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Defining digital addiction: Key features from the literature

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Defining Digital Addiction:
Key Features from the Literature[*]

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Within recent years there has been increasing societal concern around the compulsive and excessive use of digital and Internet-enabled devices, such as the use of social media or online video gaming, and associated psychological and physical harms. However, problematic use or addictive behaviours are not yet included as diagnosable mental health issues in any major diagnostic system in Western countries and the conceptualisations of the phenomena are still inconsistent. To address this issue, the present study reviewed the current conceptualisations of digital addiction used within the research literature and identified common features of the definition of digital addiction. Definitions of the phenomenon were extracted from 47 studies, and they were analysed using a content analysis approach. The initial process assessed definitions for features of digital addiction within Internet, gaming and smartphone addiction. Two higher-order themes were identified, which focused on the harm caused by the phenomenon and on the user's behaviours associated with the phenomenon. It was also found that key constructs are not specific to the usage domain, i.e. whether it is related to gaming, Internet or smartphone use. Several core features were found across different conceptualisations of digital addiction within the literature; however, it was also noted that some features are subjective and inconsistently applied. If a decision is to be reached on whether the phenomenon is a mental health disorder, then clearer definitions must be created.

Key words: Problematic Internet use, Behavioural addictions, Internet addiction, smartphone use, Gaming disorder

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Highlights:

- There is a lack of consensus on how digital addiction should be defined.
- The harm caused by the behaviour or usage patterns were the main themes of the current digital addiction conceptualisations.
- These themes were shared between behavioural domains, e.g., social media and gaming.
- Reaching a consensus on the definition of digital addiction will benefit future research.

Digital addiction is an emergent research area that explores the problematic usage of digital devices. This includes discussions on whether this behaviour can be considered a mental health condition, and if so, what the diagnostic criteria should be based upon (Poli, 2017). There is variation in the prevalence of digital addiction in different countries of the world, with estimates ranging from 2.6% of the population in Northern and Western Europe to 10.9% in the Middle East (Cheng & Li, 2014). At present, there are no diagnostic criteria for digital addiction, although Internet gaming disorder (IGD), as a type of behaviours related to digital addiction, has been included in the Diagnostic and Statistical Manual for Mental Disorders (DSM–5; American Psychiatric Association, 2003) as a future area of research and investigation (Kaptsis, King, Delfabbro, & Gradisar, 2016). Similarly, the International Classification of Diseases version 11 (ICD–11; World Health Organisation, 2018) now lists Gaming Disorder, which it further separates as being predominately online or predominately offline. There is also a lack of agreement on what terminology should be used to identify this phenomenon, with suggestions including Internet addiction, compulsive computer use, and Problematic Internet Use (PIU) (Poli, 2017). Montag, Wegmann, Sariyska, Demetrovics, and Brand (2019) note the increasing use of Internet Use Disorder (IUD) by researchers in this field, in conjunction with the phrase *smartphone 'addiction'* to refer to behaviours linked to that specific device type. To be consistent with our previous research in Ali, Jiang, Phalp, Muir, and McAlaney (2015) and Alrobai, McAlaney, Phalp, and Ali (2016a), we will use the term *digital addiction* (DA) throughout this article, which is based in part on our assertion that an individual can use a digital device in a problematic way without that device necessarily having an active Internet connection.

Whilst we do not seek to evaluate diagnostic criteria for DA within this paper, it is useful to consider the influence that proposed criteria and models of DA have on how the behaviour has been defined within the literature. Santos et al. (2016) argue that there are three models of DA that are apparent from the research literature. Firstly, a component model that originated from pathological gambling, sharing elements of the biopsychosocial process such as withdrawal, salience, tolerance, conflict, mood medication and relapse. For example, Block, (2008) suggests that for Internet pathologies to be eligible for appearing in

diagnostic manuals, the similarities of symptomatic criteria must appear like that of many substance use disorders, although this also raises the broader debate of whether behavioural addictions are comparable to pharmacological addictions. However, Kwee, Komoru-Venovic, and Kwee (2010) argue the term *Internet addiction* may not hold diagnostic value as the relationship and exploration between the classification of Internet addiction and its symptoms has not been established by empirical evidence, dissimilar to substance use disorders. Kardefelt-Winther (2014) supports this and argues that being labelled as an "Internet addict" may not indicate that an individual has an established mental disorder but should be viewed as a coping strategy for negative life experiences. As such, in some cases, Internet addiction may be a symptom of an underlying mental health issue, rather than a condition itself.

