

## Understanding the Process of IT Addiction Recovery: Insights from a Qualitative Study

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### Abstract

*The widespread use of information technology has led to undesirable consequences, particularly in the form of IT addiction. Despite recent attention to corrective behaviors that counter IT addiction, a process-based longitudinal overview of IT addiction recovery is still lacking. A process model of IT addiction recovery was developed based on qualitative narrative data obtained from interviews and published blogs and Bandura's theory of self-regulation as the baseline. It highlights the four stages of observing, assessing, adjusting, and reflecting, through which recovery efforts unfold gradually. In each stage, essential elements underlying successful completion and advancement to the next stage, particularly those that are related to IT artifact, are identified. The findings provide a richer understanding of the IT addiction recovery process and carry important implications for users who struggle with IT addiction, designers, and industry regulators.*

### Keywords:

IT Addiction, Addiction Recovery, Process Model, Social Networking Sites, Qualitative Methodology

### 1. Introduction

The use of information technology (IT) has dramatically increased during the past decade, particularly due to the advancements in smartphones and Internet technologies. It has affected all aspects of users' personal and professional lives. While the benefits of IT use are numerous (e.g., see (Beaudry et al., 2020) for a review), recent evidence attests that IT use may lead to unexpected and undesirable outcomes. For instance, recent reports show that 80% of the US population has social networking sites (SNS) accounts and uses them on average several hours a day (Tankovska, 2021). Globally, between 5 - 20% of users also reportedly suffer from addiction to various

social sites (Vaghefi et al., 2023). Similarly, recent Information Systems (IS) research highlighted behaviors such as compulsion (Gerlach & Cenfetelli, 2020), problematic use (Turel & Qahri-Saremi, 2016), and, notably, IT addiction (Turel et al., 2021).

IT addiction is commonly known as a maladaptive psychological dependency on the use of technology that is associated with significant adverse consequences across important life domains (Vaghefi et al., 2023). Failing to take action against IT addiction can trigger a range of psychological problems, such as anxiety and stress (O'Day & Heimberg, 2021), depression (Cunningham et al., 2021), cognitive overload (Cao & Sun, 2018; Zheng & Lee, 2016), reduced life satisfaction (Hawi & Samaha, 2017) and physical disturbances, such as sleep disorder (Tandon et al., 2020), all of which can undermine users' psychological or physical well-being. Moreover, addiction may harm social relationships with colleagues, partners, friends, and family (Venkatesh et al., 2019) and diminish work productivity and performance (Benson et al., 2019).

Due to these severe consequences, attempts have been made to find ways to counter the adverse effects of IT addiction. Extant IS research has highlighted corrective attempts such as the temporary discontinuance (Vaghefi et al., 2018), use reduction (Osatuyi & Turel, 2020), and quitting use (Maier et al., 2015; Soliman & Rinta-Kahila, 2019). Despite some progress, two issues limit our current understanding of these behaviors. First, the literature on IT addiction recovery has primarily used surveys to examine the causal associations between addiction and other predictors of *discontinuance intentions and behaviors*. While providing valuable insights into the determinants of recovery, current domain knowledge on this topic is largely variance-based, assuming that the variables have fixed and cross-sectional effects on recovery behaviors (Paré et al., 2008). Second, most of these studies only focus on *user traits* and

*characteristics* (e.g., habits, self-efficacy, guilt, or dissonance) in mitigating addiction. Hence, they do not pay close attention to the role of IT artifact in recovering from an addiction. Not considering the role of IT may lead to a partial consideration of the issue.

Understanding addiction recovery as it unfolds is essential. First, recent evidence shows that IT addiction develops over time (Vaghefi et al., 2023). Similarly, it seems reasonable to expect that recovery from addiction is similarly a dynamic process that unfolds gradually. Therefore, assuming that *the relationships between key variables of addiction recovery are constant* (Niemz et al., 2005) might be simplistic; this view may not portray a complete picture of the recovery process (Soliman & Rinta-Kahila, 2019). A case in point is the work by Salo et al. (2022) that explored the process underlying technostress mitigation in the context of personal IT use, which extended the rich variance-based literature on technostress. However, this paper's focus is on technostress and not addiction. and arguably, technostress differs from IT addiction (Tarafdar et al., 2020). Second, research and anecdotal evidence show that addiction recovery rarely occurs instantaneously with the first attempt; most people have to try several times, suggesting that they are going through repeated behavioral change and feedback cycles. This suggests that a process view of addiction recovery is essential for a full understanding of IT addiction recovery. Third, despite the emerging evidence about the direct role of IT in developing an addiction (Wang & Lee, 2020), our knowledge of how technology (e.g., features and apps) plays a role during recovery is minimal. Additional insights can add to the conversations surrounding the ethical and moral obligations of technology companies to design artifacts that consider the users' wellbeing (Fiske, 2022) and eventual recovery from IT addiction.

