The scope and content of each theme were defined based on the common meaning in the dataset. Throughout the whole process of thematic analysis, the researcher used the research questions to guide the analysis.

The final step was producing the report. The write-up of the analysis needed to be logical, concise, and non-repetitive. Thus, the study used an analytic narrative to explain the wholistic meaning of the data. The qualitative data analysis is reported in Chapter 4.

3.4.5 Trustworthiness issues

Trustworthiness in qualitative research is the way researchers persuade the readers about the validity of the findings (Lincoln & Guba, 1985). According to Lincoln and Guba (1985), trustworthiness in qualitative research is established through credibility, transferability, dependability, and conformability.

The credibility of the study is determined when the fit between the reader's view and the researcher's representation of the findings is perfect. Transferability, dependability, and conformity are achieved once the credibility of the interpretation and findings are established (Lincoln & Guba, 1989). Therefore, the researcher decided to first establish the credibility of the qualitative findings.

The triangulation technique was used to address the credibility (Lincoln & Guba, 1985). Triangulation is widely used in qualitative research to make sure the findings are comprehensive and

robust. The researcher used triangulation of sources by interviewing subject-matter experts, academics, and end-users whilst comparing the different perspectives on digital wellbeing to arrive at a theoretical notion of the concept. The credibility of qualitative data can also be determined through member checking (Lincoln & Guba, 1985). The findings and interpretation were shared with two participants to review the themes for clarity and relevance to the data. The coding process was done by the researcher using Nvivo software to maintain evidence of coding. To check the accuracy of the findings, the coding and interpretation of the data were shared and discussed with the primary supervisor from the Marketing Department of Auckland University of Technology. To ensure the credibility of the qualitative findings, a judging panel of three senior marketing researchers from the Marketing Department of Auckland University of Technology was involved in assessing the content and face validity of the item statements developed by the researcher.

3.4.6 Quantitative research enquiry – scale development

This section presents the methodological details for the quantitative scale development phase of study 1. The quantitative scale development phase addressed the first research question and the second research objective on developing a multidimensional measure of digital wellbeing.

3.4.7 Quantitative research method justification

The purpose of using the quantitative method was to develop a measure of digital wellbeing. According to Nunnally (1967), the process of developing a measure involves assigning numbers to objectively represent quantities of attributes. A measure assigns numbers that are perceived as statistical in nature. Therefore, in the scale development process, the quantitative research method is appropriate to assess the reliability and validity of the scale (Amaratunga et al., 2002). The dimensions and item statements of digital wellbeing were developed in the qualitative phase of study 1. To further test the reliability and validity of the scale, the quantitative method was adopted. The quantitative method provides more accurate results that can be generalised. Hence, this method was deemed appropriate to address the first research question and the second research objective on scale development.

3.4.8 Scale development enquiry

The findings from the qualitative study informed the conceptual domain of the construct and the potential item pool. An abductive approach was followed in the quantitative scale development phase.

Exploratory factor analysis is widely used in the marketing literature to determine the underlying dimensions of the construct (Churchill, 1979). Exploratory factor analysis was used in the study to understand the latent structure of the items and to determine the extent to which the items were internally consistent (Hair et al., 2019). Confirmatory factor analysis was used to validate the intended scale based on a systematic fit assessment procedure and to assess the relationship between latent constructs (Hair et al., 2010; Morin et al., 2016).

The current study adopted the scale development process as suggested by Churchill (1979). According to Churchill (1979), a multi-item measure of the construct is developed using eight steps: specify the domain of the construct, generate a sample of items, purify the measure, collect data, assess reliability, assess construct validity, and develop norms. As per Churchill (1979), marketing research that investigates behavioural relationships from a fundamental and applied perspective must follow this process to develop a multi-item measure.

3.4.8.1 Specify the domain of the digital wellbeing concept

The first step in the scale development process was to specify the domain of the digital wellbeing construct. The existing definitions of digital wellbeing in psychology and marketing were reviewed for this purpose. The lack of consensus in the existing definitions led the research into a qualitative exploration of the theoretical notion of the digital wellbeing of end-users. The results of the qualitative study provided a scholarly explanation of the digital wellbeing definition and its theoretical domain.

3.4.8.2 Generate a sample of items

The second step in the scale development process is to generate the items which capture the domain of the construct (Churchill, 1979). The results of the qualitative phase informed the dimensions of the construct. With the help of in-depth interviews, the researcher was able to uncover the four key

dimensions of digital wellbeing. The results of the thematic analysis provided themes and codes identified from the quotes in the interview transcripts, based on which a sample of items was generated to measure the construct. The emphasis at this stage was to develop a set of items that tapped each of the dimensions of digital wellbeing. The sample items were reviewed by a panel of three marketing academics from the Marketing Department of Auckland University of Technology, who suggested including items with slightly different shades of meaning (Churchill, 1979). With the help of this expert panel, the researcher therefore included slightly different nuances of meaning in statements in the item pool to develop a sound digital wellbeing scale. The expert panel reviewed the items for precise wording and double-barrelled statements and checked for socially acceptable responses. Based on the expert panel's feedback, the item pool was refined.

The existing literature on digital wellbeing definitions was reviewed to support the item generation process. The research concurrently reviewed the existing literature on digital wellbeing whilst generating the item pool. To sum up, a sample of items was generated based on the results of the qualitative phase and the existing literature on digital wellbeing scale development.

3.4.8.3 Purify the measure – exploratory factor analysis

To purify the item pool, exploratory factor analysis was conducted as a sample of items does not represent a scale (DeVillis, 2017). EFA and CFA were used in this study to determine the unidimensionality of the initial pool of items and to purify and validate the sample items. It was necessary to assess the dimensionality of the item pool as it was developed based on the results of the qualitative phase. EFA helped in examining the digital wellbeing dimensions by checking if the items were loaded on the respective dimensions or cross-loaded. This helped in removing problematic items. This further provided the researcher with the reliability of the dimensionality of the construct and the measurement items. The following section provides details on the factor analysis.

3.4.8.3.1 Sample and data collection

The data set of 280 responses was sufficient for running an EFA of 74 items, as it provided a minimum of five responses for each item (Hair et al., 2010).

A survey was designed to gather information on 1) items measuring perception related to online screen use, 2) items related to digital consumption experiences, 3) items measuring feelings about online screen use, and 4) two demographic questions. All items were measured using a 7-point Likert scale ranging from strongly disagree to strongly agree.

The questionnaire was designed using Qualtrics, a powerful online survey tool. A survey link generated from Qualtrics was circulated using MTurk. Mechanical Turk (MTurk) recruited participants from the US who were end-users of digital devices. MTurk is operated by Amazon Web Services and owned by Amazon to help researchers locate participants for research purposes. MTurk is used by thousands of researchers and is considered a reliable way to recruit participants. MTurk is also a cost-effective tool used by researchers to collect data. MTurk employs workers (participants) to browse jobs and complete them in exchange for a pre-specified rate. The registered workers were able to access the survey link sent through MTurk and completed the survey in exchange for an incentive of $3.

The research survey invited participants to share their digital consumption experiences as end-users. The screening question ensured only participants above 18 years old participated in the survey. The number of responses required was pre-set. Once the number of responses required was received, the researchers downloaded the data from Qualtrics for analysis. A total of 280 responses were received. EFA was conducted with 280 responses which were considered sufficient to explore the dimensionality of the construct.

3.4.8.3.2 Data analysis

The study adopted the EFA steps outlined by Hair et al. (2010) to guide the quantitative data analysis for scale development (see Figure 3.2). The researcher used EFA to explore the main dimensions of the construct from a set of latent constructs that were represented by a pool of item statements. The

EFA results showed how the items were grouped under several factors and how they collectively represented the construct (Hair et al., 2010).

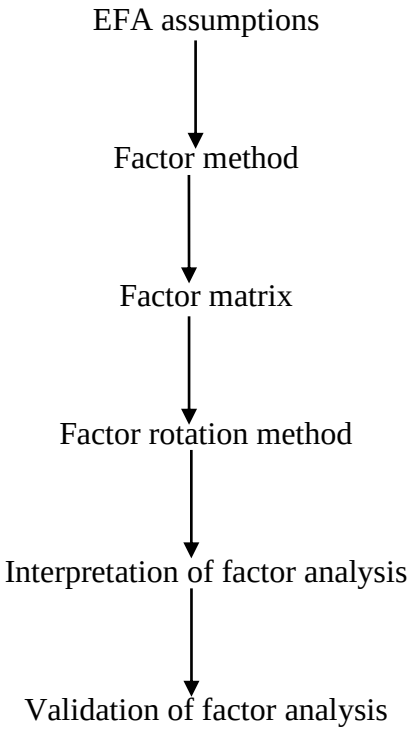

Figure 3. 2 Exploratory factor analysis process

3.4.8.3.3 Test assumptions of EFA

The data set was examined for missing data as it could cause a ubiquitous problem in further analysis (Haier et al., 2010). The survey responses were collected via MTurk using the Qualtrics platform. The responses were controlled by the researcher to completion. Hence, there was no missing data in the whole data set.

Next, the dataset was assessed for outliers. The researcher used a boxplot method to detect outliers in the dataset. Boxplots are a standardised way of displaying the distribution of the dataset graphically through quartiles (Dawson, 2011). The boxplots contain vertical lines from the boxes indicating variability outside the upper quartile and lower quartile. Those values outside the range were considered extreme outliers and were deleted.

For multivariate analysis, statistical assumptions needed to be tested in the dataset. Consequently, the dataset was tested for normality. Test of normality is essential when undertaking multivariate analysis. The test of normality was conducted using the Shapiro-Wilks test which is designed to detect the normality of the data. The Shapiro-Wilks test rejects the null hypothesis when the p-value is less than or equal to 0.05. Hair et al. (2010) suggest that in a sample larger than 200, the normality of the distribution is not a significant issue. In large samples, normality may not be a concern but must be checked for skewness and kurtosis values (Field, 2018). Normality issues arise only when the univariate skewness value is greater than 2.0 and the Kurtosis value is greater than 7.0 in a sample larger than 200. In the current study, a sample size of 280 was examined for normality and did not hinder further analysis as the skewness and Kurtosis values were within the threshold.

Once the dataset was examined for normality, the researcher assessed the suitability of the data for running exploratory factor analysis. It is possible to extract interpretable factors only when the data matrix has meaningful information. Bartlett's test of sphericity was used to measure the meaningful information in the data matrix. A chi-square value of $p \leq 0.05$ was required to run factor analysis (Tinsley & Tinsley, 1987). The Kaiser-Meyer-Olkin measure of sampling adequacy was used to assess the appropriateness of running factor analysis (Hair et al., 2009). A threshold exceeding 0.50 was set for each item and a threshold exceeding 0.8 for the overall construct was required to meet the adequacy of sampling quality.

3.4.8.3.4 Selecting factor extraction method

Factor extraction is used to identify factors that indicate a set of variables. There are several methods of factor extraction: principal component analysis (PAC), principal axis factoring (PAF), and

maximum likelihood (ML) (Hair et al., 2019; Kahn, 2006). Among these, principle component analysis (PAC) is the most widely used technique in factor extraction. The principal axis factoring (PAF), and maximum likelihood (ML) are common factor models used for providing the commonality value (Hair et al., 2010; Conway & Huffcutt, 2003). The ML technique provides the estimates of significance tests and confidence intervals but requires data that is normally distributed (Kahn, 2006). PAF provides the common variance that a variable shares with one other variable. However, PCA analyses all variances including the common and unique variances of variables. PCA is used to assess linear combinations or the principal components of observed variables. Over the research period, the researcher identified that the PAF and PCA method of factor analysis yielded the same results (Snook & Gorsuch, 1989).

Based on the objectives of the study and prior knowledge about the variance between the variables, principal component analysis was selected as the factor extraction method. Choosing this method helped in seeing the total variance among the digital wellbeing dimensions and the pattern of measurement items developed from the qualitative phase. This stage of the analysis showed how well the items generated in the qualitative phase fit the dimensions of digital wellbeing. The results of PCA provided confirmation of the dimensions of the digital wellbeing construct.

Following the qualitative study concerning the number of factors to extract, the exploratory factor analysis then used that extract number to extract factors. The researcher also compared the results from the factor solution with an eigenvalue > 1.0 to see the factor structure.

3.4.8.3.5 Selecting rotational methods

The factor extraction method provides clarity on the factor structure by equally distributing the variance to the factors (Tinsley & Tinsley, 1987). It is mainly used to simplify the factor solution before interpreting the components and the item groups (Hair et al., 2010). Orthogonal rotation and oblique rotation are the two rotational methods used in the marketing literature. The choice of the rotational method depends on the theoretical background of the construct. Orthogonal rotation puts constraints on factors as uncorrelated factors. This includes varimax, equimax, and quartimax (Tinsley & Tinsley, 1987). Among the various techniques, varimax is the most widely used method of rotation and assumes no

correlation between factors (Kahn, 2006). Oblique rotation assumes a correlation between factors and includes promax, oblimin, quartmin rotation (Park et al., 2002). In the present study, the theory suggested no correlation between variables such as physical care, agency, emotional resilience, and communion. Thus, Varimax orthogonal rotations were chosen as the researcher had prior knowledge about the meaning of the variables and they were considered appropriate for the study.

3.4.8.3.6 Interpretation of factor analysis

The results of factor analysis are judged based on the factor loadings. The rule of thumb in interpreting factor analysis is that variables must have a factor loading of 0.3 or greater, which is considered the minimum threshold for the variable to be retained. A factor loading of 0.3 means that the variance explained by the factor is 10%. However, according to Comrey and Lee (1992), in a larger sample (>200), a factor loading above 0.4 is considered fair, above 0.5 is considered good, above 0.6 is considered very good, and above 0.7 is considered excellent. The researcher used the factor loading threshold of 0.7 and made sure there were no negative loadings values as these indicate what is not a factor. In the current study, all factor loadings were higher than 0.7 and had positive values indicating the factor. Measurement items loaded on two factors with factor loadings of 0.5 were identified as cross-loadings and, if any item failed to load on any factor with the minimum factor loading of 0.3, they were removed from the item pool (Hair et al., 2010). Exploratory factor analysis was rerun after removing the problematic items.

3.4.8.4 Assessing reliability

Cronbach's alpha is one of the most widely used measures for assessing reliability (Koufteros, 1999). The internal consistency of the scale was assessed using Cronbach's alpha values to establish reliability. The items must carry a Cronbach alpha value of >0.7, and the inter-item correlation must be greater than 0.5 to ensure the internal consistency of each dimension (Hair et al., 2018). Item total correlation refers to a correlation of an item with the composite score of all the items forming the same set. When the Cronbach alpha is close to 1.0, the internal consistency of the scale is said to be high.

3.4.9 Confirmatory factor analysis

To validate the results of exploratory factor analysis, confirmatory factor analysis was conducted. CFA is a psychometric assessment of the factor structure using a systematic fitness assessment procedure (Morin, 2016). CFA is used to confirm the dimensionality of the construct as generated by the qualitative phase. Scale development studies in social and behavioural sciences use CFA to test the fit between the observed data and theory that specifies the hypothesised causal relationship between the latent factors and the observed indicators (Muller & Hancock, 2001). Therefore, CFA helps in bridging the gap between theory and observation. The results of CFA helped the researcher to see the theoretical fit of the data to reality. CFA was used to confirm the measurement model after conducting EFA (Hair et al., 2010). The results of EFA showed the underlying factors and their respective measurement items. The next step was to use CFA to test the goodness of fit of the measurement items to the factors and to refine the scale to achieve a good model fit.

3.4.9.1 Sample and data collection

A sample of 280 responses was used in EFA to explore the underlying dimensions of the construct. The same dataset of 280 responses was used in CFA to purify the digital wellbeing scale for accuracy and a good fit. The measurement scale fit the data perfectly, reflecting the quality of the sample and the generalisability of the results. CFA was carried out to identify the factoring issues and to purify the scale. The researcher designed second-order CFA comprising four dimensions of the digital wellbeing construct.

3.4.9.2 Specifying the measurement model

In the current study, the confirmatory factor analysis was carried out using the IBM Amos 25 software to design the measurement model. The measurement purification in CFA allowed the researcher to design the model based on factors and their respective items (Hair et al., 2019). Using IBM Amos 25, the researcher began to draw the model connecting latent variables to observed variables. The measuring variables were dragged from the dataset into the model to run CFA.

Each dimension of digital wellbeing was assessed by estimating the path values between the latent construct and the observed variable. The standardised factor loading should be greater than 0.70 for the identification of the construct (Hair et al., 2010). In the measurement model, all the items were hypothesised as reflective, i.e., the causality flowed from the latent construct to the measurement items.

3.4.9.2 Assessing measurement model validity

Once the measurement model was confirmed, the model was tested for goodness of fit. There are several statistical indices used to test the goodness of fit of the model (Hair et al., 2010). The current study used the widely used systematic fitness assessment procedure to test the model fit (see Table 3.2). This study used the fitness thresholds which include the common techniques for testing dimensionality such as the Root Mean Square Error of Approximation (RMSEA), with an acceptable cut-off value of less than 0.08, the Standardized Root Mean Square Residual (SRMR), with a threshold value less than 0.8, the Comparative Fit Index (CFI), with an acceptable cut-off value of more than 0.90, the Tucker Lewis Index (TLI) with a threshold value greater than 0.95 or 0.90, and the Chi-square value with an acceptable cut-off of less than 5.0 (Hair et al., 2010). A sample size of n=280 is sufficient to be validated for model fit using the above-mentioned fit indices (Bentler, 1990; Marsh & Hocevar 1985).

Table 3. 2: Statistical Index for Assessing the Goodness of Fit of the Measurement Model

Fit Index	**Recommended Value**
Absolute Fit Measures	
χ^2	The lower, the better
χ^2/df	≤ 3
RMSEA	≤ 0.06 or 0.08
Incremental Fit Measure	
TLI	≥ 0.95 or 0.90
CFI	≥ 0.95 or 0.90

According to Churchill (1979), testing construct validity in the scale development process is essential and is at the heart of the process. According to Hair et al. (2014), after EFA, the reliability and validity of the scale must be tested before further analysis. To establish construct validity, it is necessary to determine 1) the correlation between measures generated to measure the same construct and 2) whether

the outcome of the measure is as expected. Hence, the researcher examined the digital wellbeing scale for convergent validity, reliability, and discriminant validity.

Convergent validity is established by the extent to which the measure highly correlates with other measures designed to measure the construct. To prove the convergent validity of the scale, the factor loading of each construct must be greater than 0.7 and the Average Variance Extracted (AVE) must be greater than 0.50. The reliability of the scale was assessed with Composite Reliability (CR) estimates, which met the threshold of greater than 0.70 (Fornell & Larcker, 1981; Nunnally, 1978).

Discriminant validity is the extent to which the measure is unique and does not reflect other variables. It is indicated by a poor correlation between the dimension of the construct. The discriminant validity is determined by the Average Variance Extracted value, namely whether it exceeds the squared inter-construct correlations associated with that construct (Hair et al., 2010).

The criterion validity of the scale was tested to assess the degree to which the measure of one construct correlated with the measure of another related construct. The researcher used closely related existing measures of digital wellbeing such as positive health and subjective wellbeing to test criterion validity. Criterion validity was assessed based on the correlation between the measures. Correlation indicates the strength and significance among variables. A correlation value of 0.00 means there is no correlation, and a correlation value of 1.00 indicates a perfect correlation (Hair et al., 2007).

The predictive validity of the scale is assessed by the degree to which test scores accurately predict scores on a criterion measure. Predictive validity is examined using the regression model (Hair et al., 2007). The current study used mindfulness, perceived control of information, community engagement, and community identification as criteria to be predicted by the digital wellbeing scale. The positive regression coefficient values indicated a correlation between the dependent and the independent variable. A p-value less than 0.50 indicated there was a strong relationship between the dependent and the independent variable, indicating predictive validity.

The nomological validity of the construct is examined in detail in study 2 of this thesis. The research methodology details of study 2 are discussed in the following section.

3.5 Study 2 – Model testing

This section presents the methodological details for study 2 model testing. The results of study 1 scale development informed the inquiry into study 2 conceptual model testing to establish the nomological validity of the scale. Study 2 addressed the following research questions: (2) How does digital literacy influence digital wellbeing, and how is this relationship mediated by self-efficacy? (3) How does digital literacy influence digital wellbeing, and how is this relationship mediated by online social capital? (4) How does digital addiction moderate the relationship between digital literacy and digital wellbeing? (5) How does digital addiction moderate the mediating effect of self-efficacy and online social capital ? To address these research questions, quantitative data collection and analysis were undertaken in study 2.

3.5.1 Quantitative research method justification

The results of the scale development process in study 1 informed a reliable and valid digital wellbeing scale. The nomological validity of the constructed digital wellbeing scale was assessed in study 2. Nomological validity investigates whether the empirical data support a theoretical relationship between a construct and its antecedents or consequences (Cronbach & Meehl 1995; MacKenzie et al., 2011; Netemeyer et al., 2003). Therefore, four main hypotheses were developed based on the conceptual framework developed in the study. The present study hypothesised that digital literacy enhances digital wellbeing through self-efficacy and online social capital. Further, digital addiction was hypothesised to have a negative effect on the linear and mediating relationship. Nomological validity was established when the data supported the hypothesis. To establish the nomological validity, the researcher used Amos 25 to assess the model fit and the Hayes process in SPSS for model testing.

3.5.1.1 Sample and data collection

Study 2 a quantitative study to test the conceptual model and therefore an online survey was conducted with the participants who were end-users of digital devices. A total of 500 participants

completed the survey. All data were collected through MTurk, and the participants were from the US. The participants were rewarded $3 each as a token of appreciation for completing the online survey.

The survey was designed to address the constructs in the conceptual model. The main constructs include digital literacy, social capital, self-efficacy, digital addiction, and digital wellbeing. All measurement scales were carefully adapted from previous studies except for digital wellbeing, which was developed in study 1 of the current research. All items were measured using a 7-point Likert scale ranging from strongly disagree to strongly agree.

The questionnaire was designed using Qualtrics, a powerful online survey tool. A survey link generated from Qualtrics was circulated using MTurk. MTurk employs workers (participants) to browse jobs and complete them in exchange for a pre-specified rate. The registered workers were able to access the survey link sent through MTurk and completed the survey in exchange for an incentive. The research survey invited participants to share their digital consumption experiences as end-users of digital devices. The survey included two demographic questions and one screening question to ensure only participants above 18 years old participated in the survey. The number of responses required was pre-set. Once the number of responses required was received, the researcher downloaded the data from Qualtrics for analysis. A total of 500 responses were received for model testing.

3.5.1.2 Data analysis

A similar procedure of data analysis used in the quantitative phase of study 1 was followed in study 2 data analysis. There were no missing data in the demographic details or the scale item questions, as the questions were designed in 'forced choice' mode. The data were examined for outliers using the boxplot method. This was followed by testing the multivariate assumptions. The data were assessed to determine normality among variables using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Normality was further tested to examine the level of skewness and kurtosis for each measuring item in the dataset because in samples larger than 200, there are concerns over the normality of the dataset (Currant et al., 1996). This was followed by pooled CFA, validity, and a reliability test of data**.**

3.5.1.3 Specifying the measurement model

There are two methods of running CFA: the individual model and the pooled measurement model. The current study used pooled CFA as it was considered an efficient method for assessing the measurement model and addressing the issues of the identification problem. A pooled CFA was conducted combining all latent constructs in one measurement model. Using IBM Amos 25, the researcher began to draw the model connecting latent variables to observed variables. The measuring variables were dragged from the dataset into the model to run CFA. The model comprises two first-order constructs (digital addiction, and self-efficacy) and, three second-order constructs (digital literacy, online social capital, and digital wellbeing).

The unidimensionality of the measurement model was confirmed when the measurement items for the first-order construct and the latent variable of the higher-level construct had acceptable factor loadings. Once the factors loadings were obtained, those items having factor loading less than 0.70 were considered for deletion (Hair et al., 2010). The items were deleted one by one for respecifying and running a new model after item deletion (Zainudin, 2012).

3.5.1.4 Assessing measurement model validity

Once the measurement model specification was complete, it was assessed based on the fitness indices (see Table 3.2). The same fitness index used in study 1 was used in this phase to assess the measurement model. This fitness index encompassed the Root Mean Square Error of Approximation (RMSEA), with an acceptable cut-off value of less than 0.08, the Standardized Root Mean Square Residual (SRMR), with a threshold value of less than 0.8, the Comparative Fit Index (CFI), with an acceptable cut-off value of more than 0.90, the Tucker Lewis Index (TLI) with a threshold value greater than 0.95 or 0.90, and the Chi-square value with an acceptable cut-off less than 5.0 (Hair et al., 2010).

3.5.1.5 Assessing reliability and validity of CFA

The construct validity and reliability were tested by checking the convergent validity, discriminant validity, and composite reliability of the data.

Convergent validity is established when the measurement model is statistically significant. Convergent validity was assessed by checking the loading of each observed indicator on its underlying latent construct (Anderson & Gerbing, 1988). The standardised factor loadings should be significantly linked to the latent construct and have a factor loading of at least 0.5 and ideally exceed 0.7 (Hair et al., 2007). The convergent validity assessment also includes the measure of construct reliability and average variance extracted. Construct composite reliability should be greater than 0.7 (Nunnally, 1978), and the Average Variance Extracted for a construct should be larger than 0.5 to suggest adequate convergent validity (Fornell & Larcker, 1981).

Discriminant validity is determined by the average variance extracted value, namely whether or not it exceeds the squared inter-construct correlations associated with that construct (Fornell & Larcker, 1981).

3.5.1.6 Model testing using Hayes PROCESS Macro

To test the hypothesised relationship between the constructs in the conceptual model, the Hayes Process Macro for SPSS was used. This was carried out once the measurement model met the fitness threshold and was assessed for validity and reliability. The hypothesis in the study involved testing the main, mediating, and moderating effects. PROCESS Macro was used in the current study as it helps in conducting mediation and moderated mediation analysis. PROCESS is a computational tool – "MACRO" – available for SPSS that simplifies the implementation of mediation, moderation, and conditional process analysis of observed variables with a regression path analysis modeling tool utilising ordinary least squares (Hayes, 2013). Hence, Hayes PROCESS Macro, Model 1, Model 4, and Model 14 were appropriately used in the study to test the hypothesised relationship between the constructs. Model 4 of Hayes' (2013) PROCESS Macro was used to address the research question relating to the direct effect of digital literacy and the mediating role of self-efficacy and online social capital on digital wellbeing. Model 1 of Hayes' PROCESS Macro (2018) was used to examine the research question related to the moderating role of digital addiction in the relationship between digital literacy and digital wellbeing. Model 14 of Hayes' (2013) PROCESS Macro was used to address the research question on the moderated

mediation of digital addiction proposed in the model. Therefore, appropriate PROCESS Macro models were used to answer different research questions.

3.6 Ethics requirement

The above section presented a detailed overview of the mixed methodology research design used in the study. The researcher designed the methodology to specifically address the research questions and objectives of the study. This was done considering the ethical issues at all stages. Ethics approval was given by the Auckland University of Technology Ethics Committee (AUTEC) for application number 21/263 on 11 August 2021 to conduct study 1 and on 28th March 2022 to conduct study 2. The researcher followed the ethical guidelines throughout the data collection process.

Please see Appendix A for the ethics approval document required to conduct study 1.
For study 1 in-depth interviews, three different interview guides were used. Please see Appendix B for details on the three different interview guides. The consent forms were signed and returned to the researcher as a confirmation to participate in the study. Please see Appendix C for more information on the consent forms. The participants were emailed a participant information sheet and the consent form before data collection. Three sets of participant information sheets were developed by the researcher to address the research questions. Please see Appendix D, E, and F for full details of the participant information sheets that included the purpose of the study, the use of the data, and the research practice principles. The identity of the participants was kept anonymous in this thesis for privacy protection and the participants are named as 'participants' for the purpose of this study.

For the study 1 online survey, the research participants were recruited by MTurk. The participant information sheets were attached to the online survey to inform potential participants of the study details. The identity of the participants was secured by MTurk and the researcher was not able to obtain any personal information. Thus, the participants' confidentiality and anonymity were assured. Please see Appendix G for details of the participant information sheets used in the study 1 online survey and please refer to Appendix H for the study 1 online survey questionnaire.

Please see Appendix I for the ethics approval document required to conduct study 2. For study 2, an online survey was conducted on MTurk. Participant details were protected by MTurk and the researcher did not have access to any personal information about the participants. Thus, the survey participants' identity remains confidential. Please see Appendix J for the participant information sheets for the study 2 online survey and please see Appendix K for the study 2 online survey questionnaire.

Hence, all the relevant ethics approval documents needed to conduct the study were obtained from the Auckland University of Technology Ethics Committee (AUTEC).

3.7 Chapter conclusion

This chapter provided a detailed outline of the research methodology used in the study to address the research questions and the objectives of the study. An exploratory sequential mixed method was used in this thesis, with study 1 scale development incorporating in-depth interviews and an online survey to develop the digital wellbeing scale, and study 2 model testing comprising an online survey to validate the scale.

The justification and the procedures of study 1's qualitative and quantitative methods and study 2's quantitative method were discussed in detail in this chapter. The following chapter will discuss the results of study 1 scale development.

Chapter Four: Data Analysis & Findings (Study 1)

4.1 Introduction

Study 1 of this thesis includes the conceptualisation of digital wellbeing and the scale development process. A sequential exploratory mixed method design was used to address the research questions. Study 1 comprised semi-structured in-depth interviews to collect qualitative data, followed by an online survey for validation of the digital wellbeing scale. In-depth interviews were conducted with 20 participants identified as end-users of digital devices and the online survey involved 280 participants. The qualitative data analysis was performed by the researcher using Nvivo software followed by quantitative analysis using SPSS version 28 and AMOS 25.

Chapter four of this thesis presents the data analysis details and results of study 1 – scale development. This includes the description of the research sample, themes generated from the qualitative data analysis that address the first research question, the underlying dimensions of digital wellbeing, the conceptualisation and measurement of digital wellbeing, findings, and a discussion on the qualitative phase. This is followed by a description of scale purification, scale reliability and validity, and findings, before presenting a discussion on the quantitative phase. The chapter ends with a conclusion.

4.2 Description of the sample

4.2.1 In-depth interview sample

The qualitative phase included in-depth interviews conducted with 20 participants. Purposeful sampling and snowball sampling methods were used to recruit interviewees identified as end-users of digital devices. The data collection included nine male participants between the ages of 19-55, with an average age of 30, and 11 female participants between the age of 19-55, with an average age of 28. The interviewees were from different ethnic backgrounds and were from New Zealand, the USA, China, Singapore, Australia, Zimbabwe, South Korea, Samoa, the Philippines, and India. The interviewees were regular screen users and had an average screen time of eight hours per day, including work, education,

and entertainment-related online activities. In order to protect the anonymity of the interviewees, they were assigned an interviewee ID (see Table 4.1).