The second model also incorporates the construct of control from pathological gambling research. Internet addiction is therefore defined in this model as not being able to control impulses in trying to resist carrying out addictive behaviour. This can result in tolerance, where some individuals may need to experience more of the online platform to gain the same levels of satisfaction; experiencing mood swings and withdrawal symptoms when not online; time distortion; a breakdown in relationships or at work or educationally and using escapism to relieve problems. For example, Han et al. (2007), define Internet addiction to be problematic use and an impulse control disorder if the individual has an irresistible urge to engage in Internet-related activity despite negative consequences.

The third model states that there must be symptoms and impairment present for an individual to have an Internet addiction. The symptoms can include withdrawal or preoccupation and loss of other interests, escapism or continued use despite negative consequences. Impairment, which is clinically significant, can also be established within an individual with functional impairment, for example, reduced abilities socially/academically or occupationally. For example, Lemmens, Valkenburg, and Peter (2009, p. 77) stated that "excessive and compulsive use of the computer or video games that results in social and/or emotional problems; despite these problems, the gamer is unable to control this excessive use".

DA has been suggested to be co-morbid with other mental health problems, which may influence how DA is defined and potentially diagnosed. For instance, Attention Deficit/Hyperactivity Disorder (ADHD) has been found to be associated with developing IGD. In a 2-year longitudinal study of 2293 adolescents, Ko, Yen, Chen, Yeh, and Yen (2009) found that the most significant predictors of DA were ADHD symptoms and hostility. Yen et al. (2017) used clinical interviews to establish an ADHD diagnosis and supports the notion that ADHD is associated with IGD in young adults. Moreover, Chou, Liu, Yang, Yen, and Hu (2015) suggest that ADHD patients are more likely to show low satisfaction with family relationships and enhanced reactions to rewards, which may be the contributing factors to increased risk of DA. It has also been suggested that decreased levels of social skills (Zwi, Jones, Thorgaard, York, & Dennis, 2009) may steer individuals with ADHD towards behaviours that

are more socially isolated but that are immediately rewarding, such as Internet gaming (Chou et al., 2015). There have been associations demonstrated between depression, anxiety, and DA, notably in relation to IGD. Bonnaire and Baptista (2019) identified that young male gamers who have experienced difficulty in recognising their own emotions were more likely to demonstrate depression, anxiety and IGD. Moreover, the social phobia has been found to be associated with IGD (Sioni, Burleson, & Bekerian, 2017). This is supported by Yayan, Arikan, Saban, Gürarslan Baş, and Özel Özcan (2017), who found a positive association between social phobia and IGD, which appeared to be related to the use of avatars within the game. It is suggested that avatars can replace face to face communication, and those with social phobia who are uncomfortable with face to face communication can fulfil the needs of social interaction with the in-game avatars. Thus, this could be causing the individual to play more and therefore be more likely to become identified as being addicted to online gaming. This example does raise the question of whether the underlying problem really is an addiction, or if the behaviour would be better considered to be a symptom or coping mechanism for a separate mental health issue.

Pharmacological and behavioural addictions research has included neuropsychological and neurobiological factors and has added internet addiction, recently. These studies have demonstrated that DA appears to share some of the same neurocognitive characteristics as more established forms of pharmacological and behavioural addictions, such as the presence of impulsivity as established in the systematic meta-review of (Lee, Hoppenbrouwers, & Franken, 2019). However, there was less evidence for compulsivity as a consistent factor between addictions. As the authors note, caution must be taken when considering the results of the systematic meta-review in relation to DA, given how few studies there are on this phenomenon compared to other areas of addiction (Lee et al., 2019). If progress is to be made on understanding DA then there is a need to come to a greater consensus on what the phenomenon is, and how it should be defined. This could, in turn, inform the wording of future diagnostic criteria if the behaviour is ever to become formally recognised as a mental health condition. This article contributes towards this space by reviewing the conceptualisations that have been used in the literature to date, followed by the proposal of a taxonomy of DA definitions as possible addictive behaviour disorders.