Our goal is to provide an overview of the elements and the process through which one recovers from IT addiction. Our research aims at unpacking the "entities and activities that produce change from an initial state to observed outcomes." (Avgerou, 2013, p. 407) to recover from IT addiction, which has important theoretical and practical relevance. More precisely, we seek to answer the following research question: *How do users recover from IT addiction?*

To answer this question, we conduct a qualitative study that uses primary data from interviews and secondary data from published blogs and testimonies. Following an analytic inductive strategy, we develop a process model that captures the factors shaping IT addiction recovery, as well as the underlying process through which IT addiction recovery unfolds. More specifically, the data suggests that recovery from IT

addiction unfolds over time through four stages of *observing, assessing, adjusting, and reflecting* on one's use-related behavior.

## 2. Literature Review

Addiction recovery is known as a complex process that has numerous impacts on individuals (Dekkers et al., 2020). In the extant literature, the roles of many antecedents of addiction have been recognized; some of these antecedents were also found critical in addiction recovery (Vanderplasschen & Best, 2021). However, research on recovery is still emerging. Far less is known about the process through which addiction recovery takes place and the mechanisms that are central to this process (Vanderplasschen & Best, 2021).

### 2.1. Recovery from Substance and Behavioral Addiction

Addiction recovery, mostly substance addiction, has been the focus of much research in health-related domains such as medicine, psychology, and neuroscience. Recovery from an addiction is often studied in the context of substance addiction and is commonly seen as a state of abstinence or remission (Laudet, 2007). Hence, to achieve recovery, it is deemed essential to focus on 'abstinence' and 'an absence of symptoms of dependence.' A fissure in this conception of addiction recovery is the definition proposed by the Betty Ford Consensus Panel Definition: "*a voluntarily maintained lifestyle, characterized by sobriety, personal health, and citizenship*" (Panel, 2007, p. 222). Furthermore, notions such as health or life quality have been promoted along with the notion of recovery (Best et al., 2016) Although abstinence may be an important feature, it is no longer considered a mandatory prerequisite for recovery (Laudet, 2007).

Similarly, in a recent systematic review of behavioral addiction, Fernandez et al. (2020) showed that while at face value, abstinence is key for resolving problematic behaviors, there appears to be some consensus within the behavioral addiction field that controlled behavior, rather than complete abstinence, should be the recommended long-term treatment goal for many behavioral addictions, including gaming, internet use, social networking site (SNS) use, exercise, shopping, work, and eating addiction. Such behaviors are an integral part of life; therefore, it is often unrealistic to completely avoid like behaviors using technology (Kuss & Griffiths, 2017). In addition, actual benefits can be lost through

abstinence, as is when controlling exercise (gym addiction) – which embeds critical health benefits (Rendi et al., 2007) or mobile phone use (Osatuyi & Turel, 2020) – given the increasing reliance on technology within society at large for day-to-day communication (Kuss & Griffiths, 2017). All in all, there is a growing consensus that improvements in quality of life and psychological well-being must be part of addiction recovery measures.

Authors even argue that abstinence on its own, when it is not part of an intervention that teaches effective coping skills for dealing with withdrawal, cravings, or relapses, might cause more harm than good (Fernandez et al., 2020). These same issues have been identified in the case of sexual addiction, where Acceptance and Commitment Therapy and Cognitive Behavioral Therapy were considered promising approaches of regulating behaviors (Grubbs et al., 2020). Concerning the role of cognition in addiction recovery, authors have focused on decision-making and argue that cognitive decision-making central to behavioral addiction recovery (Verdejo-García et al., 2019). Indeed, as addictive disorders involve excessive and often uncontrolled behaviors, despite negative consequences for health, productivity, and social relationships (APA, 2013), decision-making is seen as a key factor in addiction recovery.