Table 4. 1: In-depth Interview Sample

Interviewee ID	Age	Gender	Nationality	Screen time per day
Interviewee 1	55	Male	Samoa	9 hours
Interviewee 2	52	Male	Zimbabwe	6 hours
Interviewee 3	42	Male	New Zealand	7 hours
Interviewee 4	28	Female	New Zealand	10 hours
Interviewee 5	29	Male	Singapore	12 hours
Interviewee 6	35	Female	India	8 hours
Interviewee 7	19	Female	Samoa	6 hours
Interviewee 8	50	Female	Philippines	7 hours
Interviewee 9	30	Female	China	8 hours
Interviewee 10	33	Female	South Korea	6 hours
Interviewee 11	29	Female	New Zealand	8 hours
Interviewee 12	22	Male	South Korea	12 hours
Interviewee 13	48	Female	Australia	9 hours
Interviewee 14	25	Female	China	10 hours
Interviewee 15	26	Male	South Korea	8 hours
Interviewee 16	32	Male	New Zealand	10 hours
Interviewee 17	35	Female	South Korea	6 hours
Interviewee 18	38	Male	USA	12 hours
Interviewee 19	29	Female	China	10 hours
Interviewee 20	33	Male	India	10 hours

4.3 Overview of interviewees' digital wellbeing experience

Predominantly, the interviewees referred to digital wellbeing as being interdependent with physical, mental, and social wellbeing. Interviewees explicitly stated that their personal experiences of digital wellbeing involved the happiness and satisfaction derived from having screen time, a sense of being aware of the occurrences in the real and digital world, a feeling of being progressive and productive, and a feeling of social acceptance and inclusion in the digital world. Further, they stated their digital consumption experience involved both positive and negative emotions that they expressed appropriately.

Interviewees felt that digital wellbeing was specifically experienced through social connections in the online world. Interviewees revealed that they felt good and had a sense of belonging and care while

connecting with people in the digital world. This mainly included online socialising with family, friends, and the community. While enjoying the positive experiences of screen use, the experiential state of digital wellbeing also meant control over their screen use. In other words, it involved 'dominion over technology'. This means that the users experienced digital wellbeing when they had a structured screen time routine, self-regulated their screen use, tactfully dealt with the impact of real-life stress on digital use, focused on total wellness, and led a balanced digital lifestyle.

Digital wellbeing was described as experiencing happiness derived from screen use and achieving external goals that were interconnected with their overall sense of wellbeing. Overall, the interviewees considered the digital wellbeing experience as managing emotions appropriately, coping with stressors, leading active lifestyles, being in control, and being connected to the digital world.

4.4 Digital wellbeing dimensions

The qualitative analysis of the data suggests that digital wellbeing was experienced by end-users as a 'state' in several dimensions, such as the state of physical care, the state of emotional resilience, the state of agency, and the state of communion. The interviewees explicitly described their experiences of digital wellbeing, based on which the researcher was able to identify the main themes (see Table 4.2). These experiential states were subjective and related to the end-users' relationship with technology. The following section discusses the main themes generated in the data.

Table 4. 2 Themes and Codes

Themes	Codes	Quotes
State of physical care	Exercising Physical activity	*"I find myself always just watching those exercising videos on YouTube and then trying to follow those things". (Female, 30 years)*
		"Digital screens, so it's becoming more and more difficult, and so I just try and strike a balance between physical activity and reading books." (Male, 42 years)
	Daily routine	*"Previously I didn't have any knowledge but now I can you know like just watch YouTube and then I can prepare all the healthy and nutritious dishes." (Female, 29 years)*
		"I actually continue listening to YouTube while doing my daily chores. Like you know, there is a study about the problem on plastics, so I put on my ear plugs and

	Taking breaks	*while I'm cooking I have my mobile phone right beside me and I continue listening." (Female, 50 years)* *"I think that is how you could probably achieve physical wellbeing by taking breaks from digital devices." (Female, 48 years)* *"I think just awareness on knowing the impacts that screen use can have and knowing when it's important to take a break." (Male, 33 years)*
	Adequate sleep	*"I feel sleepy and really tired, really exhausted and my whole day I cannot be productive I cannot do anything, and you know it's like at night I watch some Tik Toks and then I realised it is making me feel physically unhealthy." (Female, 25 years)*
	Conscious of physical health	*"Sometimes people just start getting back, back ache, or it starts hurting their eyes so they have to be concerned about all of these like bodily ailments that they are getting." (Female, 35 years)*
State of emotional resilience	Feeling resilient	*"Need to defend yourself emotionally when feedback starts coming back, so you have to also know what you put on there. Like I say, a person needs to be able to manage emotions." (Male, 52 years)* *"You have to be aware of the danger that you are never fully protected from seeing certain things that you don't want to see or from hearing certain things that we don't want to hear." (Male, 35 years)*
	Coping with negative emotions	*"A digitally well person, they'll be resilient because anyone and everyone gets like some mocks in their lives and they know how to take those logs in your stride." (Female, 33 years)* *"Back then when I posted something on social media, especially if it's a profile picture, I got so excited about how many likes I got. But now it doesn't matter anymore okay, you know, it's superficial. To me it's superficial! There are more, deeper, nicer, non toxic ways to come to engage." (Female, 28 years)* *"I think if you're emotionally umm let's say your emotions are sitting towards like a negative side, I feel like that would have an impact as to how you would utilise digital platforms to benefit you." (Female, 19 years)* *"Too much exposure you know, this also creates a certain level of guilt feelings because you know, you know you're wasting your time." (Male, 22 years)* *"I was talking about bullying the other day with a fellow parent friend of mine and in our day if we were bullied when we left school the bullying would stop. Now it follows the people home, so you can't resist. Unless you get rid of your devices, you can't escape it so much so. I think it's difficult to cope." (Male, 42 years)*

State of agency	Power	*"Uhm, maybe as soon as you wake up, don't go to your phone. That's such a normalised behaviour, but I think just setting your mind at the very start of your day, not to run to your device, and so I need to take my own advice." (Female, 28 years)*
		"So every night at about 10:45 my phone tells me you've only got 5 minutes left and then all my apps shut out. Of course you have the option of like going back in, but that kind of feels a bit guilty. So, I probably shouldn't go back. Uhm, so yeah, I think just setting up those kinds boundary." (Female, 28 years)
		"I also think how digital technology contributes to the awareness of human communities. Yeah, I look at it as influence, power in communal life." (Mlae 32 years)
		"Not putting yourself like in a vulnerable situation and you know or you know, if for instance, you find yourself becoming addicted or and you're spending a lot of time online and you think you're finding it affecting your physical, your emotional health, you must have the responsibility or capacity to change that." (Male, 55 years)
	Dominance	*"To me it is kind of taking responsibility over screen time and making sure that our digital wellbeing is being looked after." (Female, 35 years)*
		"We are the owner, we are the user, we shouldn't be controlled or managed by the technology. We shouldn't let them take over our life." (Female, 33 years)
	Competence	*"Although I don't really want to admit that, but I like to control things. The use of digital devices makes me feel like I can control something, I am satisfied when controlling the digital device. Uhm, but sometimes the digital devices make may feel like I lost my control then I feel dissatisfied." (Female, 29 years)*
		"Able to use the digital world to achieve our goals in life that support wellbeing." (Female, 33 years)
		"It is supporting me to do to accomplish everything that I want to accomplish and not distract me from attaining those goals." (Male, 29 years)
		"The digital technology is enabling you to do the tasks that we want to do. And it does not overwhelm you or it does not distract you in any way from whatever objectives that we try to achieve." (Male, 32 years)
State of communion	Social interaction	*"Nowadays most of your social interactions are online with friends on your devices, especially when they're somewhere else far from you or outside of Auckland, outside of the country. I rely on my device 100% in that aspect. And I use it to get into contact with them using device to contact them. So I would say in that aspect, yes, it's technology is a definite thing that would help with my wellbeing socially." (Female, 30 years)*
		"I'm in touch with my family with my mother with my sister with my niece. I feel so close with them through my device." (Female, 19 years)

	"I think a digitally well people are quite social animals, but they know they also enjoy being by themselves." (Male, 22 years)
	"Healthy use would be to chat with friends and sometimes I play those online games like those interactions games with friends." (Male, 29 years)
	"Screen use can help because you can communicate quite easily and I know in New Zealand that they struggle with mental health in being able to talk to someone or communicate or reach out to people to talk to and seek help. Whereas now it's, I would argue that it's a lot easier to reach out and talk to someone." (Female, 50 years)
Showing morality	*"Knowing about current events. Uhm, knowing about the realities of life. Facing back, you know you. Should I spread them? You just have to know about it, but then you kind of limit it as well because it can be quite a news report that is so disturbing." (Male, 52 years)*
	"They must have a morale. What content/service are we producing or sharing? Is there morale?" (Male, 55 years)
Being kind	*"Then other things are, a person also have to be a little bit sympathetic and kind. There are people that will put information there by mistake. We must know that they are part of a community. Even in the old world of no digital technology you would apologise, I think the same applies to digital technology." (Male, 38 years)*
	"They are diverse, some are kind, some are gentle, some helpful, some are not very helpful, seek help." (Male, 35 years)
	"I think the main thing is raising their hand and admitting, that they had this problem and also then making a brave decision to seek that help." (Female, 35 years)

4.4.1 State of physical care

The first emergent theme from the data was the state of physical care that end-users experienced as part of their screen time routine. The interviewees reported that they experienced digital wellbeing when they regularly took breaks from screen time and by balancing screen use with physical activities and daily routines. Interviewees stressed that leading an active lifestyle by exercising, having adequate sleep, and being conscious of physical health were necessary to attain digital wellbeing. Most interviewees stated that being aware of the negative impact of prolonged screen use on physical health and knowing when to take a break from screen use was vital. They reported that feeling physically healthy was important to creating a sense of digital wellness. The interviewees felt that having a structured screen time

routine was able to balance and improve their screen use. Such a routine could clearly help end-users to avoid overuse and any subsequent disruption to their daily activities.

For example, the interviewees considered exercising and physical activity as beneficial to helping them attain balance in their screen use. Some explicitly stated the need to strike a balance between screen use and physical activity:

> *"Digital screens, so it's becoming more and more difficult, and so I just try and strike a balance between physical activity, reading physical books, and screen time."*

> *"I think that is how you could probably achieve physical wellbeing by taking breaks from digital devices."*

> *"I think just awareness on knowing the impacts that can have and knowing when it's important to take a break."*

> *"I feel sleepy and really tired, really exhausted and my whole day I cannot be productive, I cannot do anything, and you know it's like at night I watch some Tik Toks and then I realised it is making me feel physically unhealthy."*

> *"Sometimes people just start getting backache, or it starts hurting their eyes, so they have to be concerned of these like bodily ailments that they are getting."*

Overall, the interviewees used words like "taking breaks", "exercise", "healthy lifestyle", "awareness about health", and "physical activity" to express their feeling of digital wellbeing. Hence, leading a physically active and healthy lifestyle alongside screen use could promote a feeling of digital wellbeing among end-users.

4.4.2 State of emotional resilience

The second theme generated from the qualitative analysis was the state of emotional resilience experienced by end-users. This state of digital wellbeing was attained by interviewees when they experienced positive emotions and managed negative emotions. Interviewees described digital wellbeing as feeling resilient and defending oneself emotionally from screen use. They further stressed the need to be resilient towards comments and feedback received via social media. Also, being aware of the superficial nature of social media engagement was essential to interviewees when seeking to guard their emotions. Interviewees described that while screen use could produce positive emotions, it could also

create negative emotions. This required the end-user to have high emotional resilience in order to handle the emotional imbalance caused by screen use.

> *"You need to defend yourself emotionally when feedback starts coming back to you, so you have to know what you put on there like I say, a person needs to be able to manage emotions."*
>
> *"You have to be aware of the emotional danger that you are never fully protected from seeing certain things that you don't want to see or from hearing certain things that we don't want to hear."*
>
> *"A digitally well person, they'll be resilient because anyone and everyone gets some mocks in their lives, and they know how to take those logs in their stride."*
>
> *"Back then when I posted something on social media, especially if it was a profile picture, I got so excited about how many likes I got. But now it doesn't matter. anymore okay, you know, it's superficial. To me it's superficial! There are more, deeper, nicer, non-toxic ways to come to engage."*

Further, coping with negative emotions was found to be key to attaining digital wellbeing. Interviewees felt that negative emotions caused by screen use could create unhealthy screen use. They also felt that the content seen on various social media platforms could be disturbing and influence the emotions of users. Most of the interviewees reported that too much exposure or overuse could trigger a feeling of guilt and emotional imbalance. Some even experienced cyberbullying and found it difficult to escape the scenario and cope with the negative impact. Interviewees felt the need to be emotionally resilient to be able to handle the challenges and harm posed by the digital world.

> *"You come across a news report that is so disturbing that it can, and it will affect your mood, your feeling of wellbeing. "*
>
> *"Too much exposure also creates a certain level of guilt feelings because you know, you're wasting your time."*
>
> *"I was talking about bullying the other day with a fellow parent friend of mine and in our days if we were bullied when we left school the bullying would stop. Now, it follows the people home, so you can't resist. Unless you get rid of your devices, you can't escape them so much so. I think it's difficult to cope."*

Hence, when an end-user is emotionally resilient, he/she can manage emotions triggered by screen use, feel emotionally stable, not feel frustrated, is aware of the superficial nature of online engagement, and can cope with any negative emotions caused by screen use.

4.4.3 State of agency

The third theme generated from the data was the state of agency experienced by the end-users. Interviewees reported that to experience digital wellbeing, an end-user needs to possess power, dominance, and competence over screen use. They mentioned that they felt the need to set boundaries between screen time and other offline activities to attain a balance. Further, they also needed to have a pre-planned mindset about when and when not to use a device. Moreover, they thought that exerting power in online social life was essential to be in control over screen use. Most of the interviewees used words like “setting time limits”, “setting boundaries”, “influence”, and “control over screen use” to describe their power over screen use.

> *“Uhm, maybe as soon as you wake up, don't go to your phone. That's such a normalised behaviour, but I think just setting your mind at the very start of your day, not to run to your device, so I need to take my own advice.”*

> *“So, every night at about 10:45 my device tells me you've only got 5 minutes left and then all my Apps shut out but of course, you have the option of going back in, but that kind of makes me feel a bit guilty. So, I probably shouldn't go back. Uhm, so yeah, I think just setting up those kinds of boundaries.”*

Moreover, the interviewees stated that to be digitally well users required dominance over screen use. This means having dominion over technology and not vice versa. They used phrases such as “taking responsibility” and “not being controlled by technology” to express the need to be dominant over screen use. Moreover, the interviewees acknowledged that end-users need to take responsibility for their screen use and must have the capacity to bring balance to their screen time. The majority felt that they should not let technology take over their lives but rather they should be in control of it. They also mentioned that being in control made them feel satisfied with their screen use.

> *“We are the owner, we are the user, we shouldn't be controlled or managed by the technology, we shouldn't let them take over our lives.*

> *“Not putting yourself like in a vulnerable situation and you know, if for instance, you find yourself becoming addicted and you're spending a lot of time online and you think you're finding it affecting your physical, your emotional health, you must have the responsibility or capacity to change that.”*

"Although I don't really want to admit that I like to control things like if the use of digital devices makes me feel like I can control something, I'll be satisfied. Uhm, that's how I analyse myself and sometimes the digital devices make may feel like I lost my control then I feel dissatisfied."

Most of the interviewees agreed on the need to be competent in screen use. They felt that screen use competence helped them accomplish goals in life by avoiding digital distractions. They also mentioned that when end-users are competent, technology supports their daily tasks and helps them achieve their goals. They explicitly stated that end-users tapping into the digital world need to be knowledgeable enough to understand the difference between online and real life.

"It is supporting me to accomplish everything that I want to accomplish and not distract me from attaining those goals."

"The digital technology is enabling you to do the tasks that we want to do, and it does not overwhelm you or it does not distract you in any way from whatever objectives that we try to achieve."

"Having a balance of tapping into like digital platforms is important, but also like understanding reality as well. Uh, when it comes back to the whole life balance point of view, it means, yeah, I guess being competent."

To sum up, end-users must set boundaries, have control, be responsible, and be competent in screen use to experience a state of agency. This ensures that end-users exert power and dominance and are competent in their digital consumption.

4.4.4 State of communion

The fourth theme that emerged from the data was the state of communion experienced by the end-users. The interviewees mentioned that they felt good when someone in the digital world interacted with them. They described digital wellbeing as having close connections and interaction with family and friends. This also included having healthy connections with new people they met online. They believed online communication could help with mental health issues such as stress, anxiety, and depression. It was stated that online social interactions could help a user during difficult times such as when an individual experienced abuse and was approached by someone in the online world seeking to help them. Sometimes, online games could drive healthy social interaction that made users feel good.

"Nowadays most of your social interactions are online with friends on your devices, especially when they're somewhere else far from you or outside of Auckland, outside of the country. I rely

on my device 100% in that aspect. I use it to get into contact with them. So, I would say in that aspect, yes, its technology is a definite thing that would help with my wellbeing socially."

"I'm in touch with my family my mother, my sister, and my niece. I feel so close with them through my device."

"I think digitally well people are quite social animals, but they know they also enjoy being by themselves."

"Healthy use would be to chat with friends, and sometimes I play those online games like those interactions games with friends."

"Digital devices can help because you can communicate quite easily and I know in New Zealand that they struggle with mental health in being able to talk to someone or communicate or reach out to people, to talk to, and seek help. Whereas now it's I would argue that it's a lot easier to reach out and talk to someone."

Further, the interviewees mentioned they felt good when someone in the online world showed morality and kindness. This means that the digital engagement of others demonstrated morality in terms of the content shared. Often interviewees felt good when their fellow users were considerate towards their comments and content sharing. Moreover, the interviewees described digital wellbeing as a state where others showed kindness and sympathy. They felt good when others exhibited respectable conduct and provided help during difficult times.

"Then other things are a person also has to be a little bit sympathetic and kind. There are people that will put information there by mistake. Even in the old world of no digital technology, you would apologise. I think the same applies to digital technology."

To summarise, the interviewees described digital wellbeing as the good experience achieved when end-users experience morality, kindness and sympathy shown by others. These aspects seem to drive the state of communion and aid users' experience of digital wellbeing.

4.5 Findings & Discussion

4.5.1 Digital wellbeing conceptualisation

Defining a concept under study forms an essential part of the scale development process (Churchill, 1979; Gilliam & Voss, 2010). An in-depth interview with study participants was used to help define the digital wellbeing concept as it is an appropriate method to understand the participants' experiences, feelings, and perspectives (Churchill, 1979). The result of the qualitative study suggests that

digital wellbeing encompasses screen use that is interrelated with other aspects of wellbeing. From the analysis, four main dimensions of digital wellbeing were identified: state of physical care, state of emotional resilience, state of agency, and state of communion. The dimensions relate to the cognitive and affective judgments of screen use. Based on the results of the study, these affective and cognitive appraisals in the study relate to an individual's evaluation of screen use that enhances balance. The results suggest that cognitive appraisal involves a comparison between the current condition of screen use and the desired state of screen use. If the difference is small, an individual is more likely to have positive experiences and vice versa. Affective appraisal of digital consumption means whether an individual considers screen use to be a pleasant or unpleasant experience. It mainly relates to how the user reacts to online experiences.

The study's working definition of digital wellbeing is that it is a state of optimal balance achieved through cognitive and affective appraisals that contribute to subjective wellbeing. Moreover, the study posits digital wellbeing as an extended version of subjective wellbeing.

The working definition mainly focuses on the aspect of balance achieved through cognitive and affect appraisals. The results of the study address the gaps identified in the operationalisation of digital wellbeing by identifying the main dimensions. For example, earlier studies have lacked consensus on the relationship between digital wellbeing and overall satisfaction with life (Büchi, 2021). The current study found that digital wellbeing is mutually dependent on mental, social, and physical wellbeing and is central in the maintenance of subjective wellbeing. It is the subjective evaluation of screen use. The study also found that digital wellbeing is not merely abstinence from technology but is also enhanced by social connection and communion in the digital world. Some studies have only provided an outline of how users' manage their relationship with technology (Tarafdar et al., 2020). The current study clearly shows how users can develop a better relationship with technology through physical care, being emotionally resilient, controlling usage, and being in communion with the digital world. The results of the study also break down the paradox of benefits and drawbacks of digital consumption by uncovering the cognitive and affective efforts required to achieve a balance in digital use. The results suggest that digital wellbeing

has an interdependent role in sustaining other aspects of wellbeing. Based on the results of the qualitative study, an operational definition of digital wellbeing is discussed in the following.

A definition of digital wellbeing must be practically and scientifically useful in further research on online screen use and wellbeing. This study uses an analytical definition established by Aristotle, i.e., a definition based on genus and differences. An analytical definition is used because it "designates that which makes a thing what it is and distinguishes that thing from all other things" (Vorbett & Connors, 1999, p. 33). Analytical definitions involve specifying the general category, defining the concept, and then defining the characteristics that set the defined concept apart from other characteristics in the general category. In the current study, digital wellbeing is defined as a user's psychological experiential state of wellbeing, which is used as the genus as it encompasses the conceptual domain of digital wellbeing. Based on qualitative data, the study extends the working definition of digital wellbeing by conceptualising it as pertaining to the psychological domain and how online screen use interacts with the cognitive and affective states. The definition also differentiates this experiential state from subjective wellbeing by positioning digital wellbeing as the condition required to maintain the hedonic and eudemonic aspects of subjective wellbeing in the online context. Further, the definition specifies digital wellbeing as a multidimensional construct reflecting four dimensions that include cognitive and affective manifestations.

A multidimensional construct is theoretically meaningful and provides a holistic view (see Figure 4.1) of the phenomenon (Martin et al., 1993). The dimensions of digital wellbeing are operationalised as a reflective model, i.e., the construct is reflected by its dimensions. This is discussed in detail in the following sections.

Based on the critical review of the existing literature on digital wellbeing and the qualitative findings of the present study, digital wellbeing of end-users is understood as a state of wellbeing. This state refers to the balance attained between the benefits and drawbacks of screen use. These experiential states mainly require emotional and cognitive processing of screen use to ensure that both the hedonic and

eudemonic aspects of subjective wellbeing are maintained. Accordingly, the present research suggests the following definition of digital wellbeing:

> Digital wellbeing can be defined as "a psychological experiential state of optimal balance between the positive and negative effects of digital consumption. Digital wellbeing comprises an individual's cognitive and affective appraisal of digital consumption, which involves the state of agency, state of communion, state of emotional resilience, and state of physical care, which significantly contribute to subjective wellbeing in its hedonic and eudemonic dimension."

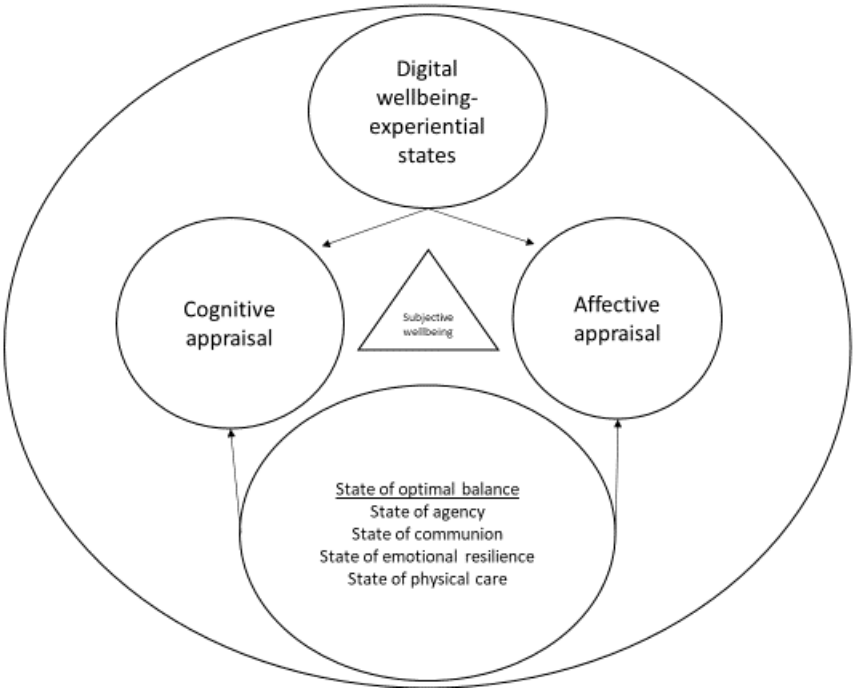

Figure 4. 1 A holistic view of digital wellbeing

4.6 Digital wellbeing scale development

To develop a scale for measuring the digital wellbeing of end-users, the study adopted the scale development and validation process as suggested by Churchill (1979), Netemeyer et al. (2003), DeVellis (2016), and MacKenzie et al. (2011). The scale development process involved item generation and selection, purification and dimensionality, and scale refinement and confirmation.

4.7 Item generation and selection

The aim of study 1 was to develop a pool of items that reflect the dimensions of digital wellbeing. Hence, item generation involved generating a pool of items to capture the construct and assessing the content validity of the items based on experts' opinions (Churchill, 1979).

4.7.1 Generating the pool of items

Measurement of digital wellbeing must be context-specific; it must be specific to the online context. The scale should reflect the impact of screen use on the wellbeing of end-users. The existing literature on digital wellbeing in marketing and other related disciples was reviewed, and it was found that there is no existing scale that distinctively measures online wellbeing. Therefore, the researcher reviewed studies that insist on the development of an online wellbeing scale to find the research gaps in online scale development, scale structure, and evaluation method (Ong et al., 2021). Based on the review of the extant literature and the results of the in-depth interviews, the researcher chose a pool of items that are measurable and reflect each dimension of digital wellbeing. Hence, based on the thematic analysis results, the phrases and terms from the interview data that describe the digital wellbeing experiences of users were selected to form a pool of items. The initial pool included 27 items to capture the conceptual domain (Churchill, 1979).

4.7.2 Content validity check by experts

The content validity of each item was assessed by following the recommendations of Netemeyer et al. (2003). An expert panel of three marketing academics from the Marketing Department of Auckland University of Technology assessed the content validity of the item pool for the clarity, relevance, specificity, and comprehensiveness of the initial scale items. Based on the remarks of the expert panel, the item statements were revised and reworded to fit the online context. Further, based on the experts' feedback, several items were modified to improve the item pool's comprehensiveness (see Table 4.3). This process led to 33 items (six for state of physical care, nine for state of emotional resilience, 10 for

state of agency, and eight for state of communion) which were the key inputs for the next phase of the study.

Table 4. 3 Digital Wellbeing Initial Measurement Item Pool

Digital wellbeing measurement item pool
State of physical care
1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.
2. My screen use does not distract me from my daily activities.
3. I try to take regular breaks from screen time.
4. My screen use does not affect my physical health.
State of emotional resilience
1. I manage my emotions well when I am online.
2. I don't feel vulnerable when I am exposed to the digital world.
3. I hardly experience frustration when I am exposed to the digital world.
4. I manage any emotional challenges caused by my screen use.
5. I cope with any mood swings that are aroused by my screen use.
6. I cope with any stressful situation caused by my screen use.
State of agency
1. I set boundaries over my screen use.
2. I limit my screen use.
3. I have control over my screen use.
4. I feel that technology should not control my life.
5. My screen time does not distract me from achieving my goals.
State of communion
1.I feel that I mostly use my screen time to connect with my friends and family.
2. I feel a sense of closeness with my family and friends through my screen use.
3. I feel that I am a social animal that loves to have healthy interaction with people in the digital world.
4. I feel it is a lot easier for me to reach out to someone in the digital world when I face struggles.
5. I feel that I struggle to find someone to talk to in the digital world.*
6. I feel good when I play some online interactive games.
7. I feel that I demonstrate morality in what I share with the people I meet online.
8. I feel I adhere to ethical behaviour in the digital world.
9. I feel that I am considerate towards the content I share with others.
10. I feel sympathetic towards the vulnerable people I meet in the digital world.
11. I feel that the people I meet online always look up to me for help.
12. I feel I help those who ask me for it.

Table 4. 4 Digital Wellbeing Item Pool Validation Results

Digital wellbeing scale items
State of physical care
PC1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.
PC2. My screen use does not distract me from my exercise routine.
PC3. I am conscious of potential bodily ailments because of my screen use.
PC4. I take regular breaks from screen time.
PC5. My screen use does not affect my daily activity.
PC6. My screen use does not interfere with my sleep.
State of emotional resilience
ER1. Screen use does not affect my emotions.
ER2. I manage my emotions well when I am online.
ER3. I feel emotionally stable when I am exposed to the digital world.
ER4. I don't feel frustrated when I am exposed to the digital world.
ER5. I feel the number of likes on social media is superficial.
ER6. I can manage any emotional challenges caused by my screen use.
ER7. I cope well with any mood swings that are aroused by my screen use.
ER8. I cope well with the emotional harm caused by screen use.
ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying)
State of agency
A1. I set boundaries over my screen use.
A2. I limit my screen time.
A3. I have the power to influence my digital communal life.
A4. I influence others in the digital world.
A5. I have control over my screen use.
A6. Technology cannot control my life.
A7. I am ready to be responsible for the negative outcomes caused by my screen use.
A8. I spend most of my screen time in achieving my goals.
A9. My screen time does not distract me from achieving my goals.
A10. I am competent in balancing my screen time and reality.
State of communion
C1. I feel good when others connect with me in the digital world.
C2. I feel good when someone online reaches out to me during difficult times.
C3. I feel good when someone interacts with me in the digital world.
C4. I feel annoyed when online fellow users exhibit improper behaviour.*
C5. I feel good when online fellow users exhibit respectable conduct.
C6. I feel good when online fellow users consider the appropriateness of the content before sharing.
C7. I feel good when the people I meet online are kind to me.
C8. I feel good when the people I meet online help me.

4.10 Rationalisation of digital wellbeing dimensions

The content validity assessment by the expert panel helped in generating an item pool that included 33 measurement items. The existing literature on digital wellbeing in the field of marketing was

reviewed to rationalise the definition and measurement of the dimensions and the potential items of digital wellbeing.

The following dimensions were derived from the qualitative study: state of physical care, emotional resilience, agency, and communion. The researcher reviewed the top journals in marketing and related disciplines to confirm if these dimensions exist in the online context in order to justify the definitions and measurement items.

4.10.1 State of physical care - Definition and measurement

The increased demands of connectivity have impaired the balance needed to lead a healthy lifestyle by reducing physical activity. Therefore, the results of the study suggest that digital wellbeing must be assessed in dimensions pertaining to the state of physical care. Although screen use supports health-related behaviours, such as information on physical activity and diet regulation, it can also have a negative impact on health. Existing studies report that excessive screen use replaces health and wellbeing-promoting activities (Goodyear et al. 2021). Therefore, the 'state of physical care' construct is significant in assessing digital wellbeing. There are no existing definitions that describe this construct in the online context. Based on the qualitative results, the study defines the state of physical care as leading a physically healthy and active lifestyle alongside digital consumption. This ensures that individuals reap the benefits of digital connectivity while also experiencing physical wellbeing. No existing scales measure the construct 'state of physical care' in an online context. Hence, measurement items reflecting physical care were generated based on the qualitative results.

Table 4. 5 State of Physical Care Measurement Items

State of physical care: The state of physical care is an experiential state of digital wellbeing in which a user experiences a physically healthy and an active lifestyle alongside their digital consumption.
PC1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.
PC2. My screen use does not distract me from my exercise routine.
PC3. I am conscious of potential bodily ailments because of my screen use.
PC4. I take regular breaks from screen time.
PC5. My screen use does not affect my daily activity.
PC6. My screen use does not interfere with my sleep.

4.10.2 State of emotional resilience - Definition and measurement

This construct is primarily researched in disciplines such as positive psychology and developmental science (Luthar et al. 2014). In general, resilience is defined as the process of adapting to or managing significant sources of stress (Masten, 2018). Resilience is considered a defensive factor that reduces an individual's development and behavioural issues. Past studies have associated resilience with developing a sense of wellbeing under stress (Davidson, 2000). Based on the qualitative results, the current study uses the construct of emotional resilience to assess digital wellbeing.