Method

Database Search

The literature search was conducted within the IEEXplore, Scopus, Springer, ScienceDirect, PsychInfo, and EBSCO Host databases, along with Google Scholar. The phrases searched for were gaming addiction, smartphone addiction, pathological usage, problematic Internet usage, digital dependency and Internet addiction. Backward and forward reference searching was then used to identify additional articles.

A total of 47 articles with relevant content were identified by the use of the search process outlined above.

Table 1
List of reviewed studies and definitions/themes for DA used in the analysis

Study	Digital Addiction Area	Definition/main theme (quotation marks indicate a definition has been quoted directly from the paper)
Aboujaoude et al. (2006)	Internet Addiction	"… a more liberal definition that included only two markers of problematic Internet use, say excessive use along with one item suggesting impairment or distress, could yield considerably higher rates."
Ali et al. (2015)	Gaming, Internet and smartphone addiction	"The excessive use of certain software-mediated operations to reach certain requirements. This includes the case when the use itself is compulsive or impulsive and also the case when the user cannot switch to other available alternatives to reach the same requirements without a good reason."
Alrobai, McAlaney, Phalp, and Ali (2016b)	Gaming, Internet and smartphone addiction	Compulsive, impulsive, excessive and hasty. DA is associated with negative behaviours such as anxiety and depression.
Ames (2013)	Smartphone Addiction	Set limits to their own smartphone us and disconnect from their devices due to stress and the increased cognitive load of constantly being connected.
Beard (2002)	Internet addiction	Social perspective suggests that familial, social, occupational and cultural factors are associated with addictive media use.
Beard (2005)	Internet Addiction	Defining an individual's psychological state, which includes both mental and emotional states as well as scholastic, occupational, and social interactions, as being impaired by overuse of the Internet.
Beranuy et al. (2013)	Gaming Addiction	From the axial analysis of control, three symptoms of Mobile Massive Multiplayer Online Role-Playing Game (MMORPG) addiction were found. These were (1) loss of control of the behaviour involved; (2) mood modification (e.g., guilt, depression) as a consequence of having played and lost control; and (3) craving or longing for playing when they are not doing it.
Block (2007)	Internet Addiction	"Excessive use, often associated with a loss of sense of time or a neglect of basic drives, 2) withdrawal , including feelings of anger, tension, and/or depression when the computer is inaccessible, 3) tolerance, including the need for better computer equipment, more software, or more hours of use, and 4) negative repercussions , including arguments, lying, poor achievement, social isolation, and fatigue."
Block (2008)	Internet Addiction	Internet addiction appears to be a common disorder that merits inclusion in DSM–5. Conceptually, the diagnosis is a compulsive-impulsive spectrum disorder that involves online and/or offline computer usage and consists of at least three subtypes: excessive gaming, sexual preoccupations, and e-mail/text messaging.
Cash et al. (2012)	Internet Addiction	All addictions, whether chemical or behavioural, share certain characteristics including salience, compulsive use (loss of control), mood modification and the alleviation of distress, tolerance and withdrawal, and the continuation despite negative consequences.
Cheng and Li (2014)	Internet Addiction	"Following the typical practice in the literature, IA was defined as problematic Internet use in this study… The IA prevalence rate was more than threefold higher than that of pathological gambling… another impulse control disorder."
Choliz (2010)	Smartphone Addiction	"Presence of addiction symptoms in subjects presenting a problematic use or diagnosed with smartphone addiction… lack of impulse control, use of the mobile phone to avoid unpleasant mood states, problems derived from the use of the mobile phone, abuse of the mobile phone."