## 2.2. Recovery from IT Addiction

With the increasing recognition of IT addiction, there is an emerging stream of studies that focuses on recovery from such addictive behaviors. Existing IS studies have focused primarily on discontinuance (Turel, 2016) and often recommend permanently terminating the problematic use of technology (Soliman & Rinta-Kahila, 2019). The findings of these studies point to several key factors that can play a role in intentions and behaviors associated with recovery. For instance, Turel (2016) showed that guilt and self-efficacy, attitude, subjective norms, perceived behavioral control, and existing habits could influence users' quitting intentions. Other studies point to cognitive dissonance, SNS exhaustion, SNS overload, fatigue, and stress in changing users' discontinuance intention (Vaghefi et al., 2020; Zhang et al., 2016).

As is the case in behavioral addiction recovery, IT research has shown that while quitting intention can lead to quitting behavior (Maier et al., 2015), permanently losing access to hedonic systems requires a significant commitment that is out of reach for most users (Osatuyi & Turel, 2020). Hence, researchers have focused on less consequential interventions that advocate taking temporary breaks from use (e.g., digital detox, technology abstinence, and vacationing)

(Radtko et al., 2021). Findings indicate that demographic variables (gender, race, and community type) or situational factors (e.g., having no access to the internet) and internal motives could influence taking a break from SNSs (Stieger & Lewetz, 2018; York & Turcotte, 2015). A few studies also have examined how monitoring and controlling use using smartphone features of designated screen time apps can help reduce the amount of time spent on technology (Kim et al., 2017; Ko et al., 2015).

While extant IS research has improved our understanding of successful (or unsuccessful) IT addiction recovery, there is a need for a better understanding of the *process* that underlies IT addiction recovery. In the next section, we propose, based on extant literature, a preliminary theoretical framing of IT addiction recovery as a process.

## 3. Theoretical Framework: Behavior Self-Regulation

The ability to “control” has been considered the key element of altering an addictive behavior and bringing it according to chosen standards (Baumeister & Vonasch, 2015). To understand the complexity of IT users' control mechanism, we draw upon Bandura's (1991) social cognitive theory of self-regulation, which states that “self-regulatory systems ... provide the very basis for purposeful action. Most human behavior, being purposive, is regulated by forethought (as) people possess self-reflective and self-reactive capabilities that enable them to exercise ... control over their thoughts, feelings, motivation, and actions.” (pgs. 248-249) This capacity for forethought – defined as a cognitively driven mechanism that works based on the individual's perception of future outcomes and is shaped by individual sensing and social comparison - is key to the self-regulation of individual behaviors (Bandura, 1991; Stajkovic & Luthans, 2001).

From a high-level perspective, the structure of self-regulatory systems presents three stages, namely *monitoring*, *evaluating*, and *reacting* (Bandura, 1991). The first stage in changing behavior is monitoring and taking note of the current behavior, including (possibly) recurring patterns. As such, monitoring is crucial to an individual's ability to (eventually) influence their actions. Defined as the conscious, cognitive effort to scrutinize one's behavior in order to identify and record behavioral information (Olson & Winchester, 2008), the monitoring of one's behavior is shaped by several factors. Being attuned or paying **attention** to one's behavior is key. Furthermore, the nature of the **context** (i.e., environmental, social, professional, etc.) in which the behavior occurs shapes one's awareness of it.

Similarly, the **time lag** of the behavior's effects makes one aware of the behavior. The more immediate the impact, the more likely to raise one's awareness compared to a more distal impact. It has also been suggested that behavioral monitoring is amenable to one's ability to effect change over the behavior, i.e., **self-efficacy** (Lazarus & Folkman, 1984). Behaviors that are perceived as easy to modify through one's deliberate efforts appear more evident to an individual than behaviors that prove more resistant to change (Bandura, 1991). Finally, **emotional states** influence how an individual's behaviors are self-monitored and cognitively perceived. It is worth noting that the effort to monitor one's behavior "is not simply a mechanical tracking and registry process. [Rather it] operates through ... processes that can bias what is observed" (Bandura, 1991, pg. 253), implying possible differences in monitoring outcomes across contexts, individuals, and behaviors.