Emotional resilience specifies the resilience of an individual in the emotional realm. The concept of 'state of emotional resilience' has not been defined in an online marketing context. Therefore, aligned with the general definition of resilience, the study considers emotional resilience as the ability to generate positive emotions and manage negative emotions caused by screen use. The role of emotional resilience is to create positive emotional experiences and reduce or manage negative emotional experiences in the online world. While there are existing scales to measure emotional resilience in the offline context (Zhang & Lu, 2010), there are no existing scales that measure emotional resilience in the online context.

Based on the existing conceptualisation of resilience and the qualitative study results, the current study defines emotional resilience as the appraisal of positive emotions and coping with negative emotions caused by digital connectivity. The measurement items for the state of emotional resilience were generated based on the results of the qualitative study.

Table 4. 6 State of Emotional Resilience Measurement Items

State of emotional resilience: The state of emotional resilience is an experiential state of digital wellbeing, in which a user experiences appraisal of positive emotions and copes with negative emotions caused by digital connectivity.
ER1. Screen use does not affect my emotions.
ER2. I manage my emotions well when I am online.
ER3. I feel emotionally stable when I am exposed to the digital world.
ER4. I don't feel frustrated when I am exposed to the digital world.
ER5. I feel the number of likes on social media is superficial.
ER6. I can manage any emotional challenges caused by my screen use.
ER7. I cope well with any mood swings that are aroused by my screen use.
ER8. I cope well with emotional harm caused by screen use.
ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying)

4.10.3 State of agency - Definition and measurement

'Agency' has been widely studied in the context of self-research, e.g., research on self-perception. The construct has been studied in various disciples of psychology, such as psychological wellbeing (Helgeson, 1994). Earlier studies have developed a general understanding of agency as the judgments of self. In general, agency has been defined as the striving to individuate and expand the self and involves qualities such as instrumentality, ambition, dominance, competence, and efficiency in goal attainment (Bakan, 1966). The concept of state of agency has not been defined in an online marketing context. Consequently, no existing scales measure agency in the online context.

Based on the existing conceptualisation of agency and the results of the interview data, the current study defines agency as the experience of power, dominance, and competence over screen use. All measurement items were generated from the results of the qualitative study.

Table 4. 7 State of Agency Measurement Items

State of agency: The state of agency is an experiential state of digital wellbeing, in which a user experiences a feeling of power, dominance and competence over their digital consumption.
A1. I set boundaries over my screen use.
A2. I limit my screen time.
A3. I have power to influence my digital communal life.
A4. I influence others in the digital world.
A5. I have control over my screen use.
A6. Technology cannot control my life.
A7. I am ready to be responsible for the negative outcomes caused by my screen use.
A8. I spend most of my screen time in achieving my goals.
A9. My screen time does not distract me from achieving my goals.
A10. I am being competent in balancing my screen time and reality.

4.10.4 State of communion - Definition and measurement

Past studies have described the concept of communion as strivings to integrate the self into a larger social unit through caring for others (Bakan, 1966). Communion involves qualities like focus on others' wellbeing, cooperativeness, and emotional expressivity (Bakan, 1966). This construct has been widely studied in psychology in areas that relate to the pursuit of benevolent social relationships. Communion primarily relates to the interest of others. In the current study, the state of communion was viewed from an observer perspective (Hauke & Abele, 2020; Abele & Wojciszke, 2007), i.e., the end-

user. All study participants felt that their interests were respected and they were shown empathy by others in the digital world. When participants realised that others in the online world were concerned about their wellbeing, they experienced a state of communion.

The concept of state of communion has not previously been defined in an online marketing context. Consequently, no existing scales measure communion in the online context. Based on the qualitative results, state of communion from an observer's perspective is defined as the state where an individual feels a sense of social connection when others in the online world show kindness and morality and render help when needed. All measurement items were generated from the results of the qualitative study that focused users' communion with others.

Table 4. 8 State of Communion Measurement Items

State of communion: The state of communion is an experiential state of digital wellbeing, in which a user feels morality, kindness, and helpfulness in interpersonal connections in the digital world.
C1. I feel good when others connect with me in the digital world.
C2. I feel good when someone online reaches out to me during difficult times.
C3. I feel good when someone interacts with me in the digital world.
C4. I feel annoyed when online fellow users exhibit improper behaviour.*
C5. I feel good when online fellow users exhibit respectable conduct.
C6. I feel good when online fellow users consider the appropriateness of the content before sharing.
C7. I feel good when the people I meet online are kind to me.
C8. I feel good when the people I meet online help me.

4.11 Formative or reflective

Two types of measurement models, reflective and formative, are widely used. It is necessary to specify the measurement model before the analysis of the structural model. The measurement model must specify the relationship between the latent constructs and observed variables (Anderson & Gerbing, 1982). According to Coltman et al. (2008), three theoretical considerations exist to determine whether the measurement model is reflective or formative.

The first theoretical consideration pertains to the nature of the construct. In a reflective model, the latent construct is independent of the measure; in a formative model, the latent construct relies on the measure (Coltman et al., 2008). In the current study, the experiential state of digital wellbeing is an independent latent construct developed innately through end-users' daily digital consumption experiences.

The second theoretical consideration is the causal relationship between the latent construct and the measurement items. In a reflective model, the causality flows from the construct to the indicator and in the formative model, the causality flows from the items to the latent construct. The current study used the digital consumption experiences expressed in the qualitative data to develop the measurement items. Therefore, the indicators reflect the digital consumption experiences and causality flow from the construct to the indicators. The third theoretical consideration is the characteristics of the indicators. In a reflective model, the research is able to include or exclude indicators of the latent construct without changing the domain of the construct and the content validity. This is because of the interchangeability of the indicators that share a common theme with the construct in reflective models. In a formative model, the inclusion and exclusion of the indicators can change the domain of the construct. This is because the indicators define the latent construct. In the present study, the experiential states of digital wellbeing are the latent construct, and the indicators do not define the construct but reflect the construct in the online context.

Therefore, the current study is more relevant to the reflective model than the formative model as the study matches the theoretical consideration of a reflective model. Thus, the relationship between the latent construct and the measures shows a reflective measurement model.

4.12 Scale purification-Exploratory factor analysis

4.12.1 Sample

An online survey targeted a sample consisting of end-users who consumed digital services on various devices in the US. A total of 280 participants completed the survey. All data were collected through MTurk. The data set of 280 responses was sufficient for EFA of 74 items (Hair et a., 2010). There were no missing data in the demographic details and in the scale items questions, as the questions were designed in ‘forced choice’ mode. The participants' details are listed below (see Table 4.9). The number of male and female participants in the study was spread well. The number of male participants (57.0%) was 162, and female participants (43.0%) was 122. The mean age of the participants was 36.0775, with S.D = 11.39777. The mean average screen time per day (in hours) was 8.4313, with S.D =

13.66787. The study participants were mainly adult end-users who had at least eight hours of screen time per day. Thus the profile of the participants in the survey was well suited to the study.

Table 4. 9 Profile of the Respondents

Demographic	Options	Frequency	Valid Percent
Gender	Male	160	57.0
	Female	120	43.0
	Total	280	100.0

Characteristics of the respondents	Mean	Std. Deviation	Variance
Age	36.0775	11.39777	129.909
Average screen time per day (in hours)	8.4313	13.66787	186.811
Valid N (listwise)			

4.13 Data examination

Hair et al. (2010) recommend that the data meet all the requirements of multivariate assumptions before conducting data analysis, as complex assumptions demand much more from the dataset. Hence, the data for this study was examined before conducting any further analysis to ensure validity and accuracy.

4.13.1 Missing data

The data was collected through MTurk, a reputable marketing research panel that allowed the researcher to control the number of surveys completed. There were no missing data in the entire dataset. Thus, the data was all set for the next step of the examination.

4.13.2 Outlier detection

The data were checked for outliers using the boxplot method. Boxplots are used to plot the distribution of the dataset using the interquartile method to detect extreme outliers. The boxplot was run for each of the items belonging to the digital wellbeing construct and extreme outliers were detected. These outliers in the data are displayed with an asterisk in the boxplots. A few extreme outliers were considered for removal. The results showed that 64 cases (see Table 4.10) were beyond the interquartile

range, and therefore, these cases were removed from the dataset for further analysis to ensure accuracy. The final dataset, after data cleaning, had 220 responses ready for EFA, which was sufficient.

Table 4. 10 Outlier Detection

	Outlier detection results
	Case with extreme values
PC3	50,93,126, 226,227,225
ER2	261,262,268,36,37,83,171,102
ER3	31,56,98,243,116, 156, 243
ER6	168,172,185,231
ER7	171,194,23
ER8	212
A3	231
A5	183, 273, 280, 99, 106, 176, 268
A7	5, 253, 234, 244, 254
A10	238,239
C4	234,235,236,237
C5	31,32,246, 259, 260
C6	232,233
C7	29, 257, 280, 283
C8	183, 262, 276,1,95

4.13.3 Testing the assumption of multivariate analysis

A test of normality was done using Kolmogorov-Smirnov and Shapiro-Wilk tests to check if the dataset was normally distributed. The results of the tests showed that the significance value for all variables was significant ($p<0.05$). Hence, the null hypothesis of normal distribution in the population was rejected and it was proved that the dataset was not normally distributed (see Table 4.11).

According to Field (2013) and Hair et al. (2010), for large samples (200 or more), the normality of the dataset is not a concern. In samples larger than 200, the test of normality is more likely to be significant, causing concerns over the normality of the dataset. Curran et al. (1996) suggest that there could be a significant problem arising with univariate skewness of absolute value 2.0 and kurtosis of 0.7 in multivariate normality tests with samples larger than 200. Hence, the test of normality was again

conducted to examine the level of skewness and kurtosis for each measuring item in the dataset. The dataset was checked for skewness and kurtosis values, and the results showed that the skewness values of the dataset ranged from 0.080 to -1.037, which was well below the threshold value of 2.0. The kurtosis values of the dataset ranged from -0.047 to -1.158, which was below the threshold value of 7.0. Thus, there was no concern about the normality of the data.

Table 4. 11 Test of Assumption

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PC1	.207	220	.000	.928	220	.000
PC2	.201	220	.000	.916	220	.000
PC3	.229	220	.000	.899	220	.000
PC4	.200	220	.000	.912	220	.000
PC5	.174	220	.000	.933	220	.000
PC6	.172	220	.000	.920	220	.000
ER1	.172	220	.000	.922	220	.000
ER2	.200	220	.000	.892	220	.000
ER3	.221	220	.000	.891	220	.000
ER4	.187	220	.000	.919	220	.000
ER5	.225	220	.000	.858	220	.000
ER6	.228	220	.000	.898	220	.000
ER7	.211	220	.000	.905	220	.000
ER8	.201	220	.000	.907	220	.000
ER9	.215	220	.000	.908	220	.000
A1	.210	220	.000	.926	220	.000
A2	.179	220	.000	.924	220	.000
A3	.224	220	.000	.898	220	.000
A4	.175	220	.000	.923	220	.000
A5	.217	220	.000	.886	220	.000
A6	.217	220	.000	.910	220	.000
A7	.216	220	.000	.883	220	.000
A8	.165	220	.000	.929	220	.000
A9	.233	220	.000	.891	220	.000
A10	.207	220	.000	.895	220	.000
C1	.159	220	.000	.910	220	.000
C2	.200	220	.000	.907	220	.000

C3	.177	220	.000	.920	220	.000
C4	.185	220	.000	.907	220	.000
C5	.252	220	.000	.886	220	.000
C6	.205	220	.000	.893	220	.000
C7	.249	220	.000	.876	220	.000
C8	.241	220	.000	.882	220	.000

a. Lilliefors Significance Correction

4.14 Exploratory factor analysis results

4.14.1 Testing assumptions of factor analysis

An exploratory factor analysis was used to reduce the 33 items to a smaller, more manageable set of underlying factors. This helped detect a meaningful pattern among the original variables and extract the main factors of digital wellbeing.

4.14.2 Factor extraction and assessing the overall fit

The results of the qualitative study suggested four dimensions to measure the digital wellbeing of end-users. Following the results of the qualitative study, EFA was run to check the structure of the dimensions. A common method of factor extraction is principal component analysis (PCA). Principal component analysis is generally used when the research purpose is to reduce the information in many measured variables to a smaller set of components (Kline, 1998; Fabrigar et al., 1999; Sofroniou & Hutcheson, 1999). Thus, the study was based on PCA to extract the factors.

4.14.3 EFA results

The EFA results showed that the KMO value was .874, which was above the recommended value of 0.5 (Hair et al., 2010, 2018). Bartlett's test of sphericity results (Chi-square $\chi 2$ (220) =3727.709, df=528, $p<.001$) indicated that the data supported the use of factor analysis and suggested that the data provided an adequate sample for further analysis (see Table 4.12).

Table 4. 12 Sample Adequacy for Factor Analysis

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.874
Bartlett's Test of Sphericity	Approx. Chi-Square	3727.709
	df	528
	Sig.	.000

Table 4. 13 Principal Component Solution for Digital Wellbeing Scale

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.263	28.070	28.070	9.263	28.070	28.070
2	3.463	10.495	38.565	3.463	10.495	38.565
3	3.133	9.494	48.059	3.133	9.494	48.059
4	1.635	4.955	53.014	1.635	4.955	53.014
5	1.249	3.785	56.799	1.249	3.785	56.799
6	1.124	3.405	60.205	1.124	3.405	60.205
7	1.022	3.097	63.302	1.022	3.097	63.302
8	.963	2.917	66.219			
9	.942	2.855	69.075			
10	.780	2.364	71.439			
11	.765	2.318	73.757			
12	.749	2.269	76.026			
13	.708	2.144	78.170			
14	.647	1.962	80.132			
15	.584	1.769	81.901			
16	.553	1.675	83.577			
17	.539	1.633	85.210			
18	.473	1.433	86.643			
19	.465	1.409	88.052			
20	.427	1.294	89.346			
21	.383	1.162	90.507			
22	.377	1.141	91.649			
23	.358	1.083	92.732			
24	.342	1.036	93.768			
25	.331	1.003	94.771			

26	.293	.886	95.657
27	.261	.792	96.449
28	.251	.761	97.210
29	.223	.676	97.886
30	.217	.658	98.544
31	.190	.577	99.121
32	.163	.493	99.614
33	.127	.386	100.000

Extraction Method: Principal Component Analysis.

Therefore, to further refine and confirm the dimensionality as per the qualitative results, EFA was performed with the orthogonal rotation method, and the PCA extraction method with the orthogonal rotation method was used in re-running EFA to confirm the dimensionality structure.

Initially, principal component analysis was applied in EFA without choosing any rotation method (see Table 4.14). The results loaded on seven components. An important tool for interpreting factors is the rotation of factors. Hair et al. (2010) suggest that if the goal of the research is to reduce the number of original variables, the appropriate solution is an orthogonal rotation. Further, an orthogonal rotation provides information that no correlation exists between the factors. Thus, the researcher used eigenvalue < 1 to determine the number of factors extracted and applied the principal component analysis factor extraction method with the orthogonal rotation method to further explore the dimensionality of the concept. Hence, EFA was run with orthogonal rotation to confirm the results of the qualitative study (see Table 4.14).

Table 4. 14 Principal Component Solution with Varimax Rotation

Rotated Component Matrix[a]

	Component						
	1	2	3	4	5	6	7
PC1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.		.686					

PC2. My screen use does not distract me from my exercise routine.		.516	.438			
PC3. I am conscious of potential bodily ailments because of my screen use.						.697
PC4. I take regular breaks from screen time.		.555			.322	.340
PC5. My screen use does not affect my daily activity.		.556	.501			
PC6. My screen use does not interfere with my sleep.			.610			
ER1. Screen use does not affect my emotions.	.477		.622			
ER2. I manage my emotions well when I am online.	.673		.390			
ER3. I feel emotionally stable when I am exposed to the digital world.	.621		.449			
ER4. I don't feel frustrated when I am exposed to the digital world.			.622			
ER5. I feel the number of likes on social media is superficial.	.658					
ER6. I can manage any emotional challenges caused by my screen use.	.669				.330	
ER7. I cope well with any mood swings that are aroused by my screen use.	.765					
ER8. I cope well with emotional harm caused by screen use.	.744					

ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying)	.602					.344
A1. I set boundaries over my screen use.		.823				
A2. I limit my screen time.		.875				
A3. I have power to influence my digital communal life.					.480	
A4. I influence others in the digital world.		.325		.597		.313
A5. I have control over my screen use.					.777	
A6. Technology cannot control my life.			.327		.535	
A7. I am ready to be responsible for the negative outcomes caused by my screen use.	.346				.562	
A8. I spend most of my screen time in achieving my goals.		.417				.463
A9. My screen time does not distract me from achieving my goals.			.699			
A10. I am being competent in balancing my screen time and reality.			.597		.531	
C1. I feel good when others connect with me in the digital world.				.834		
C2. I feel good when someone online reaches out to me during difficult times.				.731		

C3. I feel good when someone interacts with me in the digital world.	.313	.759
C4. I feel annoyed when online fellow users exhibit improper behaviour.*	.619	
C5. I feel good when online fellow users exhibit respectable conduct.	.841	
C6. I feel good when online fellow users consider the appropriateness of the content before sharing.	.772	
C7. I feel good when the people I meet online are kind to me.	.685	.416
C8. I feel good when the people I meet online help me.	.599	.450

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 8 iterations.

A factor loading can be used as an indicator when interpreting the role each item plays in defining each factor. Factor loadings mean the correlation of each item to its underlying factor. Kim and Muller (1978) recommend a factor loading of 0.3 as a cut-off for significance. Initial EFA produced a seven-factor solution. The EFA results showed that the state of emotional resilience strongly loaded with good factor loadings to factor one. The dimensions, state of physical care, and four items from state of agency loaded on factor two. State of communion loaded on factors four and five. State of agency loaded on factor six. Factors three and seven were considered for deletion because of poor factor loadings.

Further, based on the factor loadings and cross-loading, the researcher decided to remove some of the items that did not meet the requirement. The resulting exploratory solution with orthogonal rotation indicated that items PC2, PC3, PC6, ER1, ER4, A3, A4, A8, A9, and A10 had cross-loadings greater than 0.5 (Hair et al. 2004) and were subsequently deleted for further analysis. C4 was removed for low loading

because of the negatively phrased item. Overall, EFA run with the orthogonal rotation method showed that most of the measurement items developed in the qualitative study logically loaded together.

EFA was performed again with fixed factor extraction number four for the digital wellbeing scale. Again, the PCA method with the orthogonal rotation method was applied in factor analysis. The results showed that most of the items loaded to the corresponding factor except for A5, A6, and A7, and hence these items were considered for deletion. PC5 had a cross-loading less than 0.5 and hence was retained for further analysis. As expected, the dimension emotional resilience loaded well on factor one with good factor loadings. Items PC1, PC4, and PC5 of state of physical care and A1 and A2 from agency loaded on factor two with good factor loadings. The researcher decided to integrate these items as the items were clearly related to screen time/use. State of communion loaded to two separate factors (factors three and four). This was because of the theoretical logic within this dimension. More clearly, items in factor three were related to social connection and factor four related to the state of communion. Hence, to make more theoretical sense, the dimension 'state of communion' was split. Based on the EFA results, C1, C2, C3, and C8 were split and named as state of social connection, and C4, C5, C6, and C7 were retained under the state of communion.

Table 4. 15 Principal Component Solution with Varimax Rotation for Four Factors

Rotated Component Matrix[a]

	Component			
	1	2	3	4
PC1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.		**.701**		
PC4. I take regular breaks from screen time.		**.717**		
PC5. My screen use does not affect my daily activity.	**.376**	**.618**		

ER2. I manage my emotions well when I am online.	**.743**			
ER3. I feel emotionally stable when I am exposed to the digital world.	**.704**			
ER5. I feel the number of likes on social media is superficial.	**.522**			
ER6. I can manage any emotional challenges caused by my screen use.	**.787**			
ER7. I cope well with any mood swings that are aroused by my screen use.	**.836**			
ER8. I cope well with emotional harm caused by screen use.	**.826**			
ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying)	**.722**			
A1. I set boundaries over my screen use.		**.849**		
A2. I limit my screen time.		**.846**		
A5.I have control over my screen use.	.565			
A6. Technology cannot control my life.	.495	.374		
A7. I am ready to be responsible for the negative outcomes caused by my screen use.	.510			
C1. I feel good when others connect with me in the digital world.				**.845**

C2. I feel good when someone online reaches out to me during difficult times.	**.764**	
C3. I feel good when someone interacts with me in the digital world.	**.813**	
C4. I feel annoyed when online fellow users exhibit improper behaviour.*		**.650**
C5. I feel good when online fellow users exhibit respectable conduct.		**.840**
C6. I feel good when online fellow users consider the appropriateness of the content before sharing.		**.805**
C7. I feel good when the people I meet online are kind to me.	.488	**.615**
C8. I feel good when the people I meet online help me.	**.570**	.503

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

After removing some of the items that had cross-loadings, the communality value for the remaining 19 items was examined to check if the items met the acceptable levels of explanation, with 0.5 as the threshold (Hair et al., 2010). From the table below, it can be seen that all items had a communality value greater than 0.5, which indicates a sufficient explanation of the construct. However, it was noticed that ER5 had a low communality but was retained and was considered for deletion from the scale in further analysis.

Table 4. 16 Digital Wellbeing Scale Communality

Communalities

	Initial	Extraction
PC1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.	1.000	.546
PC4. I take regular breaks from screen time.	1.000	.575
PC5. My screen use does not affect my daily activity.	1.000	.507
ER2. I manage my emotions well when I am online.	1.000	.585
ER3. I feel emotionally stable when I am exposed to the digital world.	1.000	.575
ER5. I feel the number of likes on social media is superficial.	1.000	.308
ER6. I can manage any emotional challenges caused by my screen use.	1.000	.667
ER7. I cope well with any mood swings that are aroused by my screen use.	1.000	.773
ER8. I cope well with emotional harm caused by screen use.	1.000	.729
ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying)	1.000	.560
A1. I set boundaries over my screen use.	1.000	.751

A2. I limit my screen time.	1.000	.764
C1. I feel good when others connect with me in the digital world.	1.000	.755
C2. I feel good when someone online reaches out to me during difficult times.	1.000	.692
C3. I feel good when someone interacts with me in the digital world.	1.000	.722
C5. I feel good when online fellow users exhibit respectable conduct.	1.000	.819
C6. I feel good when online fellow users consider the appropriateness of the content before sharing.	1.000	.732
C7. I feel good when the people I meet online are kind to me.	1.000	.686
C8. I feel good when the people I meet online help me.	1.000	.613

Extraction Method: Principal Component Analysis.

4.14.4 Reliability tests of digital wellbeing scale

The EFA results helped in retaining four dimensions and 19 items of the digital wellbeing scale for further analysis. Item total correlation and Cronbach's alpha were assessed for all the 19 items retained from EFA to ensure digital wellbeing scale reliability. Item total correlation refers to a correlation of items with the composite score of all the items forming the same set. Corrected item-total correlation (CITC) does not include the score of a particular item in question in calculating the composite score; hence it is labelled as corrected items-total correlation (Koufteros, 1999). CITC was performed for

each construct (see Table 4.17) using the traditional cut-off value of 0.50 (Hair et al., 2010). The results showed that all items exceeded the threshold value except for ER5. Hence, ER5 was noted for deletion in CFA.

Further, Cronbach's alpha is one of the most widely used measures for assessing reliability (Koufteros, 1999). The Cronbach's alpha value was computed for each construct, as shown in Table 4.17. The reliability value for all four constructs ranged from .812 to .875, which was well above the threshold value of 0.75, considered satisfactory for basic research (Churchill, 1991; Litwin & Fink, 1995; Nunally, 1978). Thus, the reliability of the digital wellbeing scale was supported (see Table 4.17).

Table 4. 17 Digital Wellbeing Scale Reliability Test Results

Digital wellbeing dimensions		Cronbach's Alpha	Corrected Item-Total Correlation
State of physical care/agency		.827	
	PC1. I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle.		.594
	PC4. I take regular breaks from screen time.		.582
	PC5. My screen use does not affect my daily activity.		.517
	A1. I set boundaries over my screen use.		.721
	A2. I limit my screen time.		.708
State of emotional resilience		.875	.654
	ER2. I manage my emotions well when I am online.		
	ER3. I feel emotionally stable when I am exposed to the digital world.		.650

	ER5. I feel the number of likes on social media is superficial.		.383
	ER6. I can manage any emotional challenges caused by my screen use.		.718
	ER7. I cope well with any mood swings that are aroused by my screen use.		.812
	ER8. I cope well with emotional harm caused by screen use.		.778
	ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying)		.647
State of social connection		.824	.692
	C1. I feel good when others connect with me in the digital world.		
	C2. I feel good when someone online reaches out to me during difficult times.		.661
	C3. I feel good when someone interacts with me in the digital world.		.696
	C8. I feel good when the people I meet online help me.		.550
State of communion		.812	
	C5. I feel good when online fellow users exhibit respectable conduct.		.755
	C6. I feel good when online fellow users consider the appropriateness of the content before sharing.		.649

C7. I feel good when the people I meet online are kind to me.	.591

4.14.5 Digital wellbeing scale – EFA result interpretation

The exploratory factor analysis performed with the principal component analysis method and orthogonal rotation method produced results that confirmed that the underlying structure of digital wellbeing measurement items were similar and confirmed the results of the qualitative research phase in the present study. The final four dimensions of the digital wellbeing scale included state of emotional resilience, state of agency, state of social connection, and state of communion. As mentioned earlier, state of physical care and agency loaded together, hence were combined as one factor and named as state of agency as the higher factor loadings were inclined to agency. Also, the items under it were more related to screen time and screen use and it therefore made theoretical sense to combine physical care and agency. Hence, the researcher decided to integrate these dimensions and named them state of agency. Similarly, some items from the state of communion were grouped as a separate factor and were named social connection because these items related to connecting and interacting with people in the digital world. The remaining items loaded well together under state of communion. Hence, the researcher decided to regard these as separate.

Thus, four dimensions with 19 items were retained in the present study, and the four-factor model was further used in the study for performing CFA.

4.15 Scale Validation – Confirmatory factor analysis results of digital wellbeing scale

Traditionally**,** EFA and item-total correlation can only lead to preliminary analyses, particularly without an adequate theoretical base, because they fail to directly assess unidimensionality (Gerbing & Anderson, 1988). To overcome this limitation, CFA was employed for the assessment of model fit and unidimensionality (Churchill, 1979). CFA was run with the originally proposed factors that were obtained

from EFA results. A measurement model for digital wellbeing was constructed in AMOS 25 software, using the 19 items identified from EFA.

4.15.1 CFA results of the digital wellbeing scale

The initial model of 19 measurement items with four dimensions was used to measure end-users' digital wellbeing. The second-order CFA results reported the model fit indices at $\chi 2$=410.524, df=148, p<0.000; TLI= .851, CFI =.871, SRMR= .0913, RMSEA=.090. The p-value was expected to be significant owing to the sample size of n=220. The CFI was .871 and TLI .851 was close to the recommended level of 0.90. The SRMR was .0845 and the RMSEA was .090, which were slightly higher than the expected value of 0.08. The model fit indices indicate that the model fit the data reasonably well (see Figure 4.2). Table 4.18 presents a summary of the recommended benchmark for model fit indices (Bentler, 1990; Marsh & Hocevar, 1985; Marsh, Balla, & Hau, 1996) adopted in the present study.

Table 4. 18 Recommended Benchmark for Model Fit Indices

Fit Index	**Recommended value**
Absolute Fit Measures	
χ^2	The lower, the better
χ^2/df	≤ 3
RMSEA	≤ 0.06 or 0.08
Incremental Fit Measure	
TLI	≥ 0.95 or 0.90
CFI	≥ 0.95 or 0.90

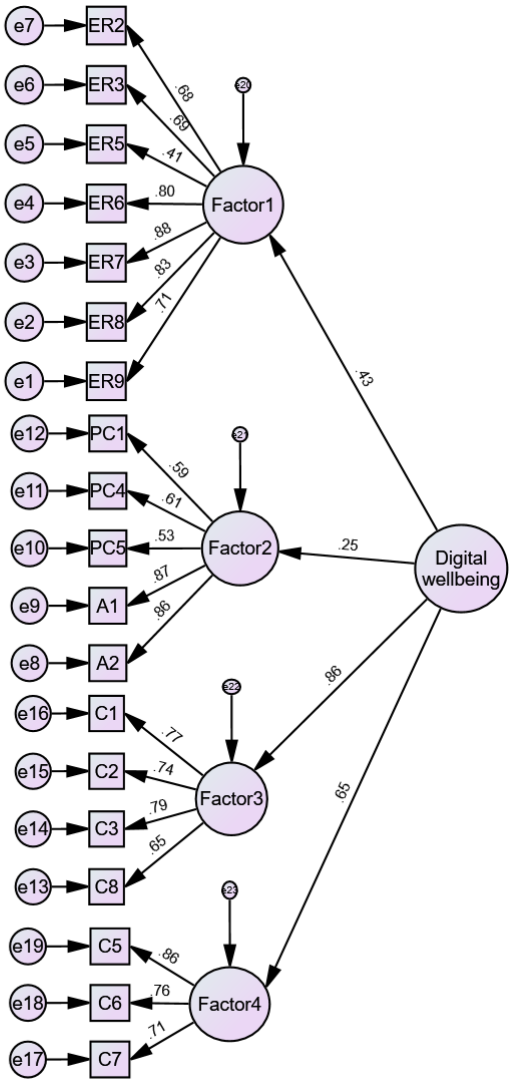

Figure 4. 2 CFA of the digital wellbeing scale

Model revision was undertaken based on assessments of factor loadings. Items with factor loadings < 0.7 were considered for removal (Hair et al., 2009; Williams et al., 1996; Fabrigar et al., 1999). The standardised indicator loading estimates of all the originally proposed items were 0.7 and higher, except for ER5, ER2, PC1, PC4, PC5, and C8 for which the standardised factor loading was less than the cut-off of 0.7. Hence, these items were removed from the scale for a better model fit. However, ER3, with a factor loading of 0.69, was retained for further analysis. The second-order factor loadings met the threshold and made theoretical sense.

After modifying the model by removing ER5, ER2, PC1, PC4, PC5, and C8 and fixing the Heywood case for A1 from the originally proposed items from EFA, the model fit indices for 13 items of the digital wellbeing scale were at $\chi 2$=158.875, df=63, p<0.000; TLI= .916, CFI =.932, SRMR= .0913, RMSEA=.0838. The model fit indices met the thresholds and suggested a good model fit for measuring the digital wellbeing of end-users (see Figure 4.3).