Study	Digital Addiction Area	Definition/main theme (quotation marks indicate a definition has been quoted directly from the paper)
Davis (2001)	Gaming addiction	Specific pathological Internet use includes those people that are dependent on a specific function of the Internet… reasonable to assume that these dependencies are content-specific and that they would exist in the absence of the Internet... also includes wasting time online, without a clear objective.
Dong, Hu, Lin, and Lu (2013)	Gaming Addiction	Inability of an individual to control his/her use of the Internet with negative consequences to psychological, social, and/or work functioning aspects.
M. D. Griffiths (1996)	Internet Addiction	"a behavioural addiction that involves human-machine interaction… Internet behaviour dependence -substance use disorder-salience, mood modification, tolerance, withdrawal, conflict, relapse."
M. D. Griffiths (2008)	Gaming Addiction	Addictions should be defined in terms of the resultant behaviour of the individual not the cause(s) of the behaviour.
M. D. Griffiths and Hunt (1998)	Internet addiction	A subset of behavioural addictions that involves human-machine interaction and is non-chemical in nature.
Ha et al. (2006)	Gaming Addiction	It has been suggested to be an inability of individuals to control their Internet use, resulting in marked distress and functional impairment of general life such as academic performance, social interaction, occupational interest, developmental stage, and behavioural problems
Han and Renshaw (2012)	Gaming Addiction	The definition for problematic online game play in this study was extensive game play time (more than 4 hours per day/30 hours per week) (Ko et al., 2009) and impaired behaviours or distress due to a maladaptive pattern of online game play.
Han et al. (2009)	Internet Addiction	Rejected the existence of a formal diagnosis of Internet addiction, postulating that PIU is a symptom of already well-defined clinical entities such as depression, social phobia, or attention deficit hyperactivity disorder (ADHD)
Irmak and Erdogan (2016)	Digital Game addiction	Digital gaming addiction is better defined by the negative outcomes rather than the time spent on games.
Kesici and Tunç (2018)	Digital addiction	DA can be defined as impulse which leads to going on using digital tools although it is known that overusing such tools will create physical, emotional, mental, and social problems for an individual.
Kim and Kim (2010)	Gaming Addiction	Addiction was defined as playing the game every day for at least 4 h per day. All of them exhibited social phobic and/or lethargic behaviour as well as a dramatic drop in academic status.
Király et al. (2014)	Problematic online gaming	Although the amount of time players spend gaming has no diagnostic value in itself, gamers with IGD spend most of their time gaming and is detrimental to their physical and psychological well-being. Losing interest in and neglecting other activities can lead to a considerable decrease in work- or education-related performance, while their interpersonal relationships deteriorate or come to an end.
Ko et al. (2015)	Smartphone Addiction	Habitual checking/multitasking disrupts study, work and social interactions
Lapointe, Boudreau-Pinsonneault, and Vaghefi (2013)	IT addiction	Dependency to a technology that results in its excessive and compulsive use. We define IT addictive behaviours as IT-related behaviour that become a major focus of a person's life and that have potential negative consequences.

Study	Digital Addiction Area	Definition/main theme (quotation marks indicate a definition has been quoted directly from the paper)
Lee, Ahn, Choi, and Choi (2014)	Smartphone Addiction	Physical, but also to psychological and social aspects. Based on the definition of Internet addiction in the literature, we define smartphone addiction as the excessive use of smartphones that interferes with the daily lives of the users. In addition, it has various clinical features, such as tolerance, withdrawal symptoms, salience, mood modification, craving, loss of control
Lemmens et al. (2009)	Gaming Addiction	Video game addiction can be defined as "excessive and compulsive use of computer or video games that results in social and/or emotional problems; despite these problems, the gamer is unable to control this excessive use"
Li and Wang (2013)	Gaming Addiction	The definition of online game addiction for this study was excessive game play (more than 4 h per day/30 h per week); scores on digital addiction questionnaires, maladaptive behaviours or distress due to excessive online game playing, including a difficulty in controlling playing duration, decreased academic performance or absence from school, interpersonal conflicts, borrowing money for purchasing items used in online gaming, and feeling anxiety and distress upon withdrawal from online game playing.
Lin et al. (2015)	Smartphone addiction	Overuse is also linked to time distortion, with the result that the smartphone is used for longer than originally intended or perceived
Lin, Dong, Wang, and Du (2015)	Gaming Addiction	Focused on the neurological bases of these three characteristics of the IGA (i.e., the impaired decision-making ability, the impaired impulsivity control ability, and the impaired emotional management ability).
Montag et al. (2015)	Smartphone Addiction	"Internet addicted individuals–and likely also smartphone addicts– typically lack skills in structuring their daily routines"
Beomwoo et al. (2017)	Gaming Addiction	Problematic Internet game play was defined as excessive Internet game play of more than 4 hours per day or 30 hours per week… and maladaptive and disruptive behaviour in general life due to excessive Internet game play.
Park et al. (2016)	Gaming Addiction	Typically, OGA is defined as a pattern of excessive and prolonged online gaming that results in a cluster of cognitive and behavioural symptoms, including progressive loss of control over gaming, tolerance, and withdrawal symptoms.
Sakuma et al. (2017)	Gaming Addiction	Internet gaming disorder (IGD) is a novel behavioural addiction that influences the physical, mental,and social aspects of health due to excessive Internet gaming.
Shapira et al. (2003)	Internet Addiction	"We propose that problematic Internet use be conceptualised as an impulse control disorder, a disorder in which individuals usually experience rising tension or arousal before an action(s) and subsequently experience a sense of relief or pleasure after completion of the behaviour(s)."
Sim, Gentile, Bricolo, Serpelloni, and Gulamoydeen (2012)	Internet addiction	The problem is attributed to the use. If we take this approach, one additional definitional issue can be resolved. If PTU is a unique problem, then it would fit under the Axis I category 'impulse-control disorders not elsewhere classified.
Smahel, Wright, and Cernikova (2015)	Internet Addiction	Children often reported health problems without indicating Internet addiction or overuse, and sometimes they reported these problems after 30 min of technology usage.