Once an individual has become aware of his/her behavior, the use of "standards for judging ... one's actions [plays] a major role in the exercise of self-(regulation)" (Bandura, 1991, pg. 293). When it comes to **evaluating** one's behavior that an individual is aware of, **motivation** plays an important role. People who desire to change their behavior are more likely to establish personal objectives and engage in self-assessment of their advancement (ibid). Another important element of evaluation is its **social comparison** element. Standards for judging one's behavior are developed based on how individuals of importance in their lives have responded to their behaviors or are gained through direct instruction by significant others (Bandura, 1991, pg. 253). In addition, the **extent of effort** expensed depends on the value proposition that an individual attaches to the behavior under scrutiny. Generally, the more aligned one's behaviors are with one's core values and well-being, the more likely it is that self-evaluation will be elicited (Simon, 1979).

Ultimately, **reaction** – here behavioral change – occurs as self-evaluation against standards regulates courses of action. As such, individuals pursue behaviors that agree with the internal or external standards previously assessed. They otherwise refrain from behaving in ways that would result in potential censure for non-adherence to standards. Prior successful execution of behavior may foster behavioral recurrence by way of enhancing one's self-efficacy (Bandura, 1977). In other words, "**(b)ehavioral attainments** ... produce self-satisfaction and raise aspirations that can augment change" (Bandura, 1991, pg. 252). The raising of one's aspirations, in turn, speaks directly to one's motivation for enacting a course of action. It has

therefore been noted that individual **motivation** for behavioral change influences the enactment of behavioral regulation, as "[l]ow motivation is accompanied by unreactive self-observation." (Bandura, 1991, pg. 252). Finally, echoing ideas from coping theory (Lazarus & Folkman, 1984), individuals are more likely to react when they credit themselves and their abilities for successfully enacting a behavior (Bandura, 1991). As such, individuals are more likely to respond self-critically to behaviors for which they evaluate themselves as being responsible but not to those they perceive as due to externalities like special circumstances or unrealistic demands (Weiner, 2012).

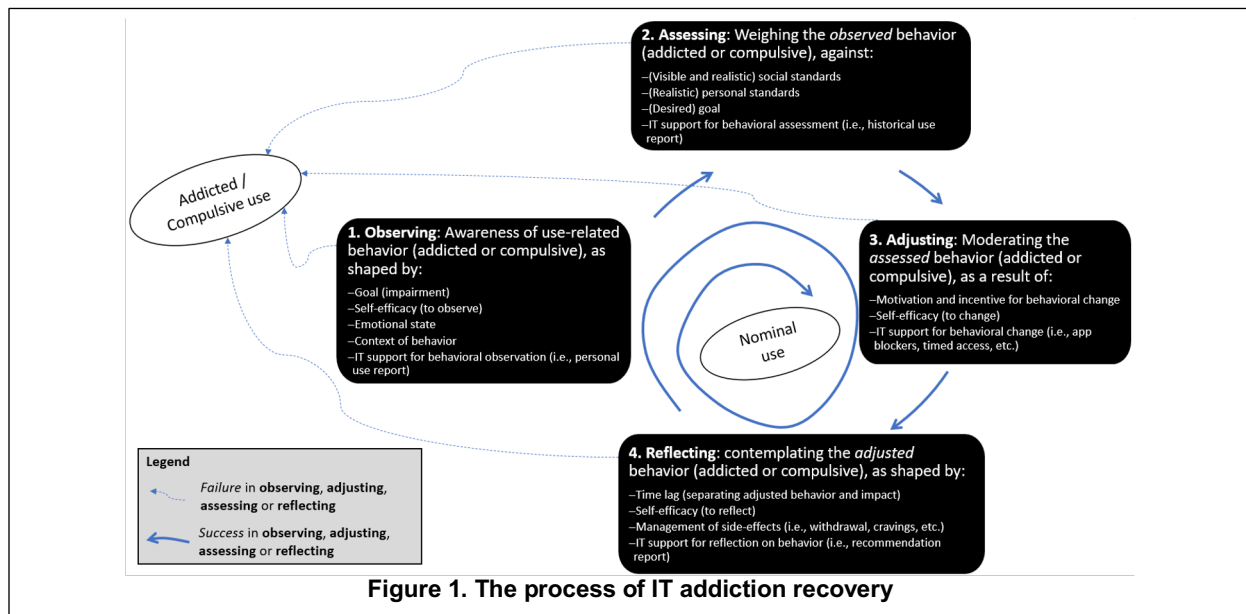
All in all, starting from the premise that much of human behavior is learned (Skinner, 2012), various mechanisms may target different factors of influence to 1) weaken the occurrence of an incumbent, often problematic behavior, 2) promote a replacement behavior that is to be desired, and 3) strengthen the desired behavior (Sugai & Horner, 2000). Informed by extant literature on behavioral control, some mechanisms can allow for actioning and managing the transition from a problematic behavior (i.e., addicted or compulsive use) to a desired behavior (i.e., nominal use) in relation to a technological artifact.