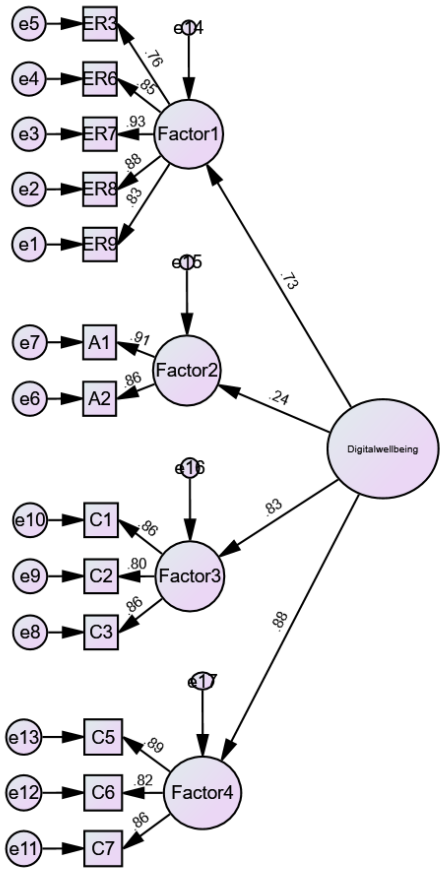

Figure 4. 3 Revised CFA model of the digital wellbeing scale

4.15.2 Construct reliability and validity for digital wellbeing scale

The present study adopted Straub's (1989) measurement validation procedure to test construct validity in terms of convergent validity and discriminant validity. The construct validity and reliability

were tested by checking the convergent validity, discriminant validity, and composite reliability of the data. The scale validation process is delineated in the following sub-section.

(a)Convergent validity

The measurement model specifies how the observed indicators relate to unobserved constructs (Kline, 2005). Having fulfilled the goodness-of-fit assessment, the next step is assessing the data's convergent validity. Convergent validity was assessed by checking the loading of each observed indicator for its underlying latent construct (Anderson & Gerbing, 1988). The factor loading was examined to identify potential problems with the CFA model. The standardised factor loadings should be significantly linked to the latent construct and have a factor loading of at least 0.5 and ideally exceed 0.7 (Hair et al. 2007). The CFA results (see Table 4.19) indicated that each factor loadings of the reflective indicators was statistically significant at 0.001 level. The latent construct state of agency had a loading of 0.24 due to the number of items. However, there was a strong correlation of 0.772 between the two items under state of agency. Hence, the researcher decided to retain state of agency as it was theoretically significant.

Convergent validity assessment also includes the measure of construct reliability and average variance extracted. According to Fornell and Larcker (1981, p. 45), average variance extracted refers to "the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error". Further, Fornell and Larcker (1981) suggest that the average variance extracted is a more conservative measure than construct composite reliability. Two criteria were assessed to ensure convergent validity: (1) construct composite reliability should be greater than 0.7 (Nunnally, 1978), and (2) average variance extracted for a construct should be larger than 0.5 to suggest adequate convergent validity (Fornell & Larcker, 1981). Table 4.19 summarises the results of construct composite reliability and average variance extracted for each construct. The results showed a construct composite reliability of 0.787 which exceeded the minimum threshold value of 0.7. Further, average variance extracted was 0.62, which exceeded the minimum threshold value of 0.5.

Generally, the present findings indicated that all constructs had achieved a range of fairly good to very good reliabilities among indicators to measure the latent constructs. In addition, the CFA model fit

relatively well, and all factor loadings were significant and exceeded 0.7. Hence, all 13 items were retained at this point, and adequate evidence of convergent validity was confirmed.

Table 4. 19 Digital Wellbeing Scale Convergent Validity and Reliability

Construct and dimensions	**Standardized factor loadings**	**Cronbach's Alpha**	**Composite reliability (CR)**	**Average variance extracted (AVE)**
State of emotional resilience	0.73	0.886	0.891	0.62
ER3	0.76			
ER6	0.85			
ER7	0.93			
ER8	0.88			
ER9	0.83			
State of Agency	0.24	0.871	0.867	0.77
A1	0.91			
A2	0.86			
State of Social connection	0.83	0.821	0.822	0.61
C1	0.86			
C2	0.80			
C3	0.86			
State of Communion	0.88	0.819	0.824	0.61
C5	0.89			
C6	0.82			
C7	0.86			

(b) <u>Discriminant validity</u>

A conservative approach in establishing discriminant validity was employed in the present study (Hair et al. 2007). Table 4.20 presents the results for discriminant validity. As suggested by Fornell and Larcker (1981), discriminant validity was determined by the average variance extracted value, namely whether or not it exceeded the squared inter-construct correlations associated with that construct. The results showed that the average variance extracted estimates ranged from 0.61 to 0.77, which was greater than the squared inter-construct correlation that ranged between 0.037 to 0.474. It was found that the

average variance extracted from each construct was well above its squared correlation with other constructs. Following Fornell and Larcker's (1981) recommendations, it was evident that these results provided adequate evidence for discriminant validity of the present measurement model.

Overall, the required reliability and validity assessment demonstrated strong evidence for satisfactory convergent validity and discriminant validity. In sum, the overall results of the goodness-of-fit of the model lent substantial support to confirming the proposed model.

Table 4. 20 Digital Wellbeing Scale Discriminant Validity

Constructs	Average variance extracted (AVE)	Emotional resilience	Agency	Communion	Communion
Emotional resilience	0.62	**0.787**			
Agency	0.77	0.135	**0.877**		
Social connection	0.61	0.320	0.232	**0.781**	
Communion	0.61	0.295	0.037	0.474	**.781**

4.15.3 Criterion validity of digital wellbeing scale

Criterion validity is the degree to which measures of one construct correlate with measures of another that must be related to it. It aims to see whether a test tool has fulfilled its function in measuring constructs (Anastasi & Urbina, 1997). To test the criterion validity of the digital wellbeing scale, the researcher chose existing measures of positive mental health and subjective wellbeing. To provide a rigorous test of criterion validity, the following was undertaken:

a) The construct 'positive health' was measured using the Warwick Edinburgh Mental Well-Being Scale (WEMWBS-shortened version) compiled by Stewart-Brown et al. (2009). The WEMWBS-shortened version comprises seven positively phrased items with a Likert scale. Sample items include, 'I've been feeling optimistic about the future', 'I've been feeling close to other people', and 'I've been able to make up my own mind about things'. The scale had a Cronbach's alpha of .898. Hence the scale was considered valid and reliable for use for further

analysis. In line with earlier studies, a positive correlation between digital wellbeing and positive mental health was expected. The results are presented in Table 4.21. The correlation between digital wellbeing and positive mental health was r=.494, p<.001, with an average score of 5.15. The results showed a moderately significant correlation between digital wellbeing and positive mental health.

b) The construct 'subjective wellbeing' was measured with the Satisfaction with Life Scale compiled by Diener et al. (1985). The satisfaction of life scale is a five-item scale designed to measure global cognitive judgment of one's life satisfaction using a seven-point Likert scale. This scale is not a measure of either positive or negative effects. Sample items include, 'In most ways my life is close to my ideal', 'If I could live my life over, I would change almost nothing', and 'I am satisfied with my life'. The scale has a Cronbach's Alpha of .912. Hence the scale was considered valid and reliable for use for further analysis. Based on previous studies, a positive correlation between digital wellbeing and subjective wellbeing was expected. The results are presented in Table 4.21. The correlation between digital wellbeing and subjective wellbeing was, r=.393, p<.001, with an average score of 4.74. The results showed a moderately significant correlation between digital wellbeing and subjective wellbeing.

The criterion validity results showed that all the expected correlations were moderately significant and in the expected direction. Overall, the results indicated that the digital wellbeing scale demonstrated criterion validity against the existing related measures of wellbeing.

Table 4. 21 Criterion Validity

Constructs	Items	Cronbach's alpha	Average score	Correlation to DWB	p-value at 0.01
Positive mental health	1. I've been feeling optimistic about the future. 2. I've been feeling useful. 3. I've been feeling relaxed. 4. I've been dealing with problems well. 5. I've been thinking clearly.	.898	5.15	.494	<.001
Subjective wellbeing	1. In most ways my life is close to my ideal. 2. The conditions of my life are excellent. 3. I am satisfied with my life. 4. So far, I have gotten the important things I want in life. 5. If I could live my life over, I would change almost nothing. 6. In most ways my life is close to my ideal. 7. The conditions of my life are excellent.	.912	4.74	.393	<.001

4.15.4 Predictive validity of digital wellbeing scale

The predictive validity of the digital wellbeing scale was analysed in the study to see the effectiveness of the newly developed scale in predicting individual performance in certain activities (Anastasi & Urbina, 1997). The current study used mindfulness, perceived control of information, community engagement, and community identification as criteria to be predicted by the digital wellbeing scale. To provide a rigorous test of predictive validity the study undertook the following:

a) The construct ‘mindfulness’ was measured using the Cognitive and Affective Mindfulness Scale Revised (CAMS-R) complied by Feldman et al. (2022). The mindfulness scale has 10 items that measure several aspects of mindfulness, including the ability to regulate attention, orientation to immediate experience, awareness of experience, and an attitude of acceptance towards experience. Sample items include, ‘It is easy for me to concentrate on what I am doing’, I am able to accept the thoughts and feelings I have’, and ‘It’s easy for me to keep track of my thoughts and feelings’. The scale has a Cronbach’s Alpha of .758. Based on evidence from earlier studies on the relationship between mindfulness and wellbeing (Baer et al., 2004; Brown & Ryan, 2003), a simple regression analysis was conducted in the current study to test if mindfulness significantly predicted digital wellbeing. The results are shown in Table 4.22. The correlation of 0.62 shows a strong positive relationship between mindfulness and digital wellbeing. The overall regression analysis was statistically significant with $R^2 = 0.384$, $F(1, 218) = 135.817$; $p<0.001$. The results showed that mindfulness significantly predicts digital wellbeing, $\beta = 0.620$, $t = 11.654$, $p<0.001$.

b) The construct ‘perceived control of information’ was measured using the perceived control scale compiled by Krasnova et al. (2010). The perceived control of information scale has three items that measure the feeling of control over information in online social networking sites. Sample items include, ‘I feel in control over the information I provide on social networking sites’ and ‘I feel in control of who can view my information on social networking sites’. The scale has a Cronbach’s Alpha of .755. A simple regression analysis was used to test whether perceived information control significantly predicted digital wellbeing. The results are shown in Table 4.22. The correlation of 0.293 shows a moderately strong positive relationship between perceived control of information and digital wellbeing. The overall regression analysis was statistically significant with $R^2 = 0.086$, $F(1, 218) = 20.515$; $p<0.001$. The results showed

that perceived control of information is a moderately significant predictor of digital wellbeing, $\beta = 0.293$, t =4.529, p<0.001.

c) The construct 'community engagement' was measured using the community engagement scale that was compiled by Algesheimer et al. (2005). The community engagement scale measures the extent to which an individual is interested in interacting and cooperating with other brand community members. The community engagement scale consists of four items and uses a 10-point Likert scale. Sample items include, 'I am motivated to participate in the brand community's activities because I feel better afterwards' and 'I am motivated to participate in the brand community's activities because I am able to support other members'. The scale has a Cronbach's Alpha of 0.898. The researcher used simple regression analysis to determine if digital wellbeing significantly predicted community engagement. The results are shown in Table 4.22. The correlation of 0.361 shows a moderately strong positive relationship between digital wellbeing and community engagement. The overall regression analysis was statistically significant with $R^2 = 0.130$, F (1, 218) = 32.708; p<0.001. The results showed that digital wellbeing is a moderately significant predictor of community engagement, $\beta = 0.361$, t = 5.719, p<0.001.

d) The construct 'community identification' was measured using the community identification scale that was compiled by Algesheimer et al. (2005). The community identification scale measures the extent to which an individual construes himself/herself as belonging to the community. The community identification scale consists of five items and uses a 10-point Likert scale. Sample items include, 'The friendships I have with other brand community members mean a lot to me', 'I see myself as a part of the brand community', and 'I am very attached to the community'. The scale has a Cronbach's Alpha of 0.890. A simple regression analysis was used to test if digital wellbeing significantly predicted community identification. The results are shown

in Table 4.22. The correlation of 0.390 shows a moderately strong positive relationship between digital wellbeing and community identification. The overall regression analysis was statistically significant with $R^2 = 0.152$, $F(1, 218) = 39.165$; $p<0.001$. The results showed that digital wellbeing is a moderately significant predictor of community identification, $\beta = 0.390$, $t = 6.258$, $p<0.001$.

The predictive validity results showed that all the expected constructs were moderately significant, except for mindfulness which was found to be a highly significant predictor of digital wellbeing. Overall, the results indicated that the digital wellbeing scale demonstrated predictive validity against the existing related measures of wellbeing.

Table 4. 22 : Predictive Validity

Constructs	Items	Cronbach's Alpha	Mean	Adjusted R^2	β	t
Mindfulness		.758	5.00	0.381	0.620	11.654
	1. It is easy for me to concentrate on what I am doing. 2. I can tolerate emotional pain. 3. I can accept things I cannot change. 4. I can usually describe how I feel at the moment in considerable detail. 5. I am easily distracted. 6. It's easy for me to keep track of my thoughts and feelings. 7. I try to notice my thoughts without judging them. 8. I am able to accept the thoughts and feelings I have. 9. I am able to focus on the present moment. 10. I am able to pay close attention to one thing for a long period of time.					
Perceived control of information		.755	5.11	0.086	0.293	4.529
	1. In most ways my life is close to my ideal. 2. The conditions of my life are excellent. 3. I am satisfied with my life. 4. So far, I have got the important things I want in life. 5. If I could live my life over, I would change almost nothing.					

	6. In most ways my life is close to my ideal. 7. The conditions of my life are excellent.					
Community engagement	1. I benefit from following the brand community's rules. 2. I am motivated to participate in the brand community's activities because I feel better afterwards. 3. I am motivated to participate in the brand community's activities because I am able to support other members. 4. I am motivated to participate in the brand community's activities because I am able to reach personal goals.	0.898	4.47	0.130	0.361	5.719
Community identification	1. I am very attached to the community. 2. Other brand community members and I share the same objectives. 3. The friendships I have with other brand community members mean a lot to me. 4. If brand community members planned something, I'd think of it as something "we" would do rather than something "they" would do. 5. I see myself as a part of the brand community.	0.890	4.19	0.152	0.390	6.258

4.16 Discussion

The qualitative results of the study produced four dimensions with 33 items to measure digital wellbeing. The EFA results confirmed the dimensionality as per the qualitative results, except for a few items which had cross-loading. This section discusses the potential reasons for cross-loadings.

The state of emotional resilience included nine items based on the interview results. The EFA result for state of emotional resilience confirmed the dimensionality with good factor loading to factor one except for ER1 'Screen use does not affect my emotions', and ER4 'I don't feel frustrated when I am exposed to the digital world'. ER1 and ER4 were generated based on the qualitative results. These items were removed from further analysis because of low factor loading and cross-loading issues. The reason for these issues is that ER1 and ER4 did not distinctly reflect how users managed their emotion in the online setting. The CFA results showed that ER2 and ER5 had low factor loadings and were removed. The reason for low factor loading for ER2 'I manage my emotions well when I am online' and ER5 'I feel the number of likes on social media is superficial' may potentially be because only a few interviewees felt that they could manage/cope with their emotions when online. Further, only a small number of interviewees mentioned the superficial nature of social media engagement, while the others felt the online world was an extension of real life that needed to be balanced efficiently.

The state of physical care had six items based on the interview results. Further analysis revealed cross-loading issues and led to the removal of PC2 'My screen use does not distract me from my exercise routine', PC3 'I am conscious of potential bodily ailments because of my screen use', PC5 'My screen use does not affect my daily activity', and PC6 'My screen use does not interfere with my sleep'. Only three items were retained under this dimension. The potential reason for removing these items could be that only a small portion of the interviewees felt there was a relationship between physical health and screen use, while the majority did not regard screen use as impacting their physical activities or daily routine. The EFA results for the state of agency indicated that items A3 'I have power to influence my digital communal life', A4 'I influence others in the digital world', A5 'I have control over

my screen use', A6 'Technology cannot control my life', A7 'I am ready to be responsible for the negative outcomes caused by my screen use', A8 'I spend most of my screen time in achieving my goals', A9 'My screen time does not distract me from achieving my goals', A10 'I am being competent in balancing my screen time and reality', had cross-loadings. The reason for cross-loading could be because these items did not collectively reflect a state of agency and some interviewees agreed on their difficulty in controlling screen use. The retained items PC1, PC4, PC5, A1, and A2 from physical care and agency were loaded together after further analysis, and these dimensions were integrated. The integrated items were theoretically and statistically related to the state of agency. After integration, the items were found to clearly reflect the dimension of state of agency. However, CFA results suggested removing PC1, PC4, and PC5 for a better model fit, and hence only two items, A1 and A2, were retained under the dimension of state of agency. This construct showed high reliability and validity in further analysis.

The dimension of state of communion, included eight items based on the qualitative results. However, EFA results showed the items loaded on two separate factors. Hence, items C1 'I feel good when others connect with me in the digital world', C2 'I feel good when someone online reaches out to me during difficult times', C3 'I feel good when someone interacts with me in the digital world', and C8 'I feel good when the people I meet online help me' were split from the original dimension and a new dimension, 'state of social connection', was developed. This is because most interviewees felt they needed social connection in the digital world. Item C4 was removed because it was negatively phrased and did not reflect a positive social connection. The remaining items, C5 'I feel good when online fellow users exhibit respectable conduct', C6 'I feel good when online fellow users consider the appropriateness of the content before sharing', C7 'I feel good when the people I meet online are kind to me', was retained under the dimension of state of communion. Splitting this dimension made theoretical sense and hence the researcher carried out further analysis. The CFA analysis suggested C8 should be removed for a better model fit. The potential reason for removing C8 is that only a small number of interviewees felt that they received help from their online social connections.

The overall EFA and CFA results produced 13 items: five items for state of emotional resilience, two for state of agency, three for state of social connection, and three for state of communion. The CFA results suggested a good model fit for the measurement model. The required reliability and validity assessment demonstrated strong evidence for satisfactory convergent validity and discriminant validity. Further criterion validity results confirmed the correlation between the digital wellbeing scale and existing scales such as the positive mental health scale and subjective wellbeing scale. This proves that a user requires cognitive effort to attain digital wellbeing. The correlation between digital wellbeing and subjective wellbeing confirms that these are related constructs yet different. This finding is well aligned with the definition developed in the current study, which states digital wellbeing is a condition needed to maintain subjective wellbeing. The current study assessed the predictive validity of the digital wellbeing scale and the results showed that the constructs of mindfulness and perceived control of information significantly predicted digital wellbeing. Moreover, digital wellbeing significantly predicted the constructs of online community engagement and online community identification. This implies that a user needs cognitive and affective appraisal to attain digital wellbeing. Thus, robust results fully confirmed and validated the measurement model for the digital wellbeing scale.

4.17 Chapter conclusion

This chapter presented study 1 – scale development. The qualitative study results generated 33 items to measure digital wellbeing based on the confirmation of the expert panel. Further, the EFA results confirmed the dimensionality and revealed 19 items with four key dimensions of digital wellbeing: state of emotional resilience, agency, social connection, and communion. The CFA analysis confirmed the measurement model had a good model fit comprising 13 items. The digital wellbeing scale proved valid and reliable for further analysis.

The next chapter focuses on study 2 – model testing. This constitutes a conceptual model that reflects the relationship between the main constructs and seeks to establish the nomological validity of the digital wellbeing scale.

Chapter Five: Study 2 model testing

5.1 Introduction

In the previous chapter, the results of a scale development process validated the measurement of the digital wellbeing of end-users. The first research question on the conceptualisation and measurement of digital wellbeing was addressed in study 1. The validated digital wellbeing scale was tested in the conceptual model and is relevant to the hypothesised relationship between the main constructs in study 2.

The fifth chapter addresses the following research questions: (2) How does digital literacy influence digital wellbeing, and how is this relationship mediated by self-efficacy? (3) How does digital literacy influence digital wellbeing, and how is this relationship mediated by online social capital? (4) How does digital addiction moderate the relationship between digital literacy and digital wellbeing? (5) How does digital addiction moderate the mediating effect of self-efficacy and online social capital?

The second, third, fourth, and fifth research questions test the direct effect, mediating effect, and moderated mediation effect of digital literacy on digital wellbeing. To address these research questions, quantitative data collection and analysis were undertaken in study 2 to establish the nomological validity of the digital wellbeing scale.

This chapter includes the profile of the respondents, data examination, measurement of the main constructs in the model, conceptual model testing, pooled CFA of the measurement model, reliability and validity of the measurement model, results, and conclusion of the chapter.

5.2 Sample

An online survey with a sample of end-users from the U.S. who consumed digital services on various devices the survey. A total of 500 participants completed the survey. All data were collected through MTurk and the participants were rewarded $3 each as a token of appreciation for completing the online survey. There were no missing data in the demographic details, or the scale item questions, as the questions were designed in ‘forced choice’ mode. The participants’ details are listed below (see Table 5.1). The participants in the survey were aged between 20-74. Most participants (45.8%) were aged

between 25-34. The number of male participants (31.3%) was 140, and female participants (68.5%) was 307. The mean score of average screen time per day (in hours) was 7.656, with S.D. = 4.155. Based on this result, the majority of participants in this study were adult end-users that spend at least 7 hours on screen time per day. The profile of the participants in the survey was well suited to the study as the aim of the study was to assess adult end-users screen use.

Table 5. 1 Profile of the Respondents

Demographic	Options	Frequency	Valid Percent
Age			
	20 to 24	39	8.7
	25 to 34	205	45.8
	35 to 44	120	26.8
	45 to 54	54	12.1
	55 to 64	25	5.6
	65 to 74	4	.9
	75 and above	1	.2
Gender			
	Male	140	31.3
	Female	307	68.5
	Others	1	.2

Table 5. 2 Characteristics of the Respondents

Characteristics of the respondents	Mean	Std. Deviation	Variance
Average screen time per day (in hours)	7.656	4.155	17.263

5.3 Data examination

5.3.1 Missing data

The data was collected via MTurk. The researcher controlled the survey completion numbers. There were no missing data in the entire dataset. All the survey questions were set in force mode in Qualtrics. Thus, the data was acceptable and ready for the next step of examination: outlier detection.

5.3.2 Outlier detection

The data was checked for outliers using the boxplot method. Boxplots are used to plot the distribution of the dataset using the interquartile method to detect extreme outliers. The boxplot was run for each item of digital wellbeing, digital literacy, social capital, self-efficacy, and digital addiction. For each boxplot, the graph was checked to see if it indicated any outlier cases. The boxplots display the extreme outliers in the data with an asterisk. It was found that the dataset had a few extreme outliers detected by the boxplot method, which were considered for removal. In total, 52 cases (see Table 5.2) were beyond the interquartile range; therefore, these cases were removed from the dataset for further analysis to ensure accuracy in the final dataset. After data cleaning, there were 448 responses for further analysis, which was sufficient.

Table 5. 3 Outlier Detection

	Outlier detection results
	Case with extreme values
DL1	91,398,162
DL2	43
DL3	162
DL5	25
DL6	94
DL8	71, 44, 297, 177
DL9	265,44,297,177
SE2	13,16,32,80
SE3	24,83,405,437,101,54,246,280
SE4	32,149,106
SE5	7,32,280,103
SE6	69,44,297,177
SC1	69,44,398

SC2	69,77,80
SC5	7,405,445,304
SC6	11,12,54,405,265,347
SC7	405,16,44,7,445,347
SC8	11,232
SC9	192,455,405,239,462,470
SC10	232
DWB2	44,43
DWB5	302,134,45
DWB8	44,69
DWB9	54,239,380
DWB10	44,459,389
DWB11	99,57
DWB12	380,218,400,389

5.3.3 Testing the assumption of multivariate analysis

A test of normality using the Kolmogorov-Smirnov and Shapiro-Wilk test was undertaken to check if the dataset was normally distributed (see Table 5.3). The Kolmogorov-Smirnov and Shapiro-Wilk test showed that the value for all variables was significant ($p<0.05$). Hence, the null hypothesis of normal distribution in the population was rejected and it was proved that the dataset was not normally distributed.

According to Field (2013) and Hair et al. (2007), in large samples (200 or more), the normality of the dataset is not a concern. In samples larger than 200, the test of normality is more likely to be significant, causing concerns over the normality of the dataset. Curran et al. (1996) suggest that there could be a significant problem arising with univariate skewness of absolute value 2.0 and kurtosis of 0.7 in multivariate normality tests with samples larger than 200. Hence, the test of normality was again conducted to examine the level of skewness and kurtosis for each measuring item in the dataset.

The dataset was checked for skewness and kurtosis values, and the results showed that the skewness values of the dataset ranged from -0.982 to 0.233, which was well below the threshold value of 2.0. The kurtosis values of the dataset ranged from -1.398 to 1.618, which was below the threshold value of 7.0. Thus, there was no concern about the normality of the data.

Table 5. 4 Results of Kolmogorov-Smirnov and Shapiro-Wilk test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
DL1. I know how to solve my own technical problems.	.223	448	<.001	.864	448	<.001
DL2. I can learn new technologies easily.	.234	448	<.001	.876	448	<.001
DL3. I keep up with important new technologies.	.201	448	<.001	.898	448	<.001
DL4. I know about a lot of different technologies.	.208	448	<.001	.916	448	<.001
DL5. I have the technical skills I need to use for learning.	.232	448	<.001	.879	448	<.001
DL6. I have good digital skills.	.236	448	<.001	.888	448	<.001
DL7. I am confident with my search and evaluative skills in regard to obtaining information from the Web.	.254	448	<.001	.840	448	<.001
DL8. I am familiar with issues related to web-based activities (e.g., cyber safety, search issues)	.224	448	<.001	.894	448	<.001
DL9. Online communications enable me to collaborate better with my peers on project work and other learning activities.	.237	448	<.001	.889	448	<.001

DL10. I frequently obtain help with my work from my friends over the Internet e.g., through Skype, Facebook, blogs.	.198	448	<.001	.922	448	<.001
SE1. If someone opposes me, I can find means and ways to get what I want.	.170	448	<.001	.932	448	<.001
SE2. It is easy for me to stick to my aims and accomplish my goals.	.212	448	<.001	.890	448	<.001
SE3. I am confident that I could deal efficiently with unexpected events.	.208	448	<.001	.899	448	<.001
SE4. Thanks to my resourcefulness, I know how to handle unforeseen situations.	.221	448	<.001	.891	448	<.001
SE5. I can remain calm when facing difficulties because I can rely on my coping abilities.	.210	448	<.001	.898	448	<.001
SE6. No matter what comes my way, I am usually able to handle it.	.237	448	<.001	.885	448	<.001
SC1. Interacting with people online makes me interested in things that happen outside of my town.	.206	448	<.001	.894	448	<.001
SC2. Interacting with people online makes me want to try new things.	.235	448	<.001	.883	448	<.001
SC3. Interacting with people online makes me interested in what people unlike me are thinking.	.220	448	<.001	.894	448	<.001
SC4. Talking with people online makes me curious about other places in the world.	.227	448	<.001	.869	448	<.001
SC5. Interacting with people online makes me feel like part of a larger community.	.210	448	<.001	.896	448	<.001

SC6. Interacting with people online makes me feel connected to the bigger picture.	.219	448	<.001	.897	448	<.001
SC7. Interacting with people online reminds me that everyone in the world is connected.	.228	448	<.001	.892	448	<.001
SC8. I am willing to spend time to support general online community activities.	.191	448	<.001	.910	448	<.001
SC9. Interacting with people online gives me new people to talk to.	.221	448	<.001	.886	448	<.001
SC10. By going online, I come in contact with new people all the time.	.195	448	<.001	.907	448	<.001
SC11. There are several people online I trust to help solve my problems.	.204	448	<.001	.923	448	<.001
SC12. There is someone online I can turn to for advice about making very important decisions.	.209	448	<.001	.913	448	<.001
SC13. There is no one online that I feel comfortable talking to about intimate personal problems.	.175	448	<.001	.923	448	<.001
SC14. When I feel lonely, there are several people online I can talk to.	.199	448	<.001	.908	448	<.001
SC15. If I needed an emergency loan of $500, I know someone online I could turn to.	.177	448	<.001	.895	448	<.001
SC16. The people I interact with online would put their reputation on the line for me.	.173	448	<.001	.928	448	<.001

SC17. The people I interact with online/offline would be good job references for me.	.216	448	<.001	.900	448	<.001
SC18. The people I interact with online would share their last dollar with me.	.141	448	<.001	.925	448	<.001
SC19. I do not know people online well enough to get them to do anything important.	.171	448	<.001	.919	448	<.001
SC20. The people I interact with online would help me fight an injustice.	.198	448	<.001	.918	448	<.001
DA1. Spent a lot of time thinking about screen use or planned screen use?	.159	448	<.001	.941	448	<.001
DA2. Felt an urge to spend screen time more and more?	.173	448	<.001	.928	448	<.001
DA3. Used screen time in order to forget about personal problems?	.195	448	<.001	.910	448	<.001
DA4. Tried to cut down on the use of screen time without success?	.159	448	<.001	.928	448	<.001
DA5. Become restless or troubled if you have been prohibited from screen use?	.159	448	<.001	.894	448	<.001
DA6. Used screen time so much that it has had a negative impact on your job/studies?	.181	448	<.001	.881	448	<.001
DWB1. I feel emotionally stable when I am exposed to the digital world.	.198	448	<.001	.910	448	<.001
DWB2. I can manage any emotional challenges caused by my screen use.	.236	448	<.001	.893	448	<.001

DWB3. I cope well with any mood swings that are aroused by my screen use.	.211	448	<.001	.907	448	<.001
DWB4. I cope well with emotional harm caused by screen use.	.208	448	<.001	.911	448	<.001
DWB5. I cope well with any digital harm that comes my way. (e.g., cyberbullying)	.196	448	<.001	.913	448	<.001
DWB6. I set boundaries over my screen use.	.187	448	<.001	.925	448	<.001
DWB7. I limit my screen time.	.188	448	<.001	.938	448	<.001
DWB8. I feel good when others connect with me in the digital world.	.180	448	<.001	.911	448	<.001
DWB9.I feel good when someone online reaches out to me during difficult times.	.191	448	<.001	.909	448	<.001
DWB10. I feel good when someone interacts with me in the digital world.	.201	448	<.001	.905	448	<.001
DWB11. I feel good when online fellow users exhibit respectable conduct.	.242	448	<.001	.882	448	<.001
DWB12. I feel good when online fellow users consider the appropriateness of the content before sharing.	.245	448	<.001	.885	448	<.001
DWB13. I feel good when the people I meet online are kind to me.	.245	448	<.001	.867	448	<.001

a. Lilliefors Significance Correction

5.4 Measurement of the constructs

The conceptual model in the study includes several constructs: digital literacy, online social capital, self-efficacy, digital addiction, and digital wellbeing. All measurement scales were carefully

adapted from previous studies except for digital wellbeing, which was developed in study 1 of the current research. Furthermore, the social media addiction scale was revised to fit the proposed model. The measurement scales were multi-item scales (see Table 5.4). All the measurement scales used a 7-point Likert scale that ranged from strongly disagree (1) to strongly agree (7) to collect survey responses (see Table 5.4).

The digital literacy skills scale was adopted from Ng (2012). The scale included 10 items that referred to three dimensions: technical skills, cognitive skills, and socio-emotional skills. These items were measured on a 7-point Likert scale with endpoints of "strongly disagree" and "strongly agree".

The general self-efficacy scale was adopted from Romppel et al. (2013), which is six items short of the original general self-efficacy scale developed by Jerusalem and Schwarzer (1995). These items were measured on a 7-point Likert scale with endpoints of "strongly disagree" and "strongly agree".

The online social capital scale was adopted from the items of Williams (2006). It is a 20-item scale that refers to two dimensions: bridging capital and bonding capital. These items were measured on a 7-point Likert scale with endpoints of "strongly disagree" and "strongly agree".