Study	Digital Addiction Area	Definition/main theme (quotation marks indicate a definition has been quoted directly from the paper)
Tao et al. (2010)	Internet addiction	All the following must be present: Preoccupation with the Internet (thinks about previous online activity or anticipates next online session) Withdrawal, as manifested by a dysphoric mood, anxiety, irritability and boredom after several days without Internet activity. At least one (or more) of the following: Tolerance, marked increase in Internet use required to achieve satisfaction Persistent desire and/or unsuccessful attempts to control, cut back or discontinue Internet use Continued excessive use of Internet despite knowledge of having a persistent or recurrent physical or psychological problem likely to have been caused or exacerbated by Internet use. Loss of interests, previous hobbies, entertainment as a direct result of, and with the exception of, Internet use. Uses the Internet to escape or relieve a dysphoric mood (e.g., feelings of helplessness, guilt, anxiety).
Vadlin, Åslund, and Nilsson (2015)	Gaming addiction	Our definition of gaming addiction is a behavioural addiction that can be related to all types of digital games: online or offline, on computers, TV games (Play Station, X-box, Wii, etc.), tablets, mobiles, or any other type of console.
van Rooij et al. (2011)	Gaming addiction	The group is defined more precisely as heavy online gamers who score highly on criteria for non-substance addiction. These criteria are theorised to be applicable to online behaviour… behavioural addiction: withdrawal symptoms, loss of control, salience, conflict, and coping (mood modification).
Walsh et al. (2008)	Smartphone Addiction	"The most defining feature is over-attachment to an object or behaviour with the behaviour continuing in spite of noted negative outcomes".
Wolfling, Beutel, Dreier, and Muller (2014)	Internet Addiction (IA)	"Primary endpoint, we assessed symptoms of IA according to a reliable and valid self-report measure…time spent online, negative consequences arising from online activities, self-efficacy expectancy, and psychosocial symptoms were defined as secondary endpoints".
Young (1996)	Internet Addiction	"Pathological Internet use – impulse control disorder - preoccupation, unsuccessful efforts of control, persistent desire, tolerance, withdrawal, staying online longer than intended".
Young (2009)	Internet Addiction	New, and often unrecognised, clinical disorder that can cause relational, occupational, and social problems.
Zhang et al. (2016)	Gaming Addiction	Characterised by high levels of craving for online gaming and related cues. Since addiction-related cues can evoke increased activation in brain areas involved in motivational and reward pro-cessing and may engender gaming behaviours or trigger relapse.

Analysis. Feature extraction was applied to papers which stated their own definitions or used definitions from another paper (Table 1). The definitions were analysed with content analysis to extract common features within the definitions. The start of the process involved assessing the definitions for features of DA within the Internet, gaming and smartphone addiction. We grouped similar features to create a category, which was then combined to develop higher-order themes.

Ethics. This study consisted solely of a literature review, with no participation of human subjects or analysis of secondary data. In keeping with the policies of the Institutional Review Board of the relevant institution, no formal ethical approval was required.