## 4. Method

Given the dearth of knowledge related to the process of IT addiction recovery, a qualitative research design was favored. The data for this study includes a set of primary and secondary data. Primary data was collected using semi-structured interviews with participants who had experienced IT addiction. We used a purposive sampling technique to select IT users who have undergone addiction recovery (Vaghefi et al., 2023) and their ability to provide rich information about their recovery experiences. Thirty individuals were interviewed (32-46 min for each interview) using a questionnaire developed based on a review of the core theory and relevant addiction recovery literature.

In addition, secondary data was collected to complement the primary data. We collected archival data from individuals who voluntarily reported their addiction recovery experience on a popular blogging platform (medium.com, ~100 million active monthly users) (Lyon, 2023). Using Python and Medium's API, we first sampled all free/premium blog posts published on Medium between Jan 2015 and Dec 2022. Next, we used queries and a set of keywords (e.g., digital technology, social media, addiction, recovery, detox, break, etc.) to find the posts that are relevant to the process of recovery.

We further scanned the title and first paragraph of every post to determine whether they contain data



about users' experience and are indeed describing a recovery process. A sample of 127 blog posts (ranging from 260-1287 words) was identified for analysis.

The blog posts were helpful in providing diverse and unfiltered individual perspectives about the process of addiction recovery, which allowed us to improve our internal reliability and consider potential rival explanations (Fischer & Parmentier, 2010). Furthermore, they allowed us to capture longitudinal narrative accounts about how addiction recovery started and changed since many reported their experience retrospectively over the course of days and up to 2 years.

To analyze the data, we used qualitative analysis techniques using NVivo 11. Using analytic induction (Patton, 2014), for the first round, we leveraged Bandura's (1991) theory of self-regulation to guide the coding and data analysis process. Specifically, we coded qualitative data reflecting key concepts contained in the initial framework (e.g., *monitoring, evaluating, reacting*, etc.) built on the analysis of extant literature. Next, keeping an open mind for emerging insights, we followed thematic coding techniques to identify key concepts, categories, and themes yielded inductively from the data (Miles & Huberman, 1994). For instance, at this stage, it became clear that the role of technology support during recovery requires scrutiny. In addition, we paid attention to the changes in the salience of the concepts during the recovery process. Overall, the analysis and theory development were iterative and included going back and forth between emerging results and literature to compare existing knowledge on recovery with our emerging insights, refine our coding categories, and enhance our theorizing. We continued the analysis until no new (or contradictory) evidence emerged,

suggesting reaching a theoretical saturation state (Corbin & Strauss, 2014). The final model outlines the key stages and constituent elements of the process of IT addiction recovery.

## 5. Results

The data suggest that recovery from IT addiction unfolds over time through four stages of *observing, assessing, adjusting, and reflecting* on one's use-related behavior. The process model shown in **Figure 1**, resonates with Bandura's conceptualization of behavioral self-regulation, and yet it offers unique insights given the particularities associated with an individual's recovery from IT addiction.

### 5.1. Observing

An individual's eventual recovery from IT addiction begins with the sourcing of information in relation to one's behavior. An important factor shaping one's awareness of an enacted behavior is the sense that the behavior impairs progression toward some valued goal or objective. As one respondent put it, "I'm trying to reduce my frequency because I noticed that I was using so much but, most importantly, that I'm not learning something more, it's just advertising and I'm losing my time. So, I'm trying to reduce the frequency." (Resp. 1) The physical context in which the use-related behavior may (or may not) be enacted also shapes one's behavioral awareness. "I'm the kind of person that would control that. I mean, in class, I don't go on social media. When I'm at dinner or in a social setting, I respect the fact that we're all together." (Resp. 3) Similarly, the emotional state, and in particular states of anxiety or