To measure digital addiction, the six items of the Bergen Social Networking Addiction Scale (BSNAS) developed by Andreassen et al. (2012) were adapted to fit the proposed model. The scale items were reworded from 'social media use' to general 'screen use'. This is a unidimensional scale that measures addiction elements such as salience, mood modification, tolerance, withdrawal, conflict, and relapse. These items were measured on a 7-point Likert scale with endpoints of "strongly disagree" and "strongly agree".

The digital wellbeing scale that was developed in study 1 was used in study 2. It is a 13-item scale that refers to four dimensions: state of emotional resilience, state of agency, state of social connection, and state of communion. These items were measured on a 7-point Likert scale with endpoints of "strongly disagree" and "strongly agree".

Table 5. 5 Measurement Scales Used

Reference	Construct	Items	Scale
Ng (2012)	Digital literacy	**Technical skills** 1. I know how to solve my own technical problems. 2. I can learn new technologies easily. 3. I keep up with important new technologies. 4. I know about a lot of different technologies. 5. I have the technical skills I need to use for learning. 6. I have good digital skills. **Cognitive skills** 7. I am confident with my search and evaluative skills in regard to obtaining information from the Web. 8. I am familiar with issues related to web-based activities. (e.g., cyber safety, search issues) **Socio-emotional skills** 9. Online communications enable me to collaborate better with my peers on project work and other learning activities. 10. I frequently obtain help with my work from my friends over the Internet, e.g., through Skype, Facebook, blogs.	7-point Likert scale Strongly Disagree (1) to Strongly Agree (7)
Romppel et al. (2013)	Self-efficacy	1. If someone opposes me, I can find means and ways to get what I want. 2. It is easy for me to stick to my aims and accomplish my goals. 3. I am confident that I could deal efficiently with unexpected events. 4. Thanks to my resourcefulness, I know how to handle unforeseen situations. 5. I can remain calm when facing difficulties because I can rely on my coping abilities. 6. No matter what comes my way, I am usually able to handle it.	7-point Likert scale Strongly Disagree (1) to Strongly Agree (7)
Williams (2017)	Online social capital	**Bridging capital** 1. Interacting with people online makes me interested in things that happen outside of my town. 2. Interacting with people online makes me want to try new things. 3. Interacting with people online makes me interested in what people unlike me are thinking. 4. Talking with people online makes me curious about	7-point Likert scale Strongly Disagree (1) to Strongly Agree (7)

		other places in the world. 5. Interacting with people online makes me feel like part of a larger community. 6. Interacting with people online makes me feel connected to the bigger picture. 7. Interacting with people online reminds me that everyone in the world is connected. 8. I am willing to spend time to support general online community activities. 9. Interacting with people online gives me new people to talk to. 10. By going online, I come in contact with new people all the time. **Bonding capital** 1. There are several people online I trust to help solve my problems.* 2. There is someone online I can turn to for advice about making very important decisions.* 3. There is no one online that I feel comfortable talking to about intimate personal problems.* 4. When I feel lonely, there are several people online I can talk to. 5. If I needed an emergency loan of $500, I know someone online I could turn to.* 6. The people I interact with online would put their reputation on the line for me. 7. The people I interact with online/offline would be good job references for me. 8. The people I interact with online would share their last dollar with me. 9. I do not know people online well enough to get them to do anything important.* 10. The people I interact with online would help me fight an injustice.	
Andreassen et al. (2012)	Digital addiction	How often during the last year have you: 1. spent a lot of time thinking about screen use or planned screen use? 2. felt an urge to spend screen time more and more? 3.used screen time in order to forget about personal problems? 4.tried to cut down on the use of screen time without success? 5.become restless or troubled if you have been	7-point Likert scale Strongly Disagree (1) to Strongly Agree (7)

		prohibited from screen use? 6.used screen time so much that it has had a negative impact on your job/studies?	
Digital wellbeing scale (study 1)	Digital wellbeing	**State of emotional resilience** ER3. I feel emotionally stable when I am exposed to the digital world. ER6. I can manage any emotional challenges caused by my screen use. ER7. I cope well with any mood swings that are aroused by my screen use. ER8. I cope well with emotional harm caused by screen use. ER9. I cope well with any digital harm that comes my way. (e.g., cyberbullying) **State of agency** A1. I set boundaries over my screen use. A2. I limit my screen time. **State of social connection** C1. I feel good when others connect with me in the digital world. C2. I feel good when someone online reaches out to me during difficult times. C3. I feel good when someone interacts with me in the digital world. **State of communion** C5. I feel good when online fellow users exhibit respectable conduct. C6. I feel good when online fellow users consider the appropriateness of the content before sharing. C7. I feel good when the people I meet online are kind to me.	7-point Likert scale Strongly Disagree (1) to Strongly Agree (7)

5.5 Conceptual model testing

5.5.1 Pooled CFA

Pooled CFA is a more efficient and highly recommended method for assessing the measurement model. This method combines all latent constructs in one measurement model, and the CFA is performed simultaneously. Pooled CFA includes both first and second order constructs in one measurement model. The present study included both first and second order constructs. The first order constructs were self-

efficacy and digital addiction. The second order constructs were digital literacy with two underlying dimensions, social capital with two underlying dimensions, and digital wellbeing with four underlying dimensions (see Figure 5.1)

5.5.2 Unidimensionality of the model

The unidimensionality of the measurement model was confirmed when the measurement items for the first-order construct and the latent variable of the higher-level construct had acceptable factor loadings. The standardised factor loadings for the second-order constructs were computed by adding up the factor loadings of the latent variables, whereas for the first-order construct, the standardised factor loadings of each item considered. All constructs had high factor loadings above 0.7 that confirmed the unidimensionality of the measurement model (Hair et al. 2007). The items ER1, DL10, SE1, SE2, DA2, DA3, SC10, SC13, SC15, SC16, SC17, SC18, and SC19 had low factor loadings. Hence, these items were removed for a better model fit.

5.5.3 Pooled CFA results

The model fit indices were examined after removing the items with low factor loadings (<0.7), and then items were constrained to achieve acceptable model fitness (Nazim, 2013). To evaluate the model fitness, several fitness indices were examined. The model fitness indices of pooled CFA were, CMIN/df=2.171, df=794, CMIN=1723.982, p=.000 TLI=.901, CFI=.908, RMSEA= .051. All the fitness indices met the relevant thresholds (see Table 5.5). The model fitness indices for pooled CFA provided a good fit to the data.

Table 5. 6 Fitness Indices

Name of index	Level of acceptance	Literature	Results of the study
RMSEA	≤ 0.06	Browne and Cudeck (1993)	.051
CFI	>0.90	Bentler (1990)	.908
TLI	>0.90	Bentler and Bonett (1980)	.901
CMIN/df	≤ 3	Marsh and Hocevar (1985)	2.171

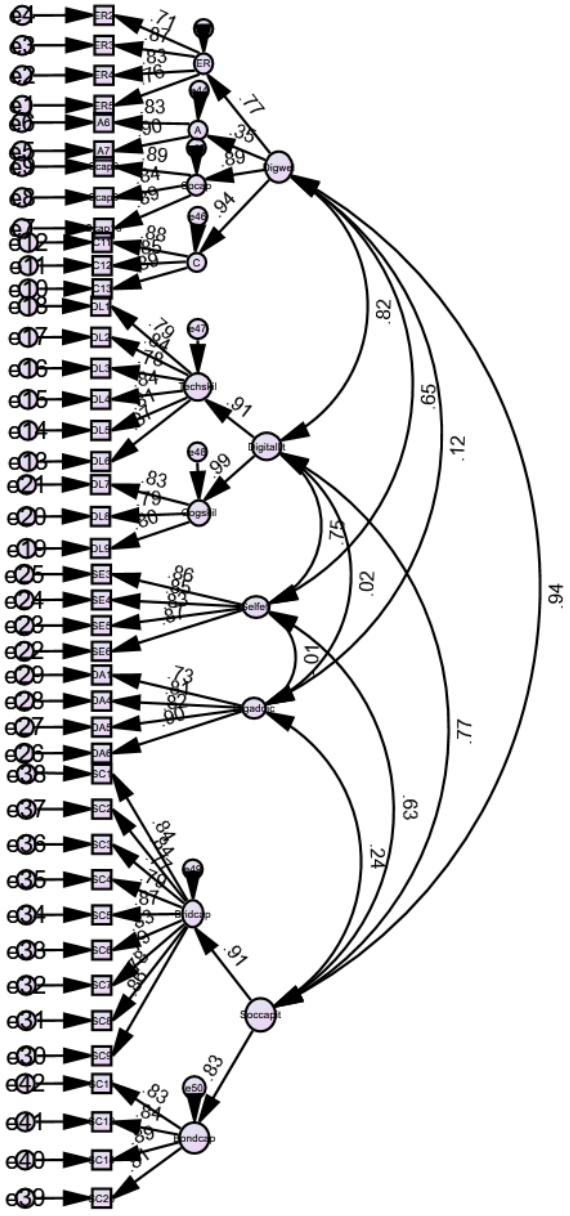

Figure 5. 1 Pooled CFA of the measurement model

5.6 Reliability and validity of the measurement model

The present study adopted Straub's (1989) measurement validation procedure to test construct validity in terms of convergent validity and discriminant validity. The construct validity and reliability were tested by checking the convergent validity, discriminant validity, and composite reliability of the data.

(a) Convergent validity

The measurement model specifies how the observed indicators relate to unobserved constructs (Kline, 2005). Having fulfilled the goodness-of-fit assessment, the next step was to assess the convergent validity of the data. Convergent validity was assessed by checking the loading of each observed indicator on its underlying latent construct (Anderson & Gerbing, 1988). The factor loading was examined to identify a potential problem with the CFA model. Standardised factor loadings should be significantly linked to the latent construct and have a factor loading of at least 0.5 and ideally exceed 0.7 (Hair et al. 2007). The CFA results for the constructs of self-efficacy and digital addiction (see Table 5.6) indicated that each factor loadings of the reflective indicators were statistically significant at a 0.001 level. The factor loadings of the latent construct to the higher-level constructs for digital wellbeing, digital literacy, and social capital were above 0.7 and met the threshold. The latent construct, state of agency, had a loading of 0.35 owing to the number of items. However, the Pearson correlation between the two items of state of agency was 0.724. Hence, there was a strong correlation between the items and they were found reliable for further analysis. Also, it holds theoretical significance in relation to digital wellbeing and is a crucial factor that explains the mindful and purposeful use of digital space (Lee et al., 2023). Given the advancement in technology and increased automation of tasks, an individual's state of agency can contribute to a balanced digital use, thereby influencing digital wellbeing.

Moreover, the variance of the latent variable was assigned the role of a model parameter, which is thought to reflect dispersion but is not equivalent to the variance defined as the sum of squared

deviation (Ha & Stoel, 2009; Verbeke & Molenberghs, 2003). In addition, the factor loadings for all the other constructs ranged from 0.73 to 0.99, and no loading was less than the recommended level of 0.70.

The convergent validity assessment also included the measure of construct reliability and average variance extracted. According to Fornell and Larcker (1981, p. 45), average variance extracted refers to "the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error". Further, Fornell and Larcker (1981) suggest that average variance extracted is a more conservative measure than construct composite reliability. Two criteria were assessed to ensure convergent validity: (1) construct composite reliability should be greater than 0.7 (Nunnally, 1978), and (2) average variance extracted for a construct should be larger than 0.5 to suggest adequate convergent validity (Fornell & Larcker, 1981). Table 6.6 summarises the results of construct composite reliability and average variance extracted for each construct. The results showed that the construct composite reliability ranged from 0.846 to 0.951, with all constructs exceeding the minimum threshold value of 0.7. Further, the average variance extracted ranged from 0.60 to 0.91, and all exceeded the minimum threshold value of 0.5.

Generally, the present findings indicated that all constructs had achieved a range of fairly good to very good reliabilities among the latent constructs to measure the higher-level construct. In addition, the CFA model fit relatively well, and all factor loadings were significant and exceeded 0.7. Hence, the measurement model showed adequate evidence of convergent validity.

Table 5. 7 Reliability and Validity for the Pooled CFA Measurement Model

Construct	Items	Standardised factor loadings	Composite reliability	AVE
Digital wellbeing			0.846	0.60
	State of emotional resilience	.77		
	ER2. I can manage any emotional challenges caused by my screen use.	.71		
	ER3. I cope well with any mood swings that are aroused by my screen use.	.87		
	ER4. I cope well with emotional harm caused by screen use.	.83		
	ER5. I cope well with any digital harm that comes my way. (e.g., cyberbullying)	.76		

	State of agency	.35		
	A6. I set boundaries over my screen use.	.83		
	A7. I limit my screen time.	.90		
	State of social connection	.89		
	SOC8. I feel good when others connect with me in the digital world.	.85		
	SOC9. I feel good when someone online reaches out to me during difficult times.	.84		
	SOC10. I feel good when someone interacts with me in the digital world.	.89		
	State of communion	.94		
	C11. I feel good when online fellow users exhibit respectable conduct.	.88		
	C12. I feel good when online fellow users consider the appropriateness of the content before sharing.	.85		
	C13. I feel good when the people I meet online are kind to me.	.89		
Digital literacy			0.951	.91
	Technical skills	.91		
	1. I know how to solve my own technical problems.	.79		
	2. I can learn new technologies easily.	.84		
	3. I keep up with important new technologies.	.78		
	4. I know about a lot of different technologies.			
	5. I have the technical skills I need to use ICT for learning and to create artefacts (e.g. presentations, digital stories, wikis, blogs) that demonstrate my understanding of what I have learnt.	.84 .81		
	6. I have good ICT skills.			
	Cognitive skills	.87		
	7. I am confident with my search and evaluative skills in regard to obtaining information from the Web.	.99 .83		
	8. I am familiar with issues related to web-based activities, e.g. cyber safety, search issues, plagiarism.	.79		
	9. ICT enables me to collaborate better with my peers on project work and other learning activities.	.80		
Self-efficacy	SE3. I am confident that I could deal efficiently with unexpected events.	.86	0.914	0.73
	SE4. Thanks to my resourcefulness, I know how to handle unforeseen situations.	.85		
	SE5. I can remain calm when facing difficulties because I can rely on my coping	.83		

	abilities.			
	SE6. No, matter what comes my way, I am usually able to handle it.	.87		
Digital addiction	DA1. spent a lot of time thinking about screen use or planned screen use?	.73	0.891	.671
	DA4. tried to cut down on the use of screen time without success?	.81		
	DA5. become restless or troubled if you have been prohibited from screen use?	.82		
	DA6. used screen time so much that it has had a negative impact on your job/studies?	.90		
Social capital			0.866	0.76
	Bridging capital	.91		
	SC1. Interacting with people online makes me interested in things that happen outside of my town.	.84		
	SC2. Interacting with people online makes me want to try new things.	.84		
	SC3. Interacting with people online makes me interested in what people unlike me are thinking.	.77		
	SC4. Talking with people online makes me curious about other places in the world.	.79		
	SC5. Interacting with people online makes me feel like part of a larger community.	.87		
	SC6. Interacting with people online makes me feel connected to the bigger picture.	.83		
	SC7. Interacting with people online reminds me that everyone in the world is connected.	.79		
	SC8. I am willing to spend time to support general online community activities.	.78		
	SC9. Interacting with people online gives me new people to talk to.			
	Bonding capital			
	SC11. There are several people online I trust to help solve my problems.	.86		
	SC12. There is someone online I can turn to for advice about making very important decisions.	.83		
	SC14. When I feel lonely, there are several people online I can talk to.	.84		
	SC20. The people I interact with online would help me fight an injustice.	.89		
		.81		
		.83		

(b) Discriminant validity

The present study employed a conservative approach to establish discriminant validity (Hair et al. 2007). Table 5.7 presents the results for discriminant validity. Fornell and Larcker (1981) suggest that discriminant validity is determined by the average variance extracted value, namely whether or not it exceeds the squared inter-construct correlations associated with that construct. The results showed that the average variance extracted estimates ranged from 0.60 to 0.91, exceeding the 0.50 cut-off limit that Anderson and Gerbing (1988) suggest. The squared inter-construct correlation of the latent variables and higher-level constructs ranged between -.007 to 0.605. It was found that the average variance extracted from each construct was above its squared correlation with other constructs. Following Fornell and Larcker's (1981) recommendations, it was evident that these results provided adequate evidence for the discriminant validity of the measurement model.

Overall, the required reliability and validity assessment demonstrated strong evidence for satisfactory convergent validity and discriminant validity. In sum, the overall results of the goodness-of-fit of the pooled CFA model lent substantial support to confirming the proposed measurement model. The hypothesised relationships in the research model were analysed using Hayes' (2013) PROCESS Macro for SPSS.

Table 5. 8 Discriminant Validity

Construct	AVE	Digital wellbeing	Digital literacy	Self-efficacy	Digital addiction	Social capital
Digital wellbeing	0.60	**0.774**				
Digital literacy	0.91	0.525	**0.954**			
Self-efficacy	0.73	0.490	0.529	**0.854**		
Digital addiction	0.67	0.172	0.083	-.007	**0.818**	
Social capital	0.76	0.605	0.509	0.404	0.262	**0.872**

5.7 Results

5.7.1 Test of direct and mediation effect

Model 4 of Hayes' (2013) PROCESS Macro was used to study the direct effect and indirect mediation effect proposed in the research model. PROCESS is a computational tool - "MACRO" – available for SPSS that simplifies the implementation of mediation, moderation, and conditional process analysis of observed variables with a regression path analysis modelling tool utilising ordinary least squares (Hayes, 2013). PROCESS Macro for SPSS was used in the current study.

To examine the direct effect of digital literacy and the mediating role of self-efficacy and social capital on digital wellbeing, Hayes' PROCESS SPSS Macro (Hayes, 2018, Model 4, 5000 bootstrap samples) was used. The hypothesised relationship between digital literacy and digital wellbeing was evaluated using Model 4. The results showed that digital literacy significantly predicted digital wellbeing ($\beta = .184$, $t = 4.488$ $p = .000$). The result indicated a positive direct effect of digital literacy on digital wellbeing that was statistically significant (95% CI: .104, .265), thus supporting H1.

To examine the mediating role of self-efficacy and social capital on digital wellbeing, Hayes' PROCESS SPSS Macro (Hayes, 2018, Model 4, 5000 bootstrap samples) was used. To test the mediating effect of self-efficacy on the relationship between digital literacy and digital wellbeing and the mediating effect of online social capital on the relationship between digital literacy and digital wellbeing, four conditions, as suggested by Baron and Kenney (1986), were followed. The first condition states that the predictor variable (digital literacy) should directly influence the mediator's self-efficacy and online social capital. The second condition is met if the mediator's self-efficacy and online social capital significantly influence the criterion variable (digital wellbeing).

H2 was tested with Model 4 and the results showed that digital literacy was a significant predictor of self-efficacy, $\beta = .634$, $p = .000$, 95% CI [.539, .729], and self-efficacy was a significant predictor of digital wellbeing, $\beta = .167$, $p = .000$, 95% CI [.104, .230]. This showed that the first and the second conditions were met, and these results supported the mediational hypothesis. The third condition of mediation – that the predictor variable (digital literacy) should significantly influence the criterion

variable (digital wellbeing) – was also met, thereby providing support to H1 and signifying that there was a positive association (β = .184, t = 4.488 p = .000). To test the existence of mediation, the researcher used bias-correct bootstrapping on the recommendation of Hayes and Rockwood (2017) to examine the true indirect effects of digital literacy on digital wellbeing via self-efficacy. The results showed that self-efficacy had a significant positive mediating effect with an indirect effect of β = .106, 95% CI [.063, .149], supporting H2 (see Table 5.9). The fourth condition of mediation was fulfilled when the results showed a partial mediating effect of self-efficacy on the relationship between digital literacy and digital wellbeing. This was further confirmed by the β value reducing from .184 to .106, which validated and strengthened the partial mediation results derived from Baron and Kenny's (1986) approach. Thus, H2 was supported.

Consecutively, H3 was tested with Model 4, and the results showed that digital literacy was a significant predictor of social capital at 95% CI [.501, .688], β = .594, p = .000, and social capital was a significant predictor of digital wellbeing 95% CI [.266, .394], β = .330, p = .000. This showed that first and the second conditions were met, and these results supported the mediational hypothesis. The third condition of mediation, that the predictor variable (digital literacy) should significantly influence the criterion variable (digital wellbeing), was also met, thereby providing support to H1 and signifying that there was a positive association (β = .184, t = 4.488 p = .000). These results supported the mediational hypothesis. To test the existence of mediation, the researcher used bias-correct bootstrapping on the recommendation of Hayes (2017) to examine the true indirect effects of digital literacy on digital wellbeing via social capital. The results showed that social capital had a significant positive mediating effect with an indirect effect of β = .196, 95% CI (.147, .255), supporting H3 (see Table 5.9). However, a slight increase in the β value from .184 to .196 predicted a possibility of full mediation.

Table 5. 9 Test of Mediation

Relationship	β	t	S.E.
Direct effect Digital literacy → Digital wellbeing	.184*	4.488	.041
Digital literacy → Self-efficacy	.634*	13.152	.048
Digital literacy → Social capital	.594*	12.485	.048
Self-efficacy → Digital wellbeing	.167*	5.182	.032
Social capital → Digital wellbeing	.330*	10.108	.033

**Note: ***Significant at the 0.05 level

Table 5. 10 Percentile Bootstrapping Confidence Interval (CI) Method (Indirect Effect)

Relationship	β	S.E. (t)	LLCI	ULCI	Sig
Digital literacy → Self-efficacy→ Digital Wellbeing	.106*	.022	.063	.149	.000
Digital literacy → Social capital→ Digital wellbeing	.196*	.027	.147	.255	.000

5.7.2 Test of moderated mediation

Hayes' PROCESS SPSS Macro (Hayes, 2018, Model 1, 5,000 bootstrap samples) was used to examine the moderating role of digital addiction in the relationship between digital literacy and digital wellbeing. The results showed that digital literacy significantly predicted digital wellbeing (β = .530, t = 14.531 p = .000) and digital addiction was not a significant predictor of digital wellbeing (β = .027, t = 1.620 p = .106). The interaction effect of digital literacy and digital addiction (β = .150, t = 6.444 p = .000, ΔR2= .353 (F (4, 443) = 80.658, p<.001) were statistically significant predictors of digital wellbeing, supporting H4a. The results at 95% confidence interval showed that the confidence interval for mean minus standard deviation (lower digital addiction) was .197; .378. The confidence interval for the

mean (average digital addiction) was .458; 601. The confidence interval for mean plus standard deviation (higher digital addiction) was .658;.881. In terms of the direction of the relationship, the effect of digital literacy on digital wellbeing was found to be significant when digital addiction was low, average, and high since the 95% confidence interval excluded zero. These results showed that the conditional direct effect was significantly positive (see Figure 5.2).

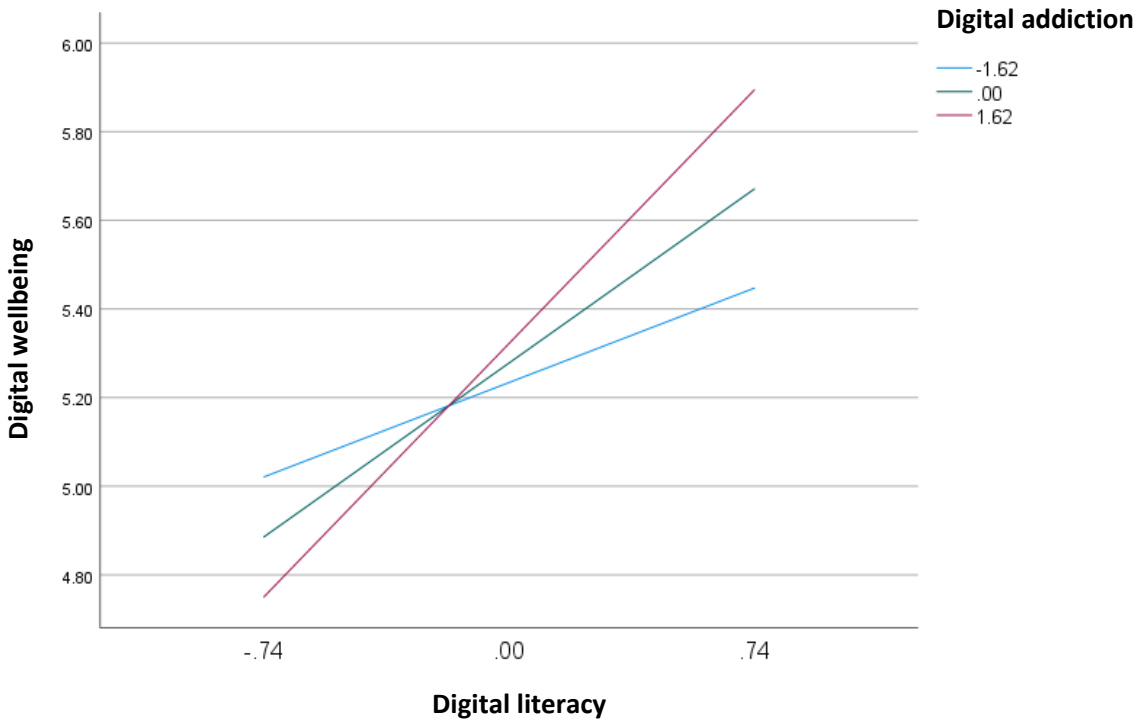

Figure 5. 2 Moderating role of digital addiction on the relationship between digital literacy and digital wellbeing

Model 14 of Hayes' (2013) PROCESS Macro was used to study the moderated mediation of digital addiction proposed in the model. The condition of moderated mediation is achieved when the conditional indirect effect of digital literacy on digital wellbeing through self-efficacy differs in levels of digital addiction. To assess the second stage of mediation, three conditions, as suggested by Guarana and Hernandez (2016), were tested. The first condition is that the indirect effect should be significant, and the second condition is that there should be a significant interaction between the mediator and the moderator

in predicting the criterion variable. The third condition is that the independent variable should have different conditional effects on the criterion variable via the mediator at high and low levels of moderator. The results displayed in Table 5.9 proved the first condition of mediation.

According to the results, digital literacy significantly predicted digital wellbeing (β = .1650, t = 4.058 p = .000), self-efficacy was a significant predictor of digital wellbeing (β = .166, t = 4.883 p = .000), and digital addiction was not a significant predictor of digital wellbeing (β = .006, t = .393 p = .694). The interaction effect of self-efficacy and digital addiction (β = .029, t = 1.563 p = .119, ΔR2= .003 (F (4, 443) = 2.444, p>.001) was not a statistically significant predictor of digital wellbeing, and did not support H4b (see Tables 5.10, 5.11). Hence the second condition was not met. The moderated mediation result showed that digital addiction did not have a moderating effect. The indirect effect of digital literacy on digital wellbeing via self-efficacy was weakest at the lowest level (-1SD) of digital addiction and strongest at the highest level (+1SD) of digital addiction; however, this did not significantly increase digital wellbeing (see Figure 5.3). The findings suggested that digital literacy, which contributes to digital wellbeing, was strongly linked to self-efficacy and the moderating effect of digital addiction was non-significant. This disproved H4b.

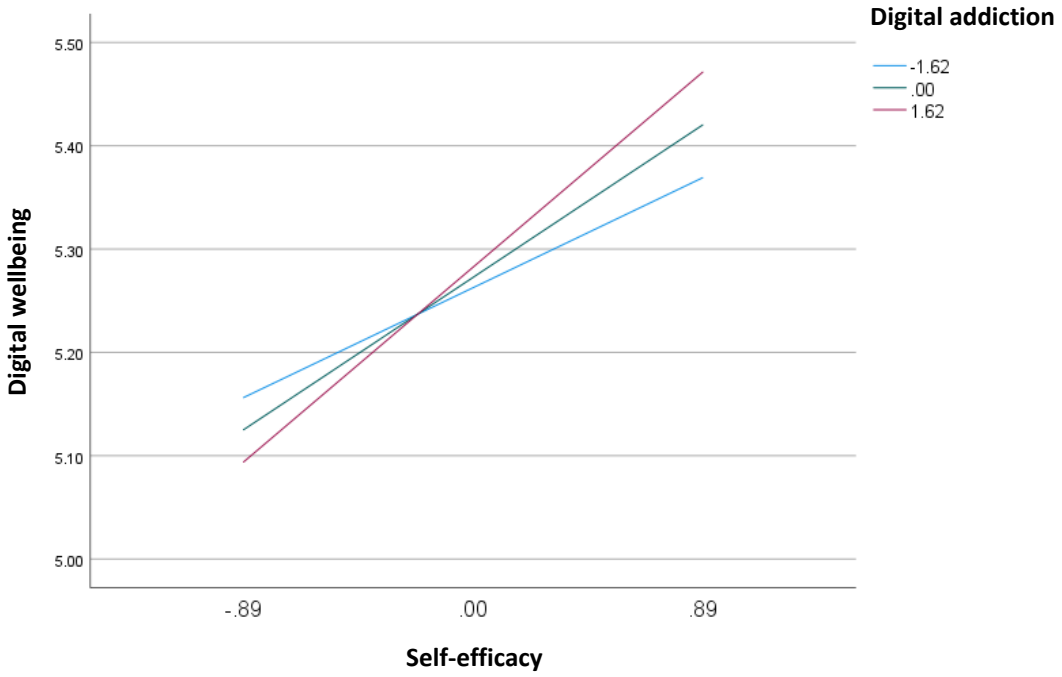

Figure 5. 3 Moderating role of digital addiction on the relationship between self-efficacy and digital wellbeing

Model 14 of Hayes' (2013) PROCESS Macro was consecutively used to study the moderated mediation effect of digital addiction on social capital proposed in the model. The condition of moderated mediation is achieved when the conditional indirect effect of digital literacy on digital wellbeing through online social capital differs in levels of digital addiction. To assess the second stage of mediation, three conditions, as suggested by Guarana and Hernandez (2016), were tested. The results displayed in Table 5.9 proved the first condition of mediation. The results showed that digital literacy significantly predicted digital wellbeing (β = .165, t = 4.058 p = .000), online social capital was a significant predictor of digital wellbeing (β = .354, t = 9.4100 p = .000), and digital addiction was not a significant predictor of digital wellbeing (β = .006, t = .393 p = .694). The interaction effect of online social capital and digital addiction (β =.057, t = 2.948 p = .003, ΔR2= .486 (F (4, 443) = 69.494, p<.001) was a statistically significant predictor of digital wellbeing, supporting H4c (see Tables 5.10, 5.11). Hence the second condition was met. The moderated mediation result showed that digital addiction had a moderating effect. The indirect

effect of digital literacy on digital wellbeing via online social capital was weakest at the lowest level (-1SD) of digital addiction and strongest at the highest level (+1SD) of digital addiction (see Figure 5.4). The findings suggested that digital literacy contributed to digital wellbeing and was linked to online social capital. The indirect effect was stronger for end-users with a higher level of digital addiction, which significantly increased digital wellbeing. The results showed that digital literacy exerted a positive influence on digital wellbeing via the mediator of social capital. They also revealed that the positive mediating effect of social capital on digital wellbeing was further strengthened (i.e., positively moderated) by digital addiction. This supported H4c and showed that social capital had a full mediation effect that was moderated by digital addiction.