Results

Feature Extractions for DA

The results of the qualitative analysis of the definition provided within the literature is shown in Figure 1. A range of features was identified, including those relating to social consequences, emotional consequences, device usage, motivation, and, similar to the diagnostic criteria used in substance misuse and sustained behaviours despite encountering harms. These features were grouped iteratively into fewer categories, finishing with two overall higher-order themes, harm focus and user focus.
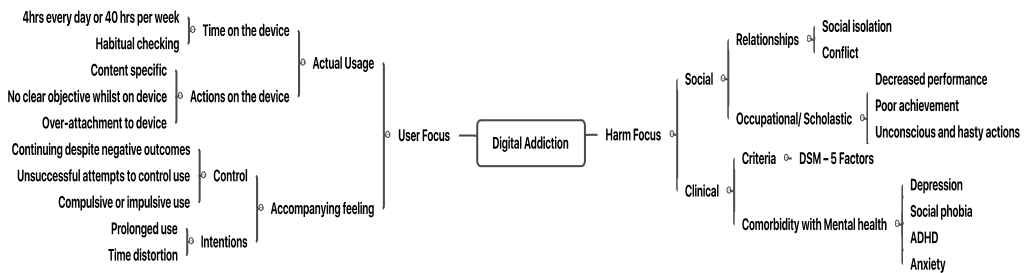

Figure 1. Digital Addiction: Features from the Literature.

Harm focus. It was found that many definitions of DA focus on the harmful consequences that individuals experience as a result of their excessive use of digital devices. Harmful social consequences involve negative relational harm including social isolation, neglect of other social activities (Block, 2007; Király, Nagygyörgy, Griffiths, & Demetrovics, 2014), and social conflict (van Rooij, Zinn, Schoenmakers, & van de Mheen, 2012). Moreover, occupational and or scholastic harm can occur, such as a decrease in performance and productivity (Ha et al., 2006). In addition, unconscious and hasty actions (Ali et al., 2015; Alrobai et al., 2016a) can influence work or school and could, therefore, cause a negative life experience with feelings of distress (Aboujaoude, Koran, Gamel, Large, & Serpe, 2006; Ha et al., 2006). It was also noted that many authors refer to symptoms and behaviours that are often listed in the DSM–5 in relation to diagnosable conditions. These include preoccupation, withdrawal, lack of control, maintenance of use despite negative consequences, functional impairment, loss of interest, development of tolerance, deceiving, and escapism (Beranuy, Carbonell, & Griffiths, 2013; Cash, Rae, Steel, & Winkler, 2012; Choliz, 2010; Tao et al., 2010; van Rooij, Schoenmakers, Vermulst, Van den Eijnden, & Van de Mheen, 2011).

User focus. Those studies which did not focus on the harms of DA instead focused on user experience of behaviours whilst interacting with the digital device. The analysis of this theme can be broken down further into the usage of the user or the feelings/behaviours that the user experiences. The usage

involves definitions of time spent online, where some definitions define the user experiencing more than 4 hours a day or 30 hours in a week on a digital device as addictive (Beomwoo, Sujin, Sun Mi, Ji Seon, & Doug Hyun, 2017) and the habitual checking of the device (Lee et al., 2014). Moreover, usage-based definitions involved device functionality and being addicted to the specific content on the device, not the device itself (Lee et al., 2014). This includes when the user has no clear objective of what they are achieving on the device and are overly attached to the digitally addictive device (Davis, 2001). The feelings of the user involve definitions of control, including the continuation of the behaviour despite negative outcomes and unsuccessful attempts to control (Walsh, White, & Young, 2008) Moreover, the definitions based on user feelings involved intention of use in relation to time; including the user experiencing time distortion (Block, 2007) and using the device for longer than intended (Aboujaoude et al., 2006).

Discussion

The current study reviewed the definitions of DA used in the literature. This incorporates some of the features from the three models established by Santos et al. (2016) and has further made additions to clarify the mapping of definitions across DA research studies. As noted, the overall main difference found between the definitions retrieved from the literature was in terms of the focus on the harm caused by the phenomena or on the user's behaviours. This separation of harm versus usage may provide an explanation for why there appears to be little research that explicitly links specific usage behaviours to specific harms. This contrasts with research into pharmacological addictions where, for example, there has been extensive research on how specific alcohol consumption behaviours relate to harm (Mostofsky, Mukamal, Giovannucci, Stampfer, & Rimm, 2016). In addition, it was noted that few of the reviewed papers discriminated between different devices, beyond general categories of smartphones and gaming systems. This may in part, be due to the overlap between devices and functionality, such as for example, gaming on a smartphone, and the methodological challenges in constructing usage measures that include every possible device. This again parallels research into alcohol-related harms, where a balance must be reached between recording the consumption of different beverage types without risking disengagement by study participants due to asking too many questions. Nevertheless, a better understanding of different types of device that are used in digital behaviours may improve prevention and intervention techniques. Finally, the papers that were reviewed discussed DA primarily in terms of social media addiction and/or video gaming addiction. There was little evidence of studies considering alternative forms of digital media addiction, which is consistent with other reviews within this area (Montag et al., 2019), although it is acknowledged that this finding may be an artefact of the search strategy that was used to locate the papers.