stress, appear to sharpen the perception of one's use-related behavior. *"If there's your friend and you see that he's active, he saw your content, and he doesn't interact with you, it's going to get you anxious. Did I do something bad? Am I being judged for posting something? it's social anxiety."* (Resp. 4) Finally, the IT itself may assist behavioral observation through specific functionality, such as personal use reports. *"With the (personal use report) that (Apple) launched, it made me realize more than ever the amount of time that I was spending on Facebook. Because [Facebook] is kind of omnipresent, you don't really realize how much time you're spending on it. [That functionality] made me realize that I was spending the equivalent of one full time job on Facebook in one week, time that I could have spent on something else."* (Resp. 4)

## 5.2. Assessing

As an individual becomes aware of one's use-related behavior, there is an effort to weigh the behavior against others' use, against one's own standards of use, or in relation to perceptions of how the use impacts progression toward a desired goal. Referring explicitly to social comparison in relation to use, multiple respondents echoed the insight from Respondent 1: *"I have [friends] that use [the social networking site] more than I do and there are others that use it less... But, overall, I would say most [of my acquaintances] use it more than I do... It changed the way I see things."* (Resp. 1) Sometimes, social standards in relation to use are given under the guise of direct and targeted feedback by significant others and help individuals evaluate the suitability of their use-related behaviors. *"For example, when I'm studying, my dad sees me reaching for my phone that is charging and he's like, 'the phone was charging, just leave it there'. I know that it's stupid for me to have a reflex like I need to see what's happening, but he helps when he vocalizes it 'put it down, you're supposed to be studying.'"* (Resp. 2) Somewhat less common, but nonetheless present, was the idea that comparing one's use is not always externally focused, looking at others, but sometimes it is inner focused. *"I wasn't really comparing to others. I didn't check out if my friends were using [the social networking site] in a way that was somehow acceptable... I was just going with my own flow and naturally using those platforms in a way that suits me."* (Resp. 4) However, comparing one's use against personal standards may become blurry, making the evaluation of one's use particularly difficult. *"You can forget who you are as a person, what your opinions are, what your values are."* (Resp. 5) Once again, the IT itself may facilitate behavioral

assessment through the provision of historical use reports, whereby an individual may trace the evolution of key elements of one's use (i.e., frequency, duration, application, etc.) over time. *"When they came out with the report on the amount of time you spent over days, weeks, and months, it made me feel better. My friends were using much, much more than I did probably because they were posting content. Still, I knew I was using too much, and I should use less."* (Resp. 2)

## 5.3. Adjusting

Ultimately, the goal of observing and assessing one's behavior is to be able to moderate it. The motivation and incentive for behavioral change, as well as one's self-efficacy for adjusting one's behavior, shape an individual's capacity for moderating their use-related behavior. Often, the motivations for moderating one's use are driven by an awareness gained from previously evaluating the use-related behavior. *"And then [my social media use] increased and now I'm trying to decrease it because I want to do better things with my life. Yeah, I realized I couldn't distance (from the technology), it was impacting me and encouraging me to become someone else. It's not what I want. So, upon reflection, I decided to reduce my daily usage."* (Resp. 1) The realization of the negative consequences of certain use-related behaviors also serves as motivation for behavioral change. *"We all know by now how harmful it is for our mental health to check our social [networks] first thing in the morning and last thing before we go to bed. So, let's eliminate that!"* (Resp. 6) It is worth noting that if an individual has already taken successful action to moderate one's use-related behavior in the past, similar strategies are more likely to be mobilized again. This reflects enhanced self-efficacy in relation to one's approach to behavioral change. *"Whenever I work, I turn my phone off so that I don't see any notifications and just grab my phone. Or just putting the sound off if you keep your cell phone on. At night, instead of using my phone, I'm trying to read books because I want to reduce my (use)."* (Resp. 1) Or in the words of a different respondent, *"you need to turn off the notifications of your phone and keep it in a different room. To put it into simple words, you and your phone need some social distancing."* (Resp. 7) Irrespective of individual strategies for moderating one's use-related behaviors, the IT itself may assist individuals with adjusting their use with the provision of functionalities targeted at behavioral change, such as enforced timed access or app blockers. *"The term 'out of sight, out of mind' is very applicable if you want to redirect your focus. If something is no longer visible to us, we quickly forget*