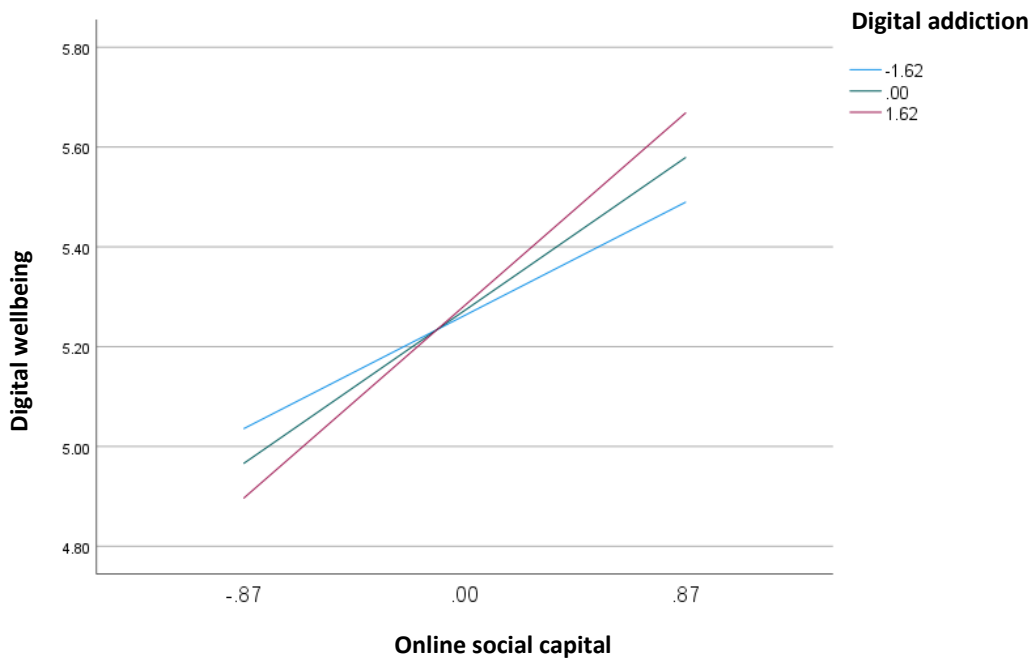

Figure 5. 4 Moderating role of digital addiction on the relationship between social capital and digital wellbeing

Table 5. 11 Moderating Mediation - Testing for the Conditional Indirect Effect

Variables	Dependent variable (digital wellbeing)
Main effects of predictor variables	
Self-efficacy	.166
Social capital	.354
Digital addiction	.006
Interaction	
Self-efficacy * Digital addiction	.029
Social capital * Digital addiction	.057
R^2	.279 (self-efficacy) .259 (social capital)
R^2 change	.486
F	69.494, p<.001

Table 5. 12 Conditional Indirect Effect for Different Digital Addiction Values (= 0 and ± standard deviation) 95% Confidence Interval for Conditional Indirect Effect Using Bqootstrap

Mediator	Values of the moderator (digital addiction)	Conditional indirect effect	Bootstrap S.E.	Lower CI	Upper CI
Self-efficacy	-1 S.D.	.076	.027	.017	.125
	M	.105	.023	.058	.151
	+1 S.D.	.135	.038	.058	.208
	Moderated mediation index	.018	.015	-.010	.048
Social capital	-1 S.D.	.156	.027	.104	.212
	M	.210	.038	.144	.291
	+1 S.D.	.265	.063	.159	.399
	Moderated mediation index	.034	.018	.002	.072

Table 5. 13 Hypotheses Testing Results

Hypothesis	Test results
H1: End-users with greater digital literacy will experience a higher level of digital wellbeing.	Supported
H2: The effect of digital literacy on digital wellbeing will be mediated through self-efficacy.	Supported
H3: The effect of digital literacy on digital wellbeing will be mediated through online social capital.	Supported
H4a: The direct effect of digital literacy on digital wellbeing will be moderated by digital addiction.	Not Supported
H4b: The mediating effect of perceived self-efficacy on digital wellbeing will be moderated by digital addiction.	Not supported
H4c: The mediating effect of online social capital on digital wellbeing will be moderated by digital addiction.	Supported

5.9 Chapter conclusion

This chapter addressed the second, third, fourth, and fifth research questions that focused on the direct, indirect, and conditional effects on digital wellbeing. The results suggested that digital literacy had a direct effect on enhancing digital wellbeing. The mediation effects of self-efficacy and online social capital were supported in the research. The analysis also revealed a significant partial mediation for self-efficacy and full mediation for online social capital. The moderated mediation analysis revealed a significant positive effect on digital literacy and online social capital. However, the moderated mediation effect was insignificant for self-efficacy but in a positive direction.

The analysis and findings in this chapter established the nomological validity of the digital wellbeing scale. Overall, the results suggest that end-users must reinforce their digital literacy skills and online social connections concurrently with self-efficacy beliefs to experience digital wellbeing, with particularly marked positive effects for end-users who exhibit a high level of digital addiction. The next

chapter discusses the theoretical and managerial implications of the study's overall findings and the study’s research limitations, before suggesting future research directions and presenting the conclusion.

Chapter Six: Implications and Conclusion

6.1 Introduction

This thesis aimed to address five research questions (1) How is digital wellbeing being conceptualised from the perspectives of subject matter experts, academics, and end-users? What are the dimensions of the digital wellbeing construct, and how should it be measured? (2) How does digital literacy influence digital wellbeing, and how is this relationship mediated by self-efficacy? (3) How does digital literacy influence digital wellbeing, and how is this relationship mediated by online social capital? (4) How does digital addiction moderate the relationship between digital literacy and digital wellbeing? (5) How does digital addiction moderate the mediating effect of self-efficacy and online social capital?

This research adopted a mixed-method research design to address the research questions. Study 1 aimed to develop a psychometrically sound digital wellbeing scale to address the first research question. Two methods were used: 1) in-depth semi-structured interviews with subject matter experts, academics, and end-users, and 2) an online survey for scale validation. Study 2 aimed to answer the second, third, fourth, and fifth research questions by analysing a conceptual model capturing the hypothesised relationships of primary constructs. A quantitative analysis was undertaken to evaluate the proposed measurement model and to establish the nomological validity of the digital wellbeing scale. The overall findings revealed how end-users experienced digital wellbeing in the ever-changing digital world.

This chapter concludes the thesis by summarising the research findings and discussing the theoretical and practical implications, research limitations, and future research directions.

6.2 Summary of the findings

Study 1 reported on the conceptualisation and measurement of digital wellbeing. The qualitative inquiry revealed that digital wellbeing is interdependent on other aspects of wellbeing. The results implied that the experiential state of digital wellbeing comprises a cognitive and affective evaluation by end-users towards their digital consumption. Further, the study positioned digital wellbeing as a psychological experiential state that supports the subjective wellbeing of end-users.

The findings of scale development and validation indicated that digital wellbeing is a multi-dimensional construct measuring the impact of digital consumption on wellbeing. Findings suggested that digital wellbeing ensures the maintenance of subjective wellbeing in the digital world. This study reveal four key dimensions of digital wellbeing: state of emotional resilience, state of agency, state of social connection, and state of communion. These are experiential states and refer to the cognitive and affective appraisal of digital consumption. These four key dimensions, therefore, help users attain optimal balance and contribute to the maintenance of subjective wellbeing. This finding addressed the first research question on the measurement and dimensionality of digital wellbeing. Overall, the findings of study 1 showed how end-users experience and manage wellbeing challenges in the digital world.

The findings of study 2, model testing, aimed to address the second, third, fourth, and fifth research questions. A conceptual model capturing the hypothesised relationship between digital literacy, self-efficacy, online social capital, digital addiction, and digital wellbeing was empirically assessed. The findings suggested that digital literacy has a direct effect on enhancing digital wellbeing. Moreover, the mediation effects of self-efficacy and online social capital were supported in the research. The analysis also revealed a significant partial mediation effect of self-efficacy and a full mediation effect of online social capital. The moderating effect of digital addiction on the relationship between digital literacy and digital wellbeing revealed a significant positive effect. Furthermore, the moderated mediation effect of online social capital on digital wellbeing was significant in a positive direction. However, the moderated mediation effect was insignificant for self-efficacy but again in a positive direction. This result implies that the effects of digital literacy and online social capital are significantly greater for users with high addiction. However, although self-efficacy is necessary for attaining digital wellbeing, it cannot aid addicted users to attain digital wellbeing. Hence, study 2 established the nomological validity of the digital wellbeing scale and confirmed the relationship between the main constructs in the conceptual model developed. Overall, study 2 suggests that end-users must reinforce their digital literacy skills and online social connections concurrently with self-efficacy beliefs to experience digital wellbeing, with marked positive effects for end-users who exhibit a high level of digital addiction.

6.3 Theoretical implications

6.3.1 Study 1: Scale development

Several authors have anecdotally defined digital wellbeing without any empirical support (Birnholtz et al., 2019; Powell, 2020; Wright, 2018) and these definitions lack general consensus. The need to conceptualise and seek consensus on a definition of digital wellbeing has led this study to find a agreed upon definition that contributes to the marketing literature. The study defines digital wellbeing as a state of optimal balance in digital consumption. This state is achieved by a cognitive and affective appraisal that incorporates four dimensions: the states of emotional resilience, agency, social connection, and communion. The operational definition presented in the study extends the current understanding of digital wellbeing by introducing these dimensions. Existing studies have defined digital wellbeing as the optimal balance between online and real lives (Abeele, 2020), the mindful use of technology (Dauden et al., 2019), a positive feeling towards using technology (Amoros et al., 2020), conscious use of technology (Powell, 2020), and healthy social media use (Stawarz, 2019). Some authors have also defined digital wellbeing as a state where subjective wellbeing is maintained (Abeele,2020). The present study extends and contributes to the marketing literature on the concept of digital wellbeing based on the aspect of optimal balance in screen use and further extends existing definitions by focusing on maintaining subjective wellbeing in the online context. Further, while existing definitions of digital wellbeing remain anecdotal (Birnholtz et al., 2019; Powell, 2020; Wright, 2018), the current study adds value by conceptualising digital wellbeing based on empirical support. This clarifies the conceptual clash that has impeded further research into wellbeing and screen use (Gui et al., 2017).

Existing definitions of digital wellbeing by Amoros et al. (2020), Birnholtz et al. (2019), Gui et al. (2017) and, Powell (2020), position digital wellbeing as, ‘a subset of wellbeing’, and ‘part of subjective wellbeing’. Based on the empirical evidence, the current study suggests new insights that reveal digital wellbeing to be interrelated with mental, physical, and social wellbeing and largely reliant on subjective wellbeing in the online context. Several researchers have emphasised the importance of ‘optimal balance’, ‘mindful balance’, and ‘right balance’ between the benefits and drawbacks of

connectivity (Abeele, 2020; Dauden Roquet & Sas, 2019), but have not empirically shown the path to optimal balance. The current study paves the way for 'balance' achieved through emotion management, online social connections, control over technology, and communion with the digital world. The study also provides empirical evidence on the subjective experience of digital wellbeing as being reliant on healthy emotions (hedonic) and sense of purpose (eudemonic) in the digital world.

The existing definition posits digital wellbeing as the conscious use of technology that enables users to realise their potential (Powell, 2020). The current study addresses the gap in how users' engagement with technology can be used to build a healthy digital community by disclosing the cognitive and affective methods of achieving digital wellbeing. The affective aspect relates to users' connection in the online world and how they function in terms of emotional and social wellbeing. The cognitive aspect pertains to the morality shown when sharing content in the online world and the mindfulness during screen time. Moreover, while online wellbeing has been studied in various contexts such as the use of social media (Christopher, 2019), dependence on clicks and likes (e.g., Shakya & Christakis, 2017), motives of use (Ryan et al. 2014), frequency and intensity of usage (Trifiro, 2018), and social connectedness (e.g., Bekalu et al., 2019), the current study brings consensus to the study of online wellbeing by conceptualising digital wellbeing in terms of the key aspect of balance achieved through cognitive and affective states of online screen use and engagement.

Thus, the study offers a solid definition of digital wellbeing for other marketing scholars who intend to investigate wellbeing in online settings. Based on the operational definition of digital wellbeing, a psychometrically sound measurement scale was developed. The existing marketing literature illustrates the use and the need for digital tools in improving online wellbeing. However, these tools are designed to support and not measure wellbeing. The present study offers scholarly evidence on measuring digital wellbeing in the online context which could potentially contribute to future research on online screen use and wellbeing.

The scholarly domain offers several scales to measure wellbeing (Trifiro, 2018; Verduyn, 2015; Valkenberg et al., 2005); however, no existing scale measures 'digital wellbeing' that distinctly captures

various user perspectives across different situations. The lack of a standardised digital wellbeing scale is a critical gap in the literature (Przybylski et al., 2021). Owing to the increased imbalance between online and offline activities and growing evidence of deteriorated subjective wellbeing by other researchers, the study contributes to existing wellbeing literature with a robust digital wellbeing scale that measures the connection between wellbeing and the screen use of end-users. The study provides a standardised digital wellbeing scale that focuses on personal and social subjective evaluations of wellbeing in online settings. This distinguishes the digital wellbeing scale from generalised subjective wellbeing scales that are often adapted to the online context (Tennant et al., 2007), and allows researchers to measure wellbeing related to online screen use in a standardised manner. Further, the digital wellbeing scale developed in the study paves the way for research into the relationship between online wellbeing and overall subjective wellbeing (Ong et al., 2021).

The results of study 1 contribute to a clear conceptualisation of the digital wellbeing of end-users by defining digital wellbeing, identifying the underlying dimensions, and developing a valid measurement scale. Overall, this thesis enhances the empirical evidence on end-users' experiential states of digital wellbeing and facilitates knowledge development on digital wellbeing.

6.3.2 Study 2: Model testing

The digital wellbeing scale developed in study 1 was used to test a conceptual model capturing the hypothesised relationships of the main constructs in study 2. The direct and indirect effect of digital literacy via self-efficacy and online social capital was assessed. Further, the moderating effect of digital addiction was investigated. The study results indicated that the hypothesised relationships were supported by the data and revealed fresh insights into when and how digital literacy influences digital wellbeing. Thus, the thesis contributes to the theoretical foundation of digital wellbeing by developing and empirically testing a conceptual model that reflects the end-users experience of digital wellbeing.

(a) The direct effect of digital literacy

The first hypothesis was on the association between digital literacy and digital wellbeing. The present study empirically demonstrated that end-users with greater digital literacy skills experience a

higher level of digital wellbeing. This shows that end-users with digital literacy skills effectively utilise digital resources that potentially contribute to the experiential states of digital wellbeing, such as the states of emotional resilience, agency, social connection, and communion in the digital world. The positive impact on digital wellbeing is because digital literacy skills provide the ability to operate digital devices with an understanding of the digital environment. This ability is achieved by users having high technical and cognitive digital literacy skills. Increased digitalisation requires users to possess the technical and cognitive skillsets that enable effective functioning in the online world. The self-perceived digital literacy skills lead an end-user to positive ends amidst the continuous developments in digital technology. Previous studies have stated the importance of digital literacy in avoiding the harmful overuse of digital technology (Royo et al., 2019). Other studies have also identified that possessing digital literacy skills enhances mental wellbeing, reducing the risk of victimisation and addictive screen use (Bawden, 2008; Jin et al., 2020). The present study also reveals the positive impact of digital literacy on digital wellbeing, thus supporting H1. The study's findings contribute to the digital wellbeing literature by highlighting how digital wellbeing is positively related to digital literacy skills. Further, it advances the theoretical knowledge of how digital literacy works as a key antecedent in enhancing digital wellbeing.

(b) Mediating effects of self-efficacy and online social capital

The study adopted two complementary theories, social cognitive theory and social capital theory, to explain how personal and social factors mediate the balanced use of technology. This integration of two theoretical approaches is because social cognitive theory also views behaviour as partially constructed by social networks (Bandura, 1989). The online environment helps users with mutual goals and interests to engage in social interactions that help them gain information and knowledge. Hence, the current research incorporates both personal cognition and social interaction when studying the digital wellbeing of users.

The conceptual model postulated that self-efficacy and online social capital will mediate the effect of digital literacy on digital wellbeing. Therefore, H2 and H3 were concurrently tested. The second hypothesis (H2) stated that self-efficacy mediates the relationship between digital literacy and digital

wellbeing. The current study demonstrated that self-efficacy partially mediates the relationship between digital literacy and digital wellbeing. Hence, H2 was supported. This finding indicated that end-users need to significantly reinforce their digital literacy skills and self-efficacy to improve their digital wellbeing. A possible explanation for the positive mediating effect of self-efficacy is that end-users with self-efficacy can effectively manage their emotional and behavioural state in the digital world (Bandura, 1997; Maddux, 1999). They also tend to use problem-focused coping strategies and are less affected by stressful events (Kulviwat et al., 2014). Therefore, end-users with self-efficacy can engage in self-development goals and efficiently decide the course of action in their digital life.

The conceptual model in the study integrated the mediators of self-efficacy and online social capital and showed them to be an essential part of the experience of digital wellbeing. Hence, the third hypothesis (H3) stated that the effect of digital literacy on digital wellbeing is mediated through online social capital. The current study demonstrated that online social capital fully mediates the relationship between digital literacy and digital wellbeing. Hence, H3 was supported. The result showed that digital literacy predicts online social capital, which indicates digital wellbeing. The positive full mediation effect of online social capital suggested that end-users with high digital literacy can experience digital wellbeing via their online social capital. A digitally literate end-user is likely to experience digital wellbeing when they possess online social networks comprising both strong and weak social ties (Putnam, 1995, 2001). The mediating effect is because end-users with online social capital benefit from online social participation in that they experience social inclusion, receive social support, and feel reduced social isolation. This highlights the key role of social capital in alleviating the risk of loneliness and social isolation, which can negatively impact health and wellbeing in the online environment (Cornwell & Waite, 2009). This means that social connection and communion with online networks are important to the achievement of balanced screen use. Thus, the present study showed that digital literacy and social capital work in sequence; that is, digital literacy skills help end-users build the online social capital essential to achieving digital wellbeing.

Overall, the mediation analysis demonstrated the significant mediating effects of self-efficacy and online social capital on the relationship between digital literacy and digital wellbeing. Thus, the conceptual model presented in the study provides empirical evidence of how digital wellbeing can be enhanced in the ever-changing digital environment that persistently poses wellbeing challenges. Further, these results support the use of two complementary theories, social cognitive theory and social capital theory, by proving that personal cognition and social networks are essential to fostering digital wellbeing. Theoretically, this finding suggests that self-efficacy and online social capital are key drivers of digital wellbeing. This finding contributes to the existing digital wellbeing literature on the mechanisms (i.e., personal, and social) underlying the effect of digital literacy on digital wellbeing.

(c) Moderating effect of digital addiction

Further, the study tested the moderating effect of digital addiction on the linear relationship between digital literacy and digital wellbeing. The results showed a significant positive moderating effect; that is, the positive moderating impact of digital addiction significantly enhanced the relationship between digital literacy and digital wellbeing. Although the moderation result is significant, the study originally hypothesised a negative moderating effect; therefore, H4a was not supported because of the positive moderating effect revealed in the analysis. To interpret the positive moderating effect of digital addiction, the interaction effect of the slopes one standard deviation (S.D.) above and below the mean of the moderating variable (digital addiction) was plotted following the suggestion of Aiken et al. (1991). In Figure 5.2, it can be seen that the pattern of the interaction effect was in a positive direction, which was not consistent with H4a. Specifically, digital literacy (shown on the horizontal axis) had a stronger positive effect on digital wellbeing (shown on the vertical axis) when end-users exhibited high levels of digital addiction compared to those who exhibited low levels of digital addiction. The positive moderating effect of digital addiction on the relationship between digital literacy and digital wellbeing can be explained by an increasingly digitalised world that demands end-users stay connected constantly and adapt to new digital technology. The demands of constant connectivity can increase the dependence on digital world leading to addictive screen use, thereby affecting the digital wellbeing of end-users. Hence,

increased connectivity to the digital world requires users to possess high digital literacy skills such as technical, social, and cognitive skills, which are essential to thrive in the digital environment and to channel their digital consumption towards a state of digital wellbeing.

Moreover, the study hypothesised that digital addiction moderates the mediating effect of perceived self-efficacy (H4b) and online social capital (H4c) on digital wellbeing. The results showed that digital addiction did not significantly moderate the mediating effect of self-efficacy on digital wellbeing. This suggested that the indirect effect was not conditional on digital addiction. Contrary to the hypothesised relationship, the moderated mediation was insignificant. Hence H4b was not supported. To interpret the insignificant moderating mediation effect, the interaction effect of the slopes one standard deviation (S.D.) above and below the mean of the moderating variable (digital addiction) was plotted following the suggestion of Aiken et al. (1991). From Figure 5.3, it can be concluded that although the interaction effect pattern was positive, the moderated mediation effect was not significant. The positive insignificant moderating effect suggested that end-users with general self-efficacy beliefs also needed to improve their digital literacy skills to significantly enhance digital wellbeing. Hence, self-belief, skills, and abilities play a combined role in boosting digital wellbeing (Prior et al., 2016; Martin, 2006). This result implies that self-efficacy enhances digital wellbeing only when working concurrently with digital literacy irrespective of the level of digital addiction.

Next, the study hypothesised that digital addiction would moderate the mediating effect of online social capital on digital wellbeing (H4c). The results demonstrated that digital addiction positively moderated the mediating effect of online social capital on digital wellbeing. Hence, H4c was fully supported. This suggested that the indirect effect of digital literacy on digital wellbeing via social capital was conditional on digital addiction. To interpret the positive moderating effect of digital addiction, the interaction effect of the slopes one standard deviation (S.D.) above and below the mean of the moderating variable (digital addiction) was plotted following the suggestion of Aiken et al. (1991). In Figure 5.4, it can be seen that the pattern of the interaction effect was in a positive direction. Specifically, online social capital (shown on the horizontal axis) had a stronger positive effect on digital wellbeing (shown on the

vertical axis) when end-users exhibited high levels of digital addiction compared to those who exhibited low levels of digital addiction. The positive moderating effect can be explained by the role of online social capital in offering emotional support and reducing feelings of depression caused by increased screen use (Hwang & Kim, 2015). Existing studies have also shown that having online social networks effectively improve the mental health of end-users (Bessiere et al., 2008; Stefanone et al., 2012). As digital wellbeing comprises a state of social connection and communion with online networks that makes users feel good, it is vital to possess online social capital to achieve this state of digital wellbeing. Addicted users can draw help and support from their online connections, which could help make screen time a better experience. This proves the relevance of the significant moderated mediation results. These findings contribute to the existing theoretical knowledge on the key role of online social capital in enhancing the digital wellbeing of end-users who exhibit high digital addiction.

To summarise the theoretical implications, this study investigated the impact of digital literacy, self-efficacy, and online social capital on digital wellbeing as well as the moderating effect of digital addiction. Past studies have researched the importance of digital literacy, self-efficacy, and online social capital in relation to subjective wellbeing (Ong et al., 2021). However, an extensive review of the existing literature revealed that there is insufficient evidence to empirically show how digital wellbeing is influenced by a number of personal and social circumstances. This is partly because the conceptual and measurement issues involved in researching the relationship between digital wellbeing and related constructs have been impeded. This thesis addressed the conceptual clash issue in study 1, and the conceptual model testing in study 2 revealed the significance of personal and social constructs in enhancing digital wellbeing.

Although past literature has identified that digital literacy has an indirect effect on quality of life and wellbeing (Soundararajan et al., 2022; Vissenberg et al., 2022), the current study found that digital literacy had a significant direct effect on increasing digital wellbeing. This finding contributes to the existing limited research on the importance of the defensive role played by digital literacy in enhancing digital wellbeing. While there is enough evidence in the existing literature on the positive association

between self-efficacy and psychological wellbeing (Chen et al., 2010; Eastin & LaRose, 2000), there is a lack of empirical evidence on the mediating role of self-efficacy in enhancing digital wellbeing. The results of the present study addressed this by showing the significant mediating effect of self-efficacy on digital wellbeing. Therefore, this finding provides empirical evidence of how digitally literate users can thrive in the digital world by enhancing their levels of self-efficacy. Further, this study offers significant theoretical insights into the role of personal factors in supporting users' digital wellbeing. Earlier research has proved that online social capital has a positive effect on both psychological and overall wellbeing (Arezzo & Giudici, 2017). Nevertheless, the effect of online social capital on the digital wellbeing of users was identified by this study as a gap to be addressed. The study found a significant mediating effect of online social capital on digital wellbeing. This therefore provides empirical evidence that users must channel their digital literacy skills to maintain online social connections and thereby support their digital wellbeing. Moreover, these findings provide a theoretical understanding of the supporting role of online social capital in enhancing digital wellbeing, proving social factors to be a fundamental mechanism in exploring digital wellbeing.

Past studies have found that digital addiction results in a poor emotional condition, anxiety, fatigue, depression, and disorientation in daily routines (Brand et al., 2016; Elhai et al., 2016; Ho et al., 2014; Lin et al., 2014) and thus decreases psychological wellbeing. So far, there is insufficient evidence of the moderating effect of addiction on the relationship between digital literacy and digital wellbeing. Considering the impact of addiction, this study expected to find it had a negative moderating effect on the relationship between digital literacy and digital wellbeing. However, the study actually found that digital addiction had a positive moderating effect which implies that addicted users must greatly enhance their digital literacy skills to increase digital wellbeing. Past studies have identified that although online social capital can positively influence wellbeing (Horwood & Anglim, 2019; Sun et al., 2020), addictive use has negative consequences (Stieger et al., 2013). Consequently, the present study expected online social capital to have a negative moderated mediation effect. However, the study found it had a significantly positive moderated mediation effect. These findings contribute to the theoretical understanding of how

addicted users must greatly refine their digital literacy skills and online social capital to foster their digital wellbeing. Investigation into past research revealed that a strong relationship between self-efficacy and digital addiction results in a decrease in wellbeing, although some studies have provided mixed findings dependent on the levels of self-efficacy and addiction (Berte et al., 2019; Ebrahim et al., 2022). Nonetheless, there is no empirical evidence of the moderated mediation of digital addiction on digital wellbeing when mediated by self-efficacy. The findings of the current study revealed an insignificant positive effect that implies digitally addicted users must focus more on gaining digital literacy skills than on their levels of self-efficacy in order to improve digital wellbeing.

Overall, the results contribute to the existing theoretical understanding of digital wellbeing by disclosing the important role of users' personal and social circumstances in increasing digital wellbeing, the positive moderating effect of digital addiction on digital literacy, and the positive moderating effect of online social capital on digital wellbeing amongst highly addicted users. Further, the results showed that the moderating effect of digital addiction on self-efficacy is insignificant for users with a high level of addiction. Therefore, highly addicted users must reinforce their digital literacy skills and online social connections to experience digital wellbeing.

6.4 Methodological contribution

This study significantly contributes to theory in terms of the development of a digital wellbeing scale. There are currently no existing scales to measure digital wellbeing and the present study contributes to the existing marketing literature by providing a digital wellbeing scale with 13 items and four dimensions. All items are measured on a 7-point Likert scale that uses positive scoring. In general, positive scoring is more intuitive and easier to understand than negative scoring as an increase in wellbeing is more desirable than a decrease (Zhen et al., 2021). The digital wellbeing scale provides a subjective evaluation of the impact of screen use on wellbeing. The digital wellbeing scale can assist researchers and scholars in further investigating the phenomenon of screen use and wellbeing. Additionally, using this scale may reduce internal and external validity issues that arise when adapting

existing scales to the online context. Thus, the digital wellbeing scale developed in the study pertains to the online context and measures the effects of screen time on users' wellbeing, including assessing users' emotional resilience, agency over screen use, social connection, and communion with the digital world.

6.5 Managerial implications

6.5.1 For marketers

The results of the study contribute to the marketing effort to design digital wellbeing interventions that help users balance their screen time and make their screen time a better experience. The study offers valuable insights to tech companies, encouraging them to think beyond the development of self-monitoring habits of screen use and instead focus on an end-user's personal and social circumstances. Based on the present study's findings, marketers must incorporate end-users personal cognition and online social interactions when designing digital wellbeing apps. This means that digital wellbeing apps must capture users' current state of screen use based on their circumstances. Such an approach focuses on subjectively enhancing health and wellbeing rather than objectively reporting excessive use. This will enable end-users to have a healthy relationship with the digital world in their daily lives.

Moreover, the study provides new insights into the experiential states of digital wellbeing that must be considered when developing digital wellbeing solutions. The study suggests considering end-users' states of emotional resilience, agency, social connection, and communion when designing digital wellbeing solutions. Understanding these states of digital wellbeing will guide marketers in offering personalised solutions to end-users based on their current state of digital wellbeing. Further, marketers can intervene in enhancing digital wellbeing by influencing these experiential states to create better screen time for users. This will help in understanding and monitoring consumers' behaviour, such as their coping strategies, level of control, emotional strength to withstand challenges, and online social connectivity. Furthermore, such solutions are highly likely to benefit users that struggle to find balance in online screen use. Lastly, this implication would help build a healthy relationship between digital marketers and end-users, thereby promoting trust and confidence.

Recent research has increasingly focused on improving the digital skills of users to manage the demands of constant connectivity (Gui et al., 2017; Hargittai & Micheli, 2019; Nguyen, 2021). The current study's findings suggest that marketers launching digital services and products must first aim to understand and enrich the digital literacy skills of users. This is because, as per the findings, it is essential that end-users possess digital literacy skills to navigate and manage constantly changing digital services and devices. Further, this implication is more significant among users that already exhibit high digital addiction. Therefore, marketers need to take a combative approach toward reducing digital addiction by increasing awareness and encouraging digital literacy skills. This study provides insights to marketers keen on digital wellbeing solutions with advice on fostering the digital wellbeing of users exhibiting high addiction, such as improved communication on the beneficial role of digital literacy and the promotion of supportive online social networks to thrive in the digital world. This will help marketers to address the growing addiction issues and help them create a sustainable and healthy relationship with users. Finally, the study significantly contributes to the marketing effort with a robust conceptual model that shows how end-users attain digital wellbeing. It is suggested that this framework is the foundation for any digital wellbeing initiatives in marketing as it enables marketers to more deeply understand end-users' circumstances and thereby to provided them with personalised solutions.

6.5.2 Policymakers and government bodies

As the demand for digital services and content continues to grow, regulatory bodies must be sober and vigilant about the harms of screen time, such as digital addiction (DCMS, 2019). The lack of a standardised tool to measure the impact of screen time on wellbeing in the online context has been a significant impediment to policy implementation. The current study's findings provide a research tool that enables a systematic assessment of digital wellbeing in the online environment. This scale addresses the policy gaps by focusing on the subjective evaluation of the cognitive, affective, and social elements involved in online life.

The study informs policymakers and regulatory bodies of the experiential states of digital wellbeing, based on which new legislation can be implemented to reduce the negative impact of screen

use and digital addiction. Specifically, the study addresses policy gaps by presenting the circumstances that promote emotional resilience, agency, social connection, and communion in the online environment.

The study offers policy makers and regulatory bodies a measurement tool that could potentially help in assessing the impact of any new legislation implemented in the digital world. For example, the tool may assess how new legislation impacts the increase in online wellbeing and the decrease in online harm.