There was a degree of consensus on the set of core features of DA across Internet, gaming and smartphone addiction. This included the features relating to impulsivity, compulsion, lack of control, negative emotional outcomes, and impairments to work and study/school. This finding could help to solidify a definition within this research area and supports the work of Kuss & Billieux (2017) who suggest that the identification of similar criteria of digitally addictive behaviours will increase the reliability of research studies across different samples and cultures so that researchers can be sure that they are studying the same digital addition. However, Kwee et al. (2010) argue that the features used for diagnostic value in the relationship and exploration between the classification of Internet addiction and its symptoms have not been established by empirical evidence.

It is notable that many of the features identified are subjective, broadly defined, or open to interpretation through cultural norms. This may create issues in defining diagnostic criteria and implementing prevention and treatment strategies that are based on these criteria. This is a challenge encountered even in areas of addiction and mental health where there are clearly established and widely accepted diagnostic criteria (King, Delfabbro, Griffiths, & Gradisar, 2012). It was also evident that several of the studies reviewed use assessment tools that are based on definitions drawn from substance misuse research. This has led to assessment tools which are based on what may be an erroneous analogy with clinically established addictive disorders, and which are not consistently applied. This is supported by King and Delfabbro (2014), who found that only two treatment studies have employed the exact same method of diagnosis for IGD. Despite this, clinical trials of treatments for DA have already begun without having a clear definition of DA (Beomwoo et al., 2017).

There were limitations to our review. Whilst every effort was made to identify relevant papers through the search of relevant databases and forward and backwards searching, this review was not conducted as a systematic review. Therefore, there may have been relevant publications from the time period that were not included. It must also be acknowledged that the review of the literature was limited to English language publications, predominately from authors based in Western countries. As Li et al. (2018) note. there is. for example, also extensive research literature published in Chinese language journals, with some existing questionnaires for DA being used as the basis for clinical treatment. Greater collaboration between researchers across the world on this topic is needed.

The current study has shown that the use of similar aspects of DA definitions was consistent across Internet, gaming and smartphone addiction. This provides evidence that there are similar criteria being used to study DA as an entity. Future research could investigate whether the criteria that are currently used to describe DA is empirically established within the Internet, smartphone and gaming addiction. Moreover, it can be investigated whether the definitions hold with different terminology of the definitions, for example, *Internet gaming*

disorder and *problematic Internet use*. The study found that the definition of symptoms of DA has been associated with substance use. However, current human interactions with the Internet, gaming and smartphones have shown that these are integrated and used for everyday life and so future research could establish what activities individuals are addicted to through the medium that facilitates the activity. It must be noted that there are unique characteristics to DA that provide different opportunities for definition and understanding that are not present in other addictive behaviours. Behaviours based on the use of a digital device can be tracked and shared with researchers in an objective and quantified way that is rarely possible in, for example, alcohol use. Digital devices can also empower individuals and research study participants to easily provide information about their experiences of DA, such as what triggers feelings of Fear of Missing Out (FoMO) (Alutaybi et al., 2019). Utilising this type of data may help researchers reach a better understanding of what DA is and how it should be conceptualised, and in turn, how it should be defined and potentially diagnosed. Even if the phenomenon is not as of this year recognised as a diagnosable mental health disorder, such research could also help inform the design of social media platforms, so as to mitigate harmful experiences associated with DA (Altuwairiqi, Arden-Close, Bolat, Renshaw-Vuillier, & Ali, 2019). Finally, the study has also revealed that some DA definitions are likened to substance use disorders, which has influenced the design or treatment and preventative strategies. However, at present, there is limited evidence to support these strategies.

References

Aboujaoude, E., Koran, L. M., Gamel, N., Large, M. D., & Serpe, R. T. (2006). Potential markers for problematic internet use: a telephone survey of 2,513 adults. *CNS Spectrum, 11*(10), 750–755. doi:10.1017/s1092852900014875

Ali, R., Jiang, N., Phalp, K., Muir, S., & McAlaney, J. (2015). *The emerging requirement for digital addiction labels*. The 20th International Working Conference on Requirements Engineering: Foundation for Software Quality (REFSQ 2015), Essen, Germany. doi: 10.1007/978-3-319-16101-3_13

Alrobai, A., McAlaney, J., Phalp, K., & Ali, R. (2016a). Exploring the risk factors of interactive e-health interventions for digital addiction. *International Journal of Sociotechnology and Knowledge Development (IJSKD), 8*(2), 1–15. doi: 10.4018/IJSKD.2016040101

Alrobai, A., McAlaney, J., Phalp, K., & Ali, R. (2016b). Online peer groups as a persuasive tool to combat digital addiction. *Persuasive Technology* (pp. 288–300): Springer. doi: 10.1007/978-3-319-31510-2_25

Altuwairiqi, M., Arden-Close, E., Bolat, E., Renshaw-Vuillier, L., & Ali, R. (2019). *When people are problematically attached to social media: How would the design matter?* The 2019 IEEE International Conference on Systems, Man and Cybernetics (SMC). doi: 10.1109/SMC.2019.8913856

Alutaybi, A., McAlaney, J., Arden-Close, E., Stefanidis, A., Phalp, K., & Ali, R. (2019). *Fear of Missing Out (FoMO) as really lived: Five classifications and one ecology*. The 2019 6th International Conference on Behavioral, Economic and Socio-Cultural Computing (BESC). doi: 10.1109/BESC48373.2019.8963027

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*. Washington, DC.

Ames, M. G. (2013). *Managing mobile multitasking: the culture of iPhones on stanford campus*. Paper presented at the Proceedings of the 2013 conference on Computer supported cooperative work, San Antonio, Texas, USA. doi: 10.1145/2441776.2441945

Beard, K. W. (2002). Internet addiction: current status and implications for employees. *Journal of Employment Counseling, 39*(1), 2–11. doi:10.1002/j.2161-1920.2002.tb00503.x

Beard, K. W. (2005). Internet addiction: a review of current assessment techniques and potential assessment questions. *Cyber Psychology & Behavior, 8*(1), 7–14. doi:10.1089/cpb.2005.8.7

Beomwoo, N., Sujin, B., Sun Mi, K., Ji Seon, H., & Doug Hyun, H. (2017). Comparing the effects of Bupropion and Escitalopram on excessive internet game play in patients with major depressive disorder. *Clinical Psychopharmacology and Neuroscience, 15*(4), 361–368. doi:10.9758/cpn.2017.15.4.361

Beranuy, M., Carbonell, X., & Griffiths, M. D. (2013). A qualitative analysis of online gaming addicts in treatment. *International Journal of Mental Health and Addiction, 11*(2), 149–161. doi:10.1007/s11469-012-9405-2

Block, J. J. (2007). *Pathological computer use in the USA.* Paper presented at the International Symposium on the Counseling and Treatment of Youth Internet Addiction, Seoul, Korea.

Block, J. J. (2008). Issues for DSM-V: internet addiction. *American Journal of Psychiatry, 165*(3), 306–307. doi:10.1176/appi.ajp.2007.07101556

Bonnaire, C., & Baptista, D. (2019). Internet gaming disorder in male and female young adults: The role of alexithymia, depression, anxiety and gaming type. *Psychiatry Research, 272*, 521–530. doi:10.1016/j.psychres.2018.12.158

Cash, H., Rae, C. D., Steel, A. H., & Winkler, A. (2012). Internet addiction: A brief summary of research and practice. *Current Psychiatry Reviews, 8*(4), 292–298. doi:10.2174/157340012803520513

Cheng, C., & Li, A. Y. (2014). Internet addiction prevalence and quality of (real) life: a meta-analysis of 31 nations across seven world regions. *Cyberpsychology, Behavior, and Social Networking, 17*(12), 755–760. doi:10.1089/cyber.2014.0317

Choliz, M. (2010). Mobile phone addiction: a point of issue. *Addiction, 105*(2), 373–374. doi:10.1111/j.1360-0443.2009.02854.x

Chou, W. J., Liu, T. L., Yang, P., Yen, C. F., & Hu, H. F. (2015). Multi-dimensional correlates of Internet addiction symptoms in adolescents with