about it. And thankfully, we have the 'do not disturb' feature mode on our phones, which allows us to choose when and how we want to be updated with our notifications." (Resp. 8) While 'do not disturb' features ensure there are no interruptions due to alerts or messaging, app blockers act to increase the effort one must expend to use the IT. Unsurprisingly, many users are not willing to do so and, as a result, reduce or halt their use-related behaviors. "Within the past year or so, I downloaded an app and website blocker, and that was the best decision that I've ever made. As of May 2022, it'll have been six months since I've last been on social media entirely. I have difficulty seeing myself going back to social media." (Resp. 9)

#### 5.4. Reflecting

Finally, once an individual adjusts one's use-related behavior, there is evidence for a mindful and, at times, critical evaluation of said behavior. This contemplation is shaped by the relative time lag between the enactment of the adjusted behavior and its impact. This seems to be a reasonable expectation since, during the first stage of the addiction recovery process, the issue of goal impairment was noted as one of the factors that focus the attention of an individual on one's use-related behavior. "Initially, 'fear-of-missing-out' made it difficult for me to stay away from social media (...). Social media is addictive, and the interaction between others in different states and countries is fun and engaging, but, again, it can be toxic, as well (...). If you stick to your guns long enough and do not give in to the temptation of checking your social media, I promise you that the fear of missing out will go away. And ... it's a liberating feeling once you relieve yourself of it." (Resp. 10) Other respondents similarly reflect on their newly adjusted use-related behaviors and appreciate the positive impacts they enable for themselves, as individuals, and for the wider community. "Without social media, I engage in very little brain junk. My time is spent reading books, taking care of my body and life, and building my blogging business (...). My headspace is filled only with knowledge and attitudes that make my life (and the world) a better place." (Resp. 11) As with other types of addictions, recovery also involves the successful management of side effects, such as withdrawal, cravings, etc., once the adjusted behaviors have been enacted. "It's just like people smoking, you know, they're used to having something in their hands. So, when they stop smoking, they need to replace it with something else. I still have the urge to take my phone out just to do something with my hands." (Resp. 2) This ability to resist the urge to return to the problematic use-related behavior from

before the adjustment is noted time and again by the respondents. Truly, this is a crucial stage in allowing the newly adjusted behavior to strengthen and take hold. "I was so used to open the (social media) website throughout the day and feel the need to check for any updates... it was second nature. However, there were moments where I was able to resist the urge and realized that I had more important matters to deal with and should not be wasting time on social media." (Resp. 12) Once again, the IT itself provides some support for enabling an individual's reflection on their adjusted use-related behavior. For instance, the functionality to customize certain alerts and thus tailor the array of notifications to one's new needs and priorities may foster an individual's reflection on what is important and valued for oneself. "App notifications create unnecessary urgency in your mind. If things are truly urgent, people can always call. Most text messages, emails, or chat messages are meant to be responded based on convenience and not urgency. In fact, app notifications make even responding to social media posts as well as shopping online urgent. This is a complete fallacy!" (Resp. 13)

Overall, data suggests that an individual's recovery from IT addiction is predicated on successfully *observing, assessing, adjusting, and reflecting* on one's use-related behavior. Depending on whether one exhibits compulsive or addicted use, progression towards nominal use requires subsequent successful enactments of *observing, assessing, adjusting, and reflecting* on one's use-related behavior. Unfortunately, failure to observe accurately one's use-related behavior, to assess it properly against standards of use, to moderate it, or to critically evaluate it, will likely preempt IT addiction recovery.

#### 6. Discussion and Conclusion

The goal of this paper was to understand how users recover from IT addiction. To this aim, we conducted a qualitative inquiry using primary and secondary data that included social media users' narratives about their IT addiction recovery. Using analytic induction and leveraging self-regulation theory (Bandura, 1991) as a research lens, our findings revealed that the process of IT addiction recovery involves stages of observing, assessing, adjusting, and reflecting. In each stage, various elements play a role that can help users enact it successfully. During the first stage, we found that goals, self-efficacy, emotional state, and context surrounding the behavior can determine whether users successfully go through observing to the assessment stage. Likewise, a set of other important elements determine the successful progression to the next stages. Our model also

highlights the unique role of IT in supporting users in each stage by providing personal use data, historical reports, app blockers, and recommendations.