Further, the findings of the study have a vital policy implication in that they point to the need to increase awareness of digital literacy skills among all end-users, particularly among those exhibiting a high level of addiction as the results show that digital literacy skills promote digital wellbeing, especially for users with a high level of digital addiction. As well as the beneficial effects of digital literacy, online social networking also increases the digital wellbeing of addicted users. The online world can consist of groups that show hatred, violence, immorality, and illegal behaviours. Hence, developing online social capital and trust should be included in the research and policy agenda seeking to promote digital wellbeing.

Based on the participants' demographic profile in the study, these policy implications are more relevant for users aged between 25 to 34. Therefore, the study's implications are viable for this category of users, thus helping policymakers to provide gender and age-based policies. Overall, new legislation that promotes digital literacy skills and online social networking is needed to regulate and reduce the harm of imbalanced screen use and its impact on wellbeing. This would specifically help addicted end-users to achieve an optimal balance in screen use.

6.5.3 For End-users

The present study investigated digital wellbeing experiences from the perspective of subject matter experts, academics, and end-users. The results indicated that the experiential states of digital wellbeing – that is, the states of emotional resilience, agency, social connection, and communion – can potentially help end-users to understand their digital wellbeing status. Further, the conceptual model revealed the significant role of digital literacy, self-efficacy, and online social capital in enhancing digital

wellbeing. These findings will help end-users assess their personal and social circumstances and reinforce the need for digital wellbeing. The results might also help end-users gain more awareness of their screen use, their mental stability to handle wellbeing challenges, and their relationship with online social networks. Thus, the study provides all end-users with fresh insights on their path to digital wellbeing.

Moreover, the key findings revealed the role of digital literacy and online social capital in fostering digital wellbeing amongst addicted users. The results of the study will potentially help end-users who recognise that they are highly addicted to screen use to sharpen their digital literacy skills and reinforce their online social capital to reduce the problem of digital addiction. This will help them attain optimal balance in their screen use and is likely to reduce their sense of guilt over their addiction.

6.6 Research limitations

Several limitations of this study are noteworthy. The research interviews (study 1) were conducted over Zoom and Teams, in Auckland, New Zealand, because of the pandemic lockdown. Likewise, online surveys for scale development (study 1) and model testing (study 2) were done through MTurk, a research company, to recruit participants from the US. The ethnic confinement of the sample in the surveys (study 1 & 2) means that the results cannot be generalised to other ethnic groups and may not clearly represent the general population.

Secondly, the measure used in study 2 for digital addiction was adapted from social media addiction to match the context of the study, i.e., general screen use. Originally, this scale was negatively phrased, and thus a higher score implied higher digital addiction. Hence, there is a need to carefully interpret the results of the effects of addiction in the conceptual model. Thirdly, although the outcome of the qualitative analysis was discussed with the supervisor to ensure accuracy, nevertheless, trustworthiness issues may still arise when a single coder is involved.

Another limitation is the cross-sectional nature of the study which does not help in determining the cause-and-effect relationship between the main constructs. Therefore, empirical evidence of digital

wellbeing experiences can be strengthened by conducting longitudinal studies that capture the screen use pattern of end-users over a period of time and this would help in producing more consistent results.

The study posits self-efficacy as a mediator to analyse the underlying mechanisms in attaining digital wellbeing. However, self-efficacy as a moderator would allow for a nuanced understanding of how personal factors can influence the strength and direction of the relationship between digital literacy and digital wellbeing.

Self-efficacy and online social capital were used as mediator to understand how it can enhance digital wellbeing. However, the key constructs digital literacy, self-efficacy, and online social capital can be used as antecedents to further examine their interactive effects on digital wellbeing.

6.7 Future research direction

The digital wellbeing scale developed in the study was tested on a sample of end-users. Future work can use this scale on specific types of end-users, such as regular gamers, content creators, social media influencers, etc. with different demographic profiles to assess the validity of the scale.

The study aimed to test the impact of digital literacy on digital wellbeing using higher-level constructs and the results of the study confirmed digital literacy as the key antecedent of enhanced digital wellbeing. However, the effect of each digital literacy skill – technical, cognitive, and socio-emotional – on digital wellbeing is yet to be assessed and must be included in future research. Recent research has continued to focus on the digital skills essential to navigating and managing the digital world without referring to the need to reduce excessive use (Hargittai & Micheli, 2019; Nguyen, 2021). Therefore, assessing the impact of each skill would reveal the significant role of the different digital literacy skills in fostering digital wellbeing.

The study demonstrated that self-efficacy and online social capital are significant mediators. However, the present study proved the effects of general self-efficacy only and the impact of computer self-efficacy (Compeau & Higgins, 1995) and internet self-efficacy (Eastin & LaRose, 2000) on digital wellbeing are yet to be tested. Using online measures of self-efficacy would render valuable insights into

digital wellbeing experiences. The findings of the present study showed that personal circumstances play a role in influencing digital wellbeing. Considering the positive impact of self-efficacy on digital wellbeing, future research must test how other personal circumstances, such as self-esteem (Bedrov & Bulaj, 2018), self-regulation (Dennis, 2021), and self-control (Lyngs, 2019), impact screen use and digital wellbeing.

As part of the aim of the study, the impact of online social capital on digital wellbeing was tested using higher-level constructs. However, the effect of each dimension, i.e., bonding and bridging capital, on digital wellbeing is yet to be tested. Future research can test the relevance of each dimension in enhancing digital wellbeing. The results of the study showed that online social capital is a significant mediator of digital wellbeing. Considering the positive effect of online social capital, future work can focus on the effects of other social factors such as online social support (Kraut et al., 1998; Shaw & Gant, 2002) on digital wellbeing.

Similarly, the study aimed to address what variables impact the digital wellbeing construct only. In the model testing, therefore, digital wellbeing was analysed using higher-level constructs, i.e., the states of emotional resilience, agency, social connection, and communion. Future research must identify how screen use impacts each state of digital wellbeing. This will help assess its full impact on digital wellbeing and will likely contribute to the existing literature on the direct relationship between screen use and each dimension of digital wellbeing.

The current study investigated the impact of general screen addiction on digital wellbeing and identified that digital literacy and online social capital are essential resources by which addicted users can enhance their digital wellbeing. A possible future research direction will be to assess the impact of online gaming addiction (Festl et al., 2013), social media addiction (Zhao, 2021), online gambling addiction (Meng et al., 2022), smartphone addiction (Zhitomirsky-Geffet & Blau, 2016) etc., on digital wellbeing to understand the significance of each type of addiction. This will help in policy implementation for specific kinds of addictions.

To further advance the theoretical contribution of the current study, an upgraded methodology is required to capture individuals' experience of digital consumption. This is because past studies have pointed to the inaccuracies in self-reporting tools on the topic of screen use and wellbeing (Sewall et al., 2020). Therefore, data collection methods such as diary interviews (Lupinacci, 2020), understanding digital activities through device logs (Parry et al., 2021), and digital ethnographies (Valasek's, 2022) must be incorporated into future studies on digital wellbeing. This methodological upgrading will enable researchers and scholars to more accurately capture users' subjective state of wellbeing and understand their general digital practices. This will pave the way for enhancing the empirical evidence of digital wellbeing experiences demonstrated in this study.

Another way to carry forward this research is to focus on issues of digital inequality (Valasek, 2022) and its relationship with digital wellbeing. It will be a valuable addition to the existing literature to assess how digitally disadvantaged groups experience digital wellbeing. Future studies can use the digital wellbeing scale to quantitively evaluate the digital wellbeing of underprivileged segments along with other qualitative research techniques.

Recent studies have found that digital wellbeing experiences differ between users' cultural, social, and technical circumstances (Thomas et al., 2022). Study 2 used a US sample only to test the conceptual model. Therefore, future work must concentrate on assessing the digital wellbeing experiences of users with different social, cultural, and technical backgrounds to compare and contrast the impact on digital wellbeing.

Finally, owing to increasing digitalisation and the demands of constant connectivity, research into digital wellbeing is even more critical to protect and enhance the wellbeing of all users. Based on the findings, this study tried to outline several directions for future research that will potentially extend the theoretical and practical knowledge of digital wellbeing in the existing literature.

6.8 Concluding remarks

The impact on internet users of increasing digitalisation and constant connectivity led to this research on digital wellbeing. A mixed method research design was used to address the research questions in the study. This study contributes to the marketing literature by providing an anecdotal conceptualisation of digital wellbeing and a psychometrically sound digital wellbeing scale that measures the impact of digital consumption on the wellbeing of users. Moreover, this study provides a theoretical framework on how end-users attain digital wellbeing in the 21st century. The findings revealed that digital literacy skills, directly and indirectly, increase digital wellbeing via self-efficacy and online social capital. Thus, the study contributes to the marketing literature on the beneficial role of the mediators self-efficacy and online social capital in attaining digital wellbeing. Further, the findings showed that the direct and indirect positive effects of digital literacy on digital wellbeing are more effective for end-users who exhibit high screen time addiction than for users with low screen time addiction. Thus, the results have important policy implications regarding addicted end-users, who need to increase their digital literacy skills, online social capital, and self-efficacy beliefs in order to attain a state of digital wellbeing.

The theoretical model in the study offers a solid foundation for further research into digital wellbeing, which has been at an impasse for a considerable period of time owing to measurement and methodological constraints (Abeele, 2022). Researchers and scholars can utilise the digital wellbeing scale developed in the study to investigate increasing concerns around screen use and wellbeing. Further, the study offers theoretical insights into the role of end users' personal and social circumstances and the impact on their digital wellbeing. Hence, the study points to the need for further research on other personal and social factors that might potentially impact digital wellbeing. Moreover, the study demonstrated the significance of digital wellbeing for addicted users. The study sheds light on a pathway towards balanced screen use for those end-users that struggle with excessive screen use and digital consumption overload. This must be further tested with users with different types of addiction, for example, online gaming addiction, social media addiction, etc. In conclusion, this study addressed all the research questions and the findings contribute fresh insights into theory and practice. Future research is

warranted to advance theoretical knowledge on the subject by investigating the role of digital wellbeing in different contexts and circumstances.

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Appendices

Appendix A: Study 1 Scale Development Ethics Approval

Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

11 August 2021

Crystal Yap
Faculty of Business Economics and Law

Dear Crystal

Re Ethics Application: **21/263 Digital wellbeing in the 21st century: A scale development and integrative model testing**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 11 August 2024.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.

3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat

Auckland University of Technology Ethics Committee

Cc: cpriyank@aut.ac.nz; katharine.jones@aut.ac.nz

Appendix **B: Interview guide**

Interview guide for subject matter experts:

The study uses semi structured in-depth interviews to develop a digital wellbeing scale that measures the dimensions that define and explain the construct.

Opening questions:

- This interview is going to be about your understanding of the idea digital wellbeing.
- Could you please tell me more about your work?
- Please share your general views on the digital wellbeing of users.
- The interview will take around 60 to 90 minutes. Are you available to respond to questions now?

Body:

- Can you describe a typical (routine) screen use that is healthy?
- Could you tell me about the connection between (and describe) a user's online activities to wellbeing?
- Please tell me about the connection between screen use and physical health?
- Please tell me about the connection between screen use and mental health?
- Please share your views on users' online activities that impact the society. (good/bad)
- Could you tell me what sort of screen use (engagement pattern) is associated with healthy usage?
- Can you share with me the considerations needed for achieving healthy online screen use? (What can a person do to achieve balanced use of screen time…)
- What does it mean by balance in screen use ?
- Do you know a person who has a great balance in screen use? Describe that person's online and offline routine (probe).
- Please use three words that describes a person's wellbeing.
- Please tell me what is (Happiness/satisfaction/QOL/wellbeing...) in online life?
- Could you tell me what comes to your mind when you think of online wellbeing in the 21st century?
- Can you name [and describe] a few things that describe user's online wellbeing?
- Could you tell me more about aspects influencing online wellbeing?
- Could you tell me what other ideas/concepts are connected to a person's online wellbeing?
- Can you tell me how online wellbeing is associated with other dimensions of wellbeing?
- Now that you can relate to online wellbeing, could you please use one or two sentence/s to describe online wellbeing.
- Can you tell me about (and mention) the feelings associated with screen use and offline routines?
- Please use a metaphor to describe the balance between online and offline life.

Engage and make sure the conversation is flowing: Could you say some more about it please? What do you mean by that? Tell me more about this please. Describe this...

Closing:

Are you willing to be contacted if there is a need for further information/clarifications?

Are there any questions that you have for me? I appreciate the time you took for this interview with me.

Thanks for your involvement.

Interview guide for Academics informants:

The study uses semi structured in-depth interviews to develop a digital wellbeing scale that measures the dimensions that define and explain the construct.

Opening questions:

- This interview is going to be about your understanding of the idea digital wellbeing.
- Could you please tell me more about your work?
- Please share your general views on the digital wellbeing of users.
- The interview will take around 60 to 90 minutes. Are you available to respond to questions now?

Body:

- Can you describe a typical (routine) screen use that is healthy?
- Could you tell me about the connection between (and describe) a user's online activities to wellbeing?
- Please tell me about the connection between screen use and physical health?
- Please tell me about the connection between screen use and mental health?
- Please share your views on users' online activities that impact the society. (good/bad)
- Could you tell me what sort of screen use (engagement pattern) is associated with healthy usage?
- Can you share with me the considerations needed for achieving healthy online screen use? (What can a person do to achieve balanced use of screen time…)
- What does it mean by balance in screen use.
- Do you know a person who has a great balance in screen use? Describe that person's online and offline routine.
- Please use three words that describes a person's wellbeing.
- Please tell me what is (Happiness/satisfaction/QOL/wellbeing...) in online life?
- Could you tell me what comes to your mind when you think of online wellbeing in the 21st century?
- Can you name [and describe] a few things that describe user's online wellbeing?
- Could you tell me more about aspects influencing online wellbeing?
- Could you tell me what other ideas/concepts are connected to a person's online wellbeing?
- Can you tell me how online wellbeing is associated with other dimensions of wellbeing?
- Now that you can relate to online wellbeing, could you please use one or two sentence/s to describe online wellbeing.
- Can you tell me about (and mention) the feelings associated with screen use and offline routines?
- Please use a metaphor to describe the balance between online and offline life.

Engage and make sure the conversation is flowing: Could you say some more about it please? What do you mean by that? Tell me more about this please. Describe this...

Closing:

Are you willing to be contacted if there is a need for further information/clarifications?

Are there any questions that you have for me? I appreciate the time you took for this interview with me.

Thanks for your involvement.

Interview guide for End-user's informants:

The study uses semi structured in-depth interviews to develop a digital wellbeing scale that measures the dimensions that define and explain the construct.

Opening questions:

- This interview is going to be about your understanding and experiences of digital consumption.
- Could you please tell me about what smart devices you use daily?
- What is the average time you spend online?
- What digital services/apps do you use frequently?
- Describe a typical day with your smart devices. In other words what are your daily online routines (describe your typical online life)
- The interview will take around 90 minutes. Are you available to respond to questions now?
- Engage and make sure the conversation is flowing: Could you say some more about it please? What do you mean by that? Tell me more about this please. Describe this...

Body:

- Please use three words to describe your current wellbeing.
- Could you tell me what comes to your mind when your online wellbeing in the 21st century? Please describe them in three words.
- Can you describe a person that experiences happiness/satisfaction online? Can you show me a few personalities?
- Could you tell me more about factors influencing a person's online satisfaction/happiness?
- Could you tell what other ideas you can associate with your online happiness/satisfaction.
- Please draw a picture/select a picture that reflects the state of your current online wellbeing?
- Can you please elaborate on your drawing/picture selection?
- What makes you to associate online wellbeing with this picture?
- What was on your mind when you drew/selected this picture?
- What is the best part of this picture?
- Could you please share with me your digital screen use routine?

- Have you ever felt your online screen use distracting you from your offline routine? If yes, can you share a scenario.
- Can you recollect (and describe) any outcomes of your screen use?
- Could you tell me how your screen use/online activities relate to your wellbeing/happiness? scenario?
- Please tell me how a person's screen use is connected to health(mental/physical).
- Could you tell me about some online activities that impact the society? please share a scenario.
- Please tell me how you manage to control your digital screen use. If any, please can you describe with some scenarios.
- Could you tell me about your online and offline routines?
- Can you tell me the moment that made you feel reasonable about your screen use (balanced feeling)?
- What do you think is the most important factor to achieve this balance?
- Please describe your online wellbeing in three or more words.
- Now that you can relate to the idea of online wellbeing, could you please use one or two sentence/s to describe a person's online wellbeing.

Engage and make sure the conversation is flowing: Could you say some more about it please? What do you mean by that? Tell me more about this please. Describe this...

Closing:

- Are you willing to be contacted if there is a need for further information/clarifications?
- Are there any questions that you have for me? I appreciate the time you took for this interview with me.

  Thanks for your involvement.

Appendix C: Consent form

Consent Form

Project title: *Digital wellbeing in the 21st century: A scale development and integrative model testing*

Project Supervisor: ***Dr Crystal Yap***

Researcher: ***Caroline Priyanka***

- ○ I have read and understood the information provided about this research project in the Information Sheet dated 11/08/2021.
- ○ I have had an opportunity to ask questions and to have them answered.
- ○ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ○ I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without being disadvantaged in any way.
- ○ I understand that if I withdraw from the study then I will be offered the choice between having any data that is identifiable as belonging to me removed or allowing it to continue to be used. However, once the findings have been produced, removal of my data may not be possible.
- ○ I agree to take part in this research.
- ○ I wish to receive a summary of the research findings (please tick one): Yes○ No○
- ○ I am willing to be re-contacted for further clarification and information (please tick one): Yes○ No○

Participant's signature: .....

Participant's name: .....

Participant's Contact Details (if appropriate):

……..

……..

……..

……..

Date:

Approved by the Auckland University of Technology Ethics Committee on 11/08/2021 AUTEC Reference number 21/263

Note: The Participant should retain a copy of this form.

Appendix D: Participant information sheet for Subject matter experts

Participant Information Sheet

Date Information Sheet Produced:

11/08/2021

Project Title

Digital wellbeing in the 21st century: A scale development and integrative model testing.

An Invitation

My name is Caroline Priyanka, and I am a Ph.D. student in the Department of Marketing at AUT University, Auckland, New Zealand. I would like to invite you to participate in my research on digital wellbeing in the 21st century. Participation in this research is voluntary and all information collected will be kept confidential. You may withdraw your participation any time before the completion of the research project.

What is the purpose of this research?

The research seeks to explore the digital consumption experience of end-users. Primarily, the research aims to conceptualise and identify the dimensions that define digital wellbeing and develop a scale to measure digital wellbeing. The study is conducted as a PhD thesis requirement at AUT University in New Zealand. The findings of this research may be used for academic publications and presentations.

How was I identified and why am I being invited to participate in this research?

You were mainly identified as you are a digital expert such as user interface designer and developer, business intelligence analyst, customer insights analyst, etc., who work on developing digital services and platforms. Based on this information, I would like to request your voluntary consent to participate in the study. Anyone not having digital presence is excluded from participating in the study.

How do I agree to participate in this research?

You can agree to participate in this research by emailing me your response at cpriyank@aut.ac.nz. Attached along with this document is a copy of the Participant Consent form. If you agree to participate in this research, please sign the consent form and email it back to me at cpriyank@aut.ac.nz. Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

Following your acceptance to take part in this study, you will take part in an in-depth interview. The schedule of the interview would be sent to you.

1) In-depth interviews: usually take 60-90 minutes. All interviews will be conducted online, and audio recorded. You will not be asked to provide any personal identifying information, you online IDs or email

address will remain confidential, and pseudonyms will be used in the final reporting. At the end of the interview session, you will be asked about your willingness to be re-contacted for further clarification/information.

What are the discomforts and risks?

There will not be any discomforts and risks associated with participating in the research. For the interviews, I can assure you that the questions are non-invasive as we are not seeking a level of detail that may identify you or create any discomfort.

How will these discomforts and risks be alleviated?

Participation is voluntary and if for any reason you feel uncomfortable, you are able to decline answering certain questions, or even withdraw from the research project at any time prior to the study's completion without any consequences. Additionally, you will have the opportunity of choosing a suitable time for participation to take place.

What are the benefits?

This research seeks to conceptualise and develop a scale for measuring digital wellbeing. This study adopts a in-depth interviews for data collection. The study will assist end-users to build a healthy relationship with technology by gauging their level of digital consumption in a fast-paced digital life. Marketers will be able to tailor their digital products, services, and communication to support the digital wellbeing of end-users. Other relevant stakeholders such as digital services designer and developers may use the knowledge of what underpins the dimension of digital wellbeing in designing interventions aimed at fostering digital wellbeing.

To develop a digital wellbeing scale, in-depth interviews will be conducted with subject matter experts, academics, and end-users. The scale development process wil include establishing clarity, relevance, comprehensiveness, and specificity in item statements for measuring digital wellbeing. The study concludes with developing a valid and reliable digital wellbeing scale.

You will receive NZ$30 as Koha for taking part in the interview. You will also have access to the results of the research and may use this information to add to your understanding of other end-users' experiences and feelings associated with digital wellbeing. This research will allow me as the primary researcher, to fulfil the requirement for the award of Ph.D. from AUT University, Auckland, New Zealand.

How will my privacy be protected?

Participation in this study is strictly voluntary. Your identity will remain confidential and will not be disclosed to anyone except to the primary researcher and project supervisor. To ensure privacy and confidentiality, your name or online ID will be changed to pseudonyms and contact information will not be disclosed in final reporting. Any data that the researcher extracts from the interview is for academic use only and all reports or published findings will not, under any circumstance, contain names or identifying characteristics. All data will be stored on a password protected memory stick and consent forms will be stored in a password protected cabinet with the project supervisor after the project is completed. Data and consent forms will be deleted after a period of six years. Contact details of the researcher and supervisor are provided in case of any concerns or complaints that need to be lodged.

What are the costs of participating in this research?

There are no costs to you other than your time to participate in the study. Interviews will take about 60 to 90 minutes.

What opportunity do I have to consider this invitation?

You can take your time to decide if you wish to participate in the research. However, it would be appreciated if you could respond within two weeks' time from the date the invitation is sent. You have the choice of selecting the most appropriate time from date options sent by the researcher for the interview.

Will I receive feedback on the results of this research?

By completing a Consent Form or by responding to the invitation email, you may tick the box showing your interest in receiving feedback on the research's results. For interviewees, a result synopsis will be emailed to you once the study is complete.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Crystal Yap, crystal.yap@aut.ac.nz, +64 9 921 9999 ext 5800.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Dr Carina Meares, *ethics@aut.ac.nz*, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Primary researcher: Caroline Priyanka (cpriyank@aut.ac.nz)

Project Supervisor Contact Details:

Project Supervisors: Dr Crystal Yap (crystal.yap@aut.ac.nz), +64 9 921 9999 ext 5800

Secondary supervisor: Dr Katharine Jones (katharine.jones@aut.ac.nz), +64 9 921 9999 ext 5036

Approved by the Auckland University of Technology Ethics Committee on *11/08/2021*, AUTEC Reference number *21/263*.

Appendix E: Participant information sheet for Academics

Participant Information Sheet

Date Information Sheet Produced:

11/08/2021

Project Title

Digital wellbeing in the 21st century: A scale development and integrative model testing.

An Invitation

My name is Caroline Priyanka, and I am a PhD student in the Department of Marketing at AUT University, Auckland, New Zealand. I would like to invite you to participate in my research on digital wellbeing in the 21st century. Participation in this research is voluntary and all information collected will be kept confidential. You may withdraw your participation any time before the completion of the research project.

What is the purpose of this research?

The research seeks to explore the digital consumption experience of end-users. Primarily, the research aims to conceptualise and identify the dimensions that define digital wellbeing and develop a scale to measure digital wellbeing of end-users. The study is conducted as a PhD thesis requirement at AUT University in New Zealand. The findings of this research may be used for academic publications and presentations.

How was I identified and why am I being invited to participate in this research?

You were mainly identified as you are a researcher and scholar specialising in wellbeing and online consumer behaviour. Based on this information, I would like to request your voluntary consent to participate in the study. Anyone not having digital presence is excluded from participating in the study.

How do I agree to participate in this research?

You can agree to participate in this research by emailing me your response at cpriyank@aut.ac.nz. Attached along with this document is a copy of the Participant Consent form. If you agree to participate in this research, please sign the consent form and email it back to me at cpriyank@aut.ac.nz. Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

Following your acceptance to take part in this study, you will take part in an in-depth interview. The schedule of the interview would be sent to you.

2) In-depth interviews: usually take 60-90 minutes. All interviews will be conducted online, and audio recorded. You will not be asked to provide any personal identifying information, your online IDs or email address will remain confidential, and pseudonyms will be used in the final reporting. At the end of the

interview session, you will be asked about your willingness to be re-contacted for further clarification/information.

What are the discomforts and risks?

There will not be any discomforts and risks associated with participating in the research. For the interviews, I can assure you that the questions are non-invasive as we are not seeking a level of detail that may identify you or create any discomfort.

How will these discomforts and risks be alleviated?

Participation is voluntary and if for any reason you feel uncomfortable, you are able to decline answering certain questions, or even withdraw from the research project at any time prior to the study's completion without any consequences. Additionally, you will have the opportunity of choosing a suitable time for participation to take place.

What are the benefits?

This research seeks to conceptualise and develop a scale for measuring digital wellbeing. This study adopts a mixed-method design to address the research problem, including semi-structured in-depth interviews and an online survey. The study advances the theoretical understanding of digital wellbeing, which is lacking in the marketing literature. Academicians and scholars may widen the scope of the research by assessing the digital wellbeing of users with diverse backgrounds. The study will develop a digital wellbeing scale that measures boundaries between real and online lives, thereby contributing to the academic body of knowledge a valid scale that precisely measures digital wellbeing. Overall, the study offers scope for further research by extending the literature on the digital wellbeing of end-users. The study will assist end-users to build a healthy relationship with technology by gauging their level of digital wellbeing in a fast-paced digital life.

To develop a digital wellbeing scale, in-depth interviews will be conducted with subject matter experts, academics, and end-users. The study will use abductive thematic analysis. The insights gathered from the thematic analysis will be used to develop the item statements for measuring digital wellbeing. The scale development process will include establishing clarity, relevance, comprehensiveness, and specificity. The study concludes with developing a valid and reliable digital wellbeing scale.

You will receive NZ$30 as Koha for taking part in the interview. You will also have access to the results of the research and may use this information to add to your understanding of other end-users' experiences and feelings associated with digital wellbeing. This research will allow me as the primary researcher, to fulfil the requirement for the award of Ph.D. from AUT University, Auckland, New Zealand.

How will my privacy be protected?

Participation in this study is strictly voluntary. Your identity will remain confidential and will not be disclosed to anyone except to the primary researcher and project supervisor. To ensure privacy and confidentiality, your name or online ID will be changed to pseudonyms and contact information will not be disclosed in final reporting. Any data that the researcher extracts from the interview is for academic use only and all reports or published findings will not, under any circumstance, contain names or identifying characteristics. All data will be stored on a password protected memory stick and consent forms will be stored in a password protected cabinet with the project supervisor after the project is completed. Data and consent forms will be deleted after a period of six years. Contact details of the researcher and supervisor are provided in case of any concerns or complaints that need to be lodged.

What are the costs of participating in this research?

There are no costs to you other than your time to participate in the study. Interviews will take about 60 to 90 minutes.

What opportunity do I have to consider this invitation?

You can take your time to decide if you wish to participate in the research. However, it would be appreciated if you could respond within two weeks' time from the date the invitation is sent. You have the choice of selecting the most appropriate time from date options sent by the researcher for the interview.

Will I receive feedback on the results of this research?

By completing a Consent Form or by responding to the invitation email, you may tick the box showing your interest in receiving feedback on the research's results. For interviewees, a result synopsis will be emailed to you once the study is complete.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Crystal Yap, crystal.yap@aut.ac.nz, +64 9 921 9999 ext 5800.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Dr Carina Meares, *ethics@aut.ac.nz*, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Primary researcher: Caroline Priyanka (cpriyank@aut.ac.nz)

Project Supervisor Contact Details:

Project Supervisors: Dr Crystal Yap (crystal.yap@aut.ac.nz), +64 9 921 9999 ext 5800

Secondary supervisor: Dr Katharine Jones (katharine.jones@aut.ac.nz), +64 9 921 9999 ext 5036

Approved by the Auckland University of Technology Ethics Committee on *11/08/2021*, AUTEC Reference number *21/263*.

Appendix F: Participant information sheet for End-users

Participant Information Sheet

Date Information Sheet Produced:

11/08/2021

Project Title

Digital wellbeing in the 21st century: A scale development and integrative model testing.

An Invitation

My name is Caroline Priyanka, and I am a PhD student in the Department of Marketing at AUT University, Auckland, New Zealand. I would like to invite you to participate in my research on digital wellbeing in the 21st century. Participation in this research is voluntary and all information collected will be kept confidential. You may withdraw your participation any time before the completion of the research project.

What is the purpose of this research?

The research seeks to explore the digital consumption experience of end-users in the 21st century. Primarily, the research aims to understand the digital consumption of end-users to develop a digital wellbeing scale. The study is conducted as a PhD thesis requirement at AUT University in New Zealand. The findings of this research may be used for academic publications and presentations.

How was I identified and why am I being invited to participate in this research?

You were mainly identified as you are an end-user having an active entertainment/career related digital presence. Based on this information, I would like to request your voluntary consent to participate in the study. Anyone not having digital prescence is excluded from participating in the study.

How do I agree to participate in this research?

You can agree to participate in this research by emailing me your response at cpriyank@aut.ac.nz. Attached along with this document is a copy of the Participant Consent form. If you agree to participate in this research, please sign the consent form and email it back to me at cpriyank@aut.ac.nz. Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data that is identifiable as belonging to you removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible.

What will happen in this research?

Following your acceptance to take part in this study, you will participate in an in-depth interview with the researcher. The schedule would be sent to you.

In-depth interviews: usually take 60-90 minutes. All interviews will be conducted online, and audio recorded. For end-users' interview questions will relate to your digital consumption experiences. You will not be asked to provide any personal identifying information, your online IDs or email address will remain

confidential, and pseudonyms will be used in the final reporting. At the end of the interview session, you will be asked about your willingness to be re-contacted for further clarification/information.

What are the discomforts and risks?

There will not be any discomforts and risks associated with participating in the research. For the image selection task, you are free to choose any images or photos from any resources, without time pressure. For the interviews, I can assure you that the questions are non-invasive as we are not seeking a level of detail that may identify you or create any discomfort.

How will these discomforts and risks be alleviated?

Participation is voluntary and if for any reason you feel uncomfortable, you are able to decline answering certain questions, or even withdraw from the research project at any time prior to the study's completion without any consequences. Additionally, you will have the opportunity of choosing a suitable time for participation to take place.

What are the benefits?

Primarily the research seeks to understand and develop a scale for measuring digital wellbeing. This study adopts in-depth interviews for collecting data. The study will help end-users to build a healthy relationship with technology by gauging their level of digital consumption in a fast-paced digital life.

To develop a digital wellbeing scale, in-depth interviews will be conducted with subject matter experts, academics, and end-users. The scale development process will include establishing clarity, relevance, comprehensiveness, and specificity. The study concludes with developing a valid and reliable digital wellbeing scale.

You will receive NZ$30 as Koha for taking part in the interview. You will also have access to the results of the research and may use this information to add to your understanding of other end-users' experiences and feelings associated with digital consumption. This research will allow me as the primary researcher, to fulfil the requirement for the award of PhD from AUT University, Auckland, New Zealand.

How will my privacy be protected?