The findings extend current IS research, first by providing a longitudinal perspective of the progression of recovery behaviors in the context of IT addiction. Building on prior literature on control, we provided a four-stage model of IT addiction recovery. Consistent with Bandura's self-regulation theory, our results revealed details of the observing, assessing, and adjusting stages and constituent elements of each stage as they play a role in progressing from that stage. In each stage, we shed light on the key enabling elements of the stage. Our results showed that progressing toward recovery involves successfully repeating these stages. However, failure to go through any of the stages may result in reverting back to compulsive or addicted use. Our process model extends the rich literature in IS that looked at various recovery IT addiction behaviors, such as permanent or temporary discontinuance of use (Soliman & Rinta-Kahila, 2019) or its reduction (Kim et al., 2007). While this literature provides valuable insights about several antecedents and explains significant variance in users' recovery behaviors and intentions, our results are novel – and comparable to those of Salo et al. (2022) regarding technostress - in that they provide a process-based understanding of addiction recovery and how continuous progression across four stages enables recovery and nominal use.

Second, compared to Bandura's self-regulation theory and likely due to the unique context we studied (i.e., IT addiction recovery), we found evidence of a fourth stage of behavioral self-regulation, namely reflecting. It is at this stage that users can assess the progress of their IT addiction recovery strategy and identify the areas for improving future iterations. The reflecting stage also includes managing the side effects of recovery that users may experience, such as cravings and withdrawal effects, as well as other effects that may influence the recovery process. These findings, although not directly addressed in Bandura's self-regulation theory, are in line with other behavior change and self-learning models that discuss post-action mechanisms (Schmitz & Wiese, 2006). By providing insights related to the reflecting stage, our model helps provide a deeper understanding of the IT addiction recovery process and highlights the importance of self-reflection as a necessary stage in enhancing addiction recovery and fostering a continuous trajectory toward curbing IT addiction and achieving nominal use.

Third, our findings clarified the supporting role of IT through each stage of the process. Based on a detailed examination of our data, we found that

technology plays a significant role in behavior change by 1) enabling awareness of the problematic behavior through personal use reports, 2) facilitating behavioral assessment through the provision of historical use reports, 3) helping recovery through app blockers, screentime features, and other use prevention/reduction mechanisms, and 4) allowing for reflection on behavior change by providing customized reports and recommendations for improving user-IT interaction. In this way, the findings go beyond existing IS literature that primarily focuses on individual users' traits and characteristics underlying recovery, such as habits, self-efficacy, guilt, or dissonance (Soliman & Rinta-Kahila, 2019).

In addition to the theoretical contribution, our study has important practical implications for developing intervention strategies for those who are struggling with IT addiction. The four-stage model proposed in this paper can be used as the foundation for developing detailed intervention strategies that support users' successful advancement through the stages. For example, tailored interventions can focus on goal setting, emotion regulation, providing a supportive environment (e.g., from peers), and self-efficacy enhancements through training and education. Similarly, a recovery strategy can highlight the significance of ongoing reflection and management of side effects while mindfully tracking the immediate and long-term outcomes during the reflecting stage. Increasing use-related awareness, assessment, adjustment, and reflection can ultimately lead to healthier engagement with IT.

The findings also highlight the important role of the IT artifact in supporting the recovery stages. Designers and developers can build upon these insights to create technologies (e.g., apps) or add features to existing technologies to offer detailed reports and help raise awareness of use, historical reports that facilitate the assessment of IT addiction, and app blockers, screen time controllers (and other similar technologies) that can control use and help to adjust behavior. Furthermore, technologies can be designed to promote self-reflection and continuous improvement of addicted and compulsive use. The IT industry has been the subject of much criticism for not considering the well-being of users (Fiske, 2022). However, stakeholders have a responsibility to consider the role that their products play in users' recovery and hence should design technologies and incorporate features that enable healthy and balanced use of IT and minimizes the negative effects of IT addiction. Finally, given that the priorities of IT providers may not consistently align with this consideration, our findings can inform industry regulators in developing IT-related policies.

Regulators can leverage the findings to establish guidelines and standards that promote responsible IT design and mandate the inclusion of tools and measures that allow users accurately observe, assess, adjust, and reflect on their use.

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