Participation in this study is strictly voluntary. Your identity will remain confidential and will not be disclosed to anyone except to the primary researcher and project supervisor. To ensure privacy and confidentiality, your name or online ID will be changed to pseudonyms and contact information will not be disclosed in final reporting. Any data that the researcher extracts from the interview is for academic use only and all reports or published findings will not, under any circumstance, contain names or identifying characteristics. All data will be stored on a password protected memory stick and consent forms will be stored in a password protected cabinet with the project supervisor after the project is completed. Data and consent forms will be deleted after a period of six years. Contact details of the researcher and supervisor are provided in case of any concerns or complaints that need to be lodged.

What are the costs of participating in this research?

There are no costs to you other than your time to participate in the study. Interviews will take about 60 to 90 minutes and the image selection task about 20 to 30 minutes.

What opportunity do I have to consider this invitation?

You can take your time to decide if you wish to participate in the research. However, it would be appreciated if you could respond within two weeks' time from the date the invitation is sent. You have the choice of selecting the most appropriate time from date options sent by the researcher for the interview.

Will I receive feedback on the results of this research?

By completing a Consent Form or by responding to the invitation email, you may tick the box showing your interest in receiving feedback on the research's results. For interviewees, a result synopsis will be emailed to you once the study is complete.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Crystal Yap, crystal.yap@aut.ac.nz, +64 9 921 9999 ext 5800.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Dr Carina Meares, *ethics@aut.ac.nz*, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Primary researcher: Caroline Priyanka (cpriyank@aut.ac.nz)

Project Supervisor Contact Details:

Project Supervisors: Dr Crystal Yap (crystal.yap@aut.ac.nz), +64 9 921 9999 ext 5800

Secondary supervisor: Dr Katharine Jones (katharine.jones@aut.ac.nz), +64 9 921 9999 ext 5036

Approved by the Auckland University of Technology Ethics Committee on *11/08/2021*, AUTEC Reference number *21/263*.

Appendix G: Participant information sheet for study 1 online survey

Participant Information Sheet

Date Information Sheet Produced:

11/08/2021

Project Title

Digital wellbeing in the 21st century: A scale development and integrative model testing.

An Invitation

My name is Caroline Priyanka, and I am a Ph.D. student in the Department of Marketing at AUT University, Auckland, New Zealand. I would like to invite you to participate in my research on digital wellbeing in the 21st century. Participation in this research is voluntary and all information collected will be kept confidential. You may withdraw your participation any time before the completion of the research project.

What is the purpose of this research?

The research seeks to explore the digital consumption experience of end-users. The study is conducted as a PhD thesis requirement at AUT University in New Zealand. The findings of this research may be used for academic publications and presentations.

How was I identified and why am I being invited to participate in this research?

You were mainly identified as you are an active end user having digital presence and meet all the inclusion criteria for participation in this research. Based on this information, I would like to request your voluntary consent to participate in the study.

How do I agree to participate in this research?

If you are interested in the research, start the survey by clicking the link that has been sent to your email address by Mturk. Completion of the questionnaire will be deemed to be an agreement to participate in the research.

Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. However, once the survey is completed, the data cannot be removed from the study.

What will happen in this research?

Following your acceptance to take part in this study, you will take part in an online survey.

Online survey: You will be asked to take up an online survey. It will take about 20 to 25 minutes to fill up the survey. You will not be asked to provide any personal identifying information; your online IDs or email address will remain confidential.

What are the discomforts and risks?

There will not be any discomforts and risks associated with participating in the research. The online survey for scale validation will also be risk and discomfort free as the newly developed instrument will be reviewed by a panel of 10 academics and scholars before the survey.

How will these discomforts and risks be alleviated?

Participation is voluntary and if for any reason you feel uncomfortable, you are able to decline answering certain questions, or even withdraw from the research project at any time prior to the study's completion without any consequences. Additionally, you will have the opportunity of choosing a suitable time for participation to take place.

What are the benefits?

This research seeks to conceptualise and develop a scale for measuring digital wellbeing. This study adopts a mixed-method design to address the research problem, including semi-structured in-depth interviews and an online survey. The study advances the theoretical understanding of digital wellbeing, which is lacking in the marketing literature. Academicians and scholars may widen the scope of the research by assessing the digital wellbeing of users with diverse backgrounds. The study will assist end-users to build a healthy relationship with technology by gauging their level of digital wellbeing in a fast-paced digital life.

You as a participant in the online survey for scale validation you will receive NZ$5 as a token of appreciation for participating in this study. You will also have access to the results of the research and may use this information to add to your understanding of other end-users' experiences and feelings associated with digital wellbeing. This research will allow me as the primary researcher, to fulfil the requirement for the award of Ph.D. from AUT University, Auckland, New Zealand.

How will my privacy be protected?

Participation in this study is strictly voluntary. This is an anonymous survey and all data that the researcher extracts from the online survey is for academic use only and all reports or published findings will not, under any circumstance, contain names or identifying characteristics. All data will be stored on a password protected memory stick and will be stored in a password protected cabinet with the project supervisor after the project is completed. Data will be deleted after a period of six years. Contact details of the researcher and supervisor are provided in case of any concerns or complaints that need to be lodged.

What are the costs of participating in this research?

There are no costs to you other than your time to participate in the study. Online survey will take around 20 to 25 minutes.

What opportunity do I have to consider this invitation?

You can take your time to decide if you wish to participate in the research. However, it would be appreciated if you could respond within one weeks' time from the date the invitation is sent.

Will I receive feedback on the results of this research?

By completing a Consent Form or by responding to the invitation email, you may tick the box showing your interest in receiving feedback on the research's results. For anonymous surveys, the participants will be provided with an URL t which they will be able to read a summary of the findings.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Crystal Yap, crystal.yap@aut.ac.nz, +64 9 921 9999 ext 5800.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Dr Carina Meares, *ethics@aut.ac.nz*, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Primary researcher: Caroline Priyanka (cpriyank@aut.ac.nz)

Project Supervisor Contact Details:

Project Supervisors: Dr Crystal Yap (crystal.yap@aut.ac.nz), +64 9 921 9999 ext 5800

Secondary supervisor: Dr Katharine Jones (katharine.jones@aut.ac.nz), +64 9 921 9999 ext 5036

Approved by the Auckland University of Technology Ethics Committee on *type the date final ethics approval was granted*, AUTEC Reference number *type the reference number*.

Appendix H: Study 1 Survey Questionnaire

A study on digital wellbeing in the 21st century

This questionnaire was developed by a PhD student at Auckland University of Technology, Auckland, New Zealand. The questionnaire asks about the digital consumption experiences of end-users. This study is for academic purposes only, and all data will be treated with the greatest confidentiality. Your participation in this research is completely voluntary. You are free to stop filling in the questionnaire anytime you feel uncomfortable. By completing this survey, you confirm that you are 18 years of age or older. If you have any further questions or any comments related to this research, please feel free to email me: cpriyank@aut.ac.nz

Q1 Age

_____

Q2 Gender

- ○ Male (1)
- ○ Female (2)

Q3 Average screen time per day (in hours)

Q4 Based on your digital consumption experiences, I would like to know your understanding about the following items:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I always try to strike a balance between my physical activity and screen time to maintain an active lifestyle. (Q2_1)	○	○	○	○	○	○	○
My screen use does not distract me from my exercise routine. (Q2_2)	○	○	○	○	○	○	○
I am conscious about the potential bodily ailments because of my screen use. (Q2_3)	○	○	○	○	○	○	○
I take regular breaks from screen time. (Q2_4)	○	○	○	○	○	○	○
My screen use does not affect my daily activity. (Q2_5)	○	○	○	○	○	○	○
My screen use does not interfere with my sleep. (Q2_6)	○	○	○	○	○	○	○
Screen use does not affect my emotions.	○	○	○	○	○	○	○

(Q2_7)							
I manage my emotions well when I am online. (Q2_8)	○	○	○	○	○	○	○
I feel emotionally stable when I am exposed to the digital world. (Q2_9)	○	○	○	○	○	○	○
I don't feel frustrated when I am exposed to the digital world. (Q2_10)	○	○	○	○	○	○	○
I feel the number of likes on social media is superficial (Q2_11)	○	○	○	○	○	○	○
I can manage any emotional challenges caused by my screen use. (Q2_12)	○	○	○	○	○	○	○
I cope well with any mood swings that are aroused by my screen use. (Q2_13)	○	○	○	○	○	○	○
I cope well with emotional harm caused by screen use. (Q2_14)	○	○	○	○	○	○	○
I cope well with any digital harm that comes my way. (e.g., cyberbullying) (Q2_15)	○	○	○	○	○	○	○

Q5 Based on your digital consumption experiences, I would like to know your understanding about the following items:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I set boundaries over my screen use. (Q5_1)	○	○	○	○	○	○	○
I limit my screen time. (Q5_12)	○	○	○	○	○	○	○
I have power to influence my digital communal life. (Q5_13)	○	○	○	○	○	○	○
I influence others in the digital world. (Q5_14)	○	○	○	○	○	○	○
I have control over my screen use. (Q5_15)	○	○	○	○	○	○	○
Technology cannot control my life. (Q5_16)	○	○	○	○	○	○	○
I am ready to be responsible for the negative outcomes caused by my screen use. (Q5_17)	○	○	○	○	○	○	○
I spend most of my screen time in achieving my goals. (Q5_18)	○	○	○	○	○	○	○
My screen time does not distract me from achieving	○	○	○	○	○	○	○

my goals. (Q5_19)							
I am being competent in balancing my screen time and reality. (Q5_20)	○	○	○	○	○	○	○
I feel good when others connect with me in the digital world. (Q5_11)	○	○	○	○	○	○	○
I feel good when someone online reaches out to me during difficult times. (Q5_21)	○	○	○	○	○	○	○
I feel good when someone interacts with me in the digital world. (Q5_22)	○	○	○	○	○	○	○
I feel annoyed when online fellow users exhibit improper behavior. (Q5_23)	○	○	○	○	○	○	○
I feel good when online fellow users exhibit respectable conduct. (Q5_24)	○	○	○	○	○	○	○
I feel good when online fellow users consider the appropriateness of the content before sharing. (Q5_25)	○	○	○	○	○	○	○

I feel good when the people I meet online are kind to me. (Q5_26)	○	○	○	○	○	○	○
I feel good when the people I meet online help me. (Q5_27)	○	○	○	○	○	○	○

Q6 Please indicate your perception on the following items:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
In most ways my life is close to my ideal. (Q3_1)	○	○	○	○	○	○	○
The conditions of my life are excellent. (Q3_2)	○	○	○	○	○	○	○
I am satisfied with my life. (Q3_3)	○	○	○	○	○	○	○
So far I have gotten the important things I want in life. (Q3_4)	○	○	○	○	○	○	○
If I could live my life over, I would change almost nothing. (Q3_5)	○	○	○	○	○	○	○
I feel in control over the information I provide on Social	○	○	○	○	○	○	○

networking sites. (Q3_6)							
Privacy setting allows me to have full control over the information I provide on Social networking sites. (Q3_7)	○	○	○	○	○	○	○
I feel in control of who can view my information on Social networking sites. (Q3_8)	○	○	○	○	○	○	○
I am very attached to the online community. (Q3_9)	○	○	○	○	○	○	○
Other online brand community members and I share the same objectives. (Q3_10)	○	○	○	○	○	○	○
The friendships I have with other online brand community members mean a lot to me. (Q3_11)	○	○	○	○	○	○	○
If online brand community members planned something, I'd think of it as	○	○	○	○	○	○	○

something "we" would do rather than something "they" would do. (Q3_12)							
I see myself as a part of the online brand community. (Q3_13)	○	○	○	○	○	○	○
I benefit from following the online brand community's rules. (Q3_14)	○	○	○	○	○	○	○
I am motivated to participate in the online brand community's activities because I feel better afterwards. (Q3_15)	○	○	○	○	○	○	○
I am motivated to participate in the online brand community's activities because I am able to support other members. (Q3_16)	○	○	○	○	○	○	○
I am motivated to participate in the online brand community's	○	○	○	○	○	○	○

activities because I am able to reach personal goals. (Q3_17)	

Q7 Please indicate how you feel about the following items:

	Never (1)	(2)	(3)	(4)	(5)	(6)	Always (7)
It is easy for me to concentrate on what I am doing. (Q4_1)	○	○	○	○	○	○	○
I can tolerate emotional pain. (Q4_2)	○	○	○	○	○	○	○
I can accept things I cannot change. (Q4_3)	○	○	○	○	○	○	○
I can usually describe how I feel at the moment in considerable detail. (Q4_4)	○	○	○	○	○	○	○
I am easily distracted. (Q4_5)	○	○	○	○	○	○	○
It's easy for me to keep track of my thoughts and feelings. (Q4_6)	○	○	○	○	○	○	○
I try to notice my thoughts without judging them.	○	○	○	○	○	○	○

(Q4_7)							
I am able to accept the thoughts and feelings I have. (Q4_8)	○	○	○	○	○	○	○
I am able to focus on the present moment. (Q4_9)	○	○	○	○	○	○	○
I am able to pay close attention to one thing for a long period of time. (Q4_10)	○	○	○	○	○	○	○
I've been feeling optimistic about the future (Q4_11)	○	○	○	○	○	○	○
I've been feeling useful (Q4_12)	○	○	○	○	○	○	○
I've been feeling relaxed (Q4_13)	○	○	○	○	○	○	○
I've been dealing with problems well (Q4_14)	○	○	○	○	○	○	○
I've been thinking clearly (Q4_15)	○	○	○	○	○	○	○
I've been feeling close to other people (Q4_16)	○	○	○	○	○	○	○

I've been able to make up my own mind about things. (Q4_17)	○	○	○	○	○	○	○

Q8 Please indicate on a scale from 'never' to 'always', how much these statements characterize you.

	Never (1)	(2)	(3)	(4)	(5)	(6)	Always (7)
How often do you spend time online when you'd rather sleep? (Q5_1)	○	○	○	○	○	○	○
How often do you feel tense, irritated, or stressed if you cannot use the Internet for as long as you want to? (Q5_2)	○	○	○	○	○	○	○
How often does it happen to you that you wish to decrease the amount of time spent online but you do not succeed? (Q5_3)	○	○	○	○	○	○	○
How often do you try to conceal the amount of time spent online? (Q5_4)	○	○	○	○	○	○	○

How often do people in your life complain about spending too much time online? (Q5_5)	○	○	○	○	○	○	○
How often does it happen to you that you feel depressed, moody, or nervous when you are not on the Internet and these feelings stop once you are back online? (Q5_6)	○	○	○	○	○	○	○

Q11 Thank you for your time.

Appendix I: Study 2 model testing ethics approval

Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

28 March 2022

Crystal Yap
Faculty of Business Economics and Law

Dear Crystal

Re Ethics Application: **21/263 Digital wellbeing in the 21st century: A scale development and integrative model testing**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application for Study Two (Online Survey) has been approved for three years until 25 March 2025.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.

7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.
8. AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through http://www.aut.ac.nz/research/researchethics

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: cpriyank@aut.ac.nz; katharine.jones@aut.ac.nz

Appendix J: Participant information sheet for study 2 online survey

Participant Information Sheet

Date Information Sheet Produced:

28 March 2022

Project Title

Digital wellbeing in the 21st century: A scale development and integrative model testing.

An Invitation

My name is Caroline Priyanka, and I am a Ph.D. student in the Department of Marketing at AUT University, Auckland, New Zealand. I would like to invite you to participate in my research on digital wellbeing in the 21st century. Participation in this research is voluntary and all information collected will be kept confidential. You may withdraw your participation any time before the completion of the research project.

What is the purpose of this research?

The research seeks to explore the digital wellbeing experience of end-users. I am conducting this study to understand the role of digital literacy, self-efficacy, and online social capital in fostering digital wellbeing of end-users. The study is conducted as a PhD thesis requirement at AUT University in New Zealand. The findings of this research may be used for academic publications and presentations.

How was I identified and why am I being invited to participate in this research?

You were mainly identified as you are an end-user aged 20 and above having an active entertainment/career-related digital presence. Any participant aged below 20 and participants not having digital presence are excluded from participating in the study.

How do I agree to participate in this research?

If you are interested in the research, start the survey by clicking the link that has been sent to your email address by Mturk. Completion of the questionnaire will be deemed to be an agreement to participate in the research.

Your participation in this research is voluntary (it is your choice) and whether or not you choose to participate will neither advantage nor disadvantage you. You are able to withdraw from the study at any time. However, once the survey is completed, the data cannot be removed from the study.

What will happen in this research?

Before beginning the study, Mturk will send you an email with the research invitation and the survey link. If you are interested in the research, just click the survey link which will lead you to a questionnaire.

Following your acceptance to take part in this study, you will take part in an online survey. The online survey will take around 20 to 25 minutes to complete. You will not be asked to provide any personally identifying information; your online IDs or email address will remain confidential.

What are the discomforts and risks?

There will not be any discomforts and risks to participating in the research.

How will these discomforts and risks be alleviated?

Participation is voluntary and if for any reason you feel uncomfortable, you are able to decline answering certain questions, or even withdraw from the research project at any time prior to the study's completion without any consequences.

What are the benefits?

It is expected that this study will provide marketing reserachers a theoretical foundation for marketing theory progress and research development in understanding the digital consumption experiences of end-users. Hence, the study will advance the theoretical understanding of digital wellbeing, which is lacking in the marketing literature. Participantion in this study will benefit marketing practice with the means to understand the digital consumption experiences of end-users.

You will receive NZ$5 as a token of appreciation for participating in this study. This research will allow me, as the primary researcher, to fulfil the requirement for the award of Ph.D. from AUT University, Auckland, New Zealand.

How will my privacy be protected?

Participation in this study is strictly voluntary. This is an anonymous survey and all data that the researcher extracts from the online survey is for academic use only and all reports or published findings will not, under any circumstance, contain names or identifying characteristics. All data will be stored on a password protected memory stick and will be stored in a password protected cabinet with the project supervisor after the project is completed. Data will be deleted after a period of six years. Contact details of the researcher and supervisor are provided in case of any concerns or complaints that need to be lodged.

What are the costs of participating in this research?

There are no costs to you other than your time to participate in the study. The online survey will take around 20 to 25 minutes.

What opportunity do I have to consider this invitation?

You can take your time to decide if you wish to participate in the research. However, it would be appreciated for you to respond within three weeks time from the date the invitation is sent.

Will I receive feedback on the results of this research?

Interested participants may access the findings of the study using the url https://www.dwbresearchfindings.com

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Crystal Yap, crystal.yap@aut.ac.nz, +64 9 921 9999 ext 5800.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, *ethics@aut.ac.nz* , (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Primary researcher: Caroline Priyanka (cpriyank@aut.ac.nz)

Project Supervisor Contact Details:

Project Supervisors: Dr Crystal Yap (crystal.yap@aut.ac.nz), +64 9 921 9999 ext 5800

Secondary supervisor: Dr Ricky Chan (ricky.chan@aut.ac.nz), +64 9 921 9999 ext 5185

Approved by the Auckland University of Technology Ethics Committee on *type the date final ethics approval was granted*, AUTEC Reference number *type the reference number*.

Appendix K: Study 2 online survey questionnaire

A study on digital wellbeing in the 21st century

This questionnaire was developed by a PhD student at Auckland University of Technology, Auckland, New Zealand. The questionnaire asks about the online screen use experiences of end-users. This study is for academic purposes only, and all data will be treated with the greatest confidentiality. Your participation in this research is completely voluntary. You are free to stop filling in the questionnaire anytime you feel uncomfortable. By completing this survey, you confirm that you are 20 years of age or older. If you have any further questions or any comments related to this research, please feel free to email me: cpriyank@aut.ac.nz. Please read the information sheet for more details before you take up the survey.

Q2 Age

- ○ 20 - 24 (1)
- ○ 25 - 34 (2)
- ○ 35 - 44 (3)
- ○ 45 - 54 (4)
- ○ 55 - 64 (5)
- ○ 65 - 74 (6)
- ○ Above 75 (7)

Q3 Gender

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)
- ○ Prefer not to say (4)

Q4 Average screen time per day (in hours)

_____

Q5 Based on your digital consumption experiences, I would like to know your understanding about the following items:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I feel emotionally stable when I am exposed to the digital world. (Q5_1)	○	○	○	○	○	○	○
I can manage any emotional challenges caused by my screen use. (Q5_2)	○	○	○	○	○	○	○
I cope well with any mood swings that are aroused by my screen use. (Q5_3)	○	○	○	○	○	○	○
I cope well with emotional harm caused by screen use. (Q5_4)	○	○	○	○	○	○	○
I cope well with any digital harm that comes my way. (e.g., cyberbullying) (Q5_5)	○	○	○	○	○	○	○
I set boundaries over my screen use. (Q5_6)	○	○	○	○	○	○	○
I limit my screen time. (Q5_7)	○	○	○	○	○	○	○

I feel good when others connect with me in the digital world. (Q5_8)	○	○	○	○	○	○	○
I feel good when someone online reaches out to me during difficult times. (Q5_9)	○	○	○	○	○	○	○
I feel good when someone interacts with me in the digital world. (Q5_10)	○	○	○	○	○	○	○
I feel good when online fellow users exhibit respectable conduct. (Q5_11)	○	○	○	○	○	○	○
I feel good when online fellow users consider the appropriateness of the content before sharing. (Q5_12)	○	○	○	○	○	○	○
I feel good when the people I meet online are kind to me. (Q5_13)	○	○	○	○	○	○	○

Q6 Please indicate your perception on the following items related to online screen use:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I know how to solve my own technical problems. (Q6_1)	○	○	○	○	○	○	○
I can learn new technologies easily. (Q6_2)	○	○	○	○	○	○	○
I keep up with important new technologies. (Q6_3)	○	○	○	○	○	○	○
I know about a lot of different technologies. (Q6_4)	○	○	○	○	○	○	○
I have the technical skills I need to use for learning. (Q6_5)	○	○	○	○	○	○	○
I have good digital skills. (Q6_6)	○	○	○	○	○	○	○
I am confident with my search and evaluate skills in regard to obtaining information from the Web. (Q6_7)	○	○	○	○	○	○	○
I am familiar with issues related to web-based activities (e.g., cyber safety, search	○	○	○	○	○	○	○

issues) (Q6_8)							
Online communications enables me to collaborate better with my peers on project work and other learning activities. (Q6_9)	○	○	○	○	○	○	○
I frequently obtain help with my work from my friends over the Internet e.g., through Skype, Facebook, Blogs. (Q6_10)	○	○	○	○	○	○	○
If someone opposes me, I can find means and ways to get what I want. (Q6_11)	○	○	○	○	○	○	○
It is easy for me to stick to my aims and accomplish my goals. (Q6_17)	○	○	○	○	○	○	○
I am confident that I could deal efficiently with unexpected events. (Q6_16)	○	○	○	○	○	○	○
Thanks to my resourcefulness, I know how to handle unforeseen situations. (Q6_16)	○	○	○	○	○	○	○
I can remain calm when facing difficulties	○	○	○	○	○	○	○

because I can rely on my coping abilities. (Q6_16)	
No matter what comes my way, I am usually able to handle it. (Q6_16)	○ ○ ○ ○ ○ ○ ○

Q7 Please indicate how you feel about the following items related to online screen use:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
Interacting with people online makes me interested in things that happen outside of my town. (Q7_1)	○	○	○	○	○	○	○
Interacting with people online makes me want to try new things. (Q7_5)	○	○	○	○	○	○	○
Interacting with people online makes me interested in what people unlike me are thinking. (Q7_6)	○	○	○	○	○	○	○
Talking with people online makes me curious about	○	○	○	○	○	○	○

other places in the world. (Q7_7)							
Interacting with people online makes me feel like part of a larger community. (Q7_8)	○	○	○	○	○	○	○
Interacting with people online makes me feel connected to the bigger picture. (Q7_9)	○	○	○	○	○	○	○
Interacting with people online reminds me that everyone in the world is connected. (Q7_10)	○	○	○	○	○	○	○
I am willing to spend time to support general online community activities. (Q7_11)	○	○	○	○	○	○	○
Interacting with people online gives me new people to talk to. (Q7_12)	○	○	○	○	○	○	○
By going online, I come in contact with new people	○	○	○	○	○	○	○

all the time. (Q7_13)							
There are several people online I trust to help solve my problems. (Q7_14)	○	○	○	○	○	○	○
There is someone online I can turn to for advice about making very important decisions. (Q7_15)	○	○	○	○	○	○	○
There is no one online that I feel comfortable talking to about intimate personal problems. (Q7_16)	○	○	○	○	○	○	○
When I feel lonely, there are several people online I can talk to. (Q7_17)	○	○	○	○	○	○	○
If I needed an emergency loan of $500, I know someone online I can turn to. (Q7_18)	○	○	○	○	○	○	○
The people I interact with online would	○	○	○	○	○	○	○

put their reputation on the line for me. (Q7_19)							
The people I interact with online/offline would be good job references for me. (Q7_20)	○	○	○	○	○	○	○
The people I interact with online would share their last dollar with me. (Q7_21)	○	○	○	○	○	○	○
I do not know people online well enough to get them to do anything important. (Q7_22)	○	○	○	○	○	○	○
The people I interact with online would help me fight an injustice. (Q7_23)	○	○	○	○	○	○	○

Q8 Please indicate on a scale from 'never' to 'always', how much these statements characterize you.

	Never (1)	(2)	(3)	(4)	(5)	(6)	Always (7)
Spent a lot of time thinking about screen use or planned screen use?	○	○	○	○	○	○	○

(Q8_1)							
Felt an urge to spend screen time more and more? (Q8_4)	○	○	○	○	○	○	○
Used screen time in order to forget about personal problems? (Q8_5)	○	○	○	○	○	○	○
Tried to cut down on the use of screen time without success? (Q8_6)	○	○	○	○	○	○	○
Become restless or troubled if you have been prohibited from screen use? (Q8_7)	○	○	○	○	○	○	○
Used screen time so much that it has had a negative impact on your job/studies? (Q8_8)	○	○	○	○	○	○	○

Q9 This is the end of the survey, thank you for your time. Please use the Mturk code to receive your incentive.

Appendix L: Qualitative research themes and codes

Themes	Codes	Quotes
State of physical care	Exercising Physical activity	*"I find myself always just watching those exercising videos on YouTube and then trying to follow those things".*
		"Digital screens, so it's becoming more and more difficult, and so I just try and strike a balance between physical activity and reading books."
	Daily routine	*"Previously I didn't have any knowledge but now I can you know like just watch YouTube and then I can prepare all the healthy and nutritious dishes."*
		"I actually continue listening to YouTube while doing my daily chores. Like you know, there is a study about the problem on plastics, so I put on my ear plugs and while I'm cooking I have my mobile phone right beside me and I continue listening."
	Taking breaks	*"I think that is how you could probably achieve physical wellbeing by taking breaks from digital devices."*
		"I think just awareness on knowing the impacts that screen use can have and knowing when it's important to take a break."
	Adequate sleep	*"I feel sleepy and really tired, really exhausted and my whole day I cannot be productive I cannot do anything, and you know it's like at night I watch some Tik Toks and then I realised it is making me feel physically unhealthy."*
	Conscious of physical health	*"Sometimes people just start getting back, back ache, or it starts hurting their eyes so they have to be concerned about all of these like bodily ailments that they are getting."*
State of emotional resilience	Feeling resilient	*"Need to defend yourself emotionally when feedback starts coming back, so you have to also know what you put on there. Like I say, a person needs to be able to manage emotions."*
		"You have to be aware of the danger that you are never fully protected from seeing certain things that you don't want to see or from hearing certain things that we don't want to hear."
	Coping with negative emotions	*"A digitally well person, they'll be resilient because anyone and everyone gets like some mocks in their lives and they know how to take those logs in your stride."*
		"Back then when I posted something on social media, especially if it's a profile picture, I got so excited about how many likes I got. But now it doesn't matter anymore okay, you know, it's superficial. To me it's superficial! There are more, deeper, nicer, non toxic ways to come to engage."
		"I think if you're emotionally umm let's say your emotions are sitting towards like

		a negative side, I feel like that would have an impact as to how you would utilise digital platforms to benefit you."
		"Too much exposure you know, this also creates a certain level of guilt feelings because you know, you know you're wasting your time."
		"I was talking about bullying the other day with a fellow parent friend of mine and in our day if we were bullied when we left school the bullying would stop. Now it follows the people home, so you can't resist. Unless you get rid of your devices, you can't escape it so much so. I think it's difficult to cope."
State of agency	Power	*"Uhm, maybe as soon as you wake up, don't go to your phone. That's such a normalised behaviour, but I think just setting your mind at the very start of your day, not to run to your device, and so I need to take my own advice."*
		"So every night at about 10:45 my phone tells me you've only got 5 minutes left and then all my apps shut out. Of course you have the option of like going back in, but that kind of feels a bit guilty. So, I probably shouldn't go back. Uhm, so yeah, I think just setting up those kinds boundary."
		"I also think how digital technology contributes to the awareness of human communities. Yeah, I look at it as influence, power in communal life."
		"Not putting yourself like in a vulnerable situation and you know or you know, if for instance, you find yourself becoming addicted or and you're spending a lot of time online and you think you're finding it affecting your physical, your emotional health, you must have the responsibility or capacity to change that."
		"To me it is kind of taking responsibility over screen time and making sure that our digital wellbeing is being looked after."
	Dominance	*"We are the owner, we are the user, we shouldn't be controlled or managed by the technology. We shouldn't let them take over our life."*
		"Although I don't really want to admit that, but I like to control things. The use of digital devices makes me feel like I can control something, I am satisfied when controlling the digital device. Uhm, but sometimes the digital devices make may feel like I lost my control then I feel dissatisfied."
	Competence	*"Able to use the digital world to achieve our goals in life that support wellbeing."*
		"It is supporting me to do to accomplish everything that I want to accomplish and not distract me from attaining those goals."
		"The digital technology is enabling you to do the tasks that we want to do. And it does not overwhelm you or it does not distract you in any way from whatever objectives that we try to achieve."

State of communion	Social interaction	*"Nowadays most of your social interactions are online with friends on your devices, especially when they're somewhere else far from you or outside of Auckland, outside of the country. I rely on my device 100% in that aspect. And I use it to get into contact with them using device to contact them. So I would say in that aspect, yes, it's technology is a definite thing that would help with my wellbeing socially."*
		"I'm in touch with my family with my mother with my sister with my niece. I feel so close with them through my device."
		"I think a digitally well people are quite social animals, but they know they also enjoy being by themselves."
		"Healthy use would be to chat with friends and sometimes I play those online games like those interactions games with friends."
		"Screen use can help because you can communicate quite easily and I know in New Zealand that they struggle with mental health in being able to talk to someone or communicate or reach out to people to talk to and seek help. Whereas now it's, I would argue that it's a lot easier to reach out and talk to someone."
	Showing morality	*"Knowing about current events. Uhm, knowing about the realities of life. Facing back, you know you. Should I spread them? You just have to know about it, but then you kind of limit it as well because it can be quite a news report that is so disturbing."*
		"They must have a morale. What content/service are we producing or sharing? Is there morale?"
	Being kind	*"Then other things are, a person also have to be a little bit sympathetic and kind. There are people that will put information there by mistake. We must know that they are part of a community. Even in the old world of no digital technology you would apologise, I think the same applies to digital technology."*
		"They are diverse, some are kind, some are gentle, some helpful, some are not very helpful, seek help."
		"I think the main thing is raising their hand and admitting, that they had this problem and also then making a brave decision to seek that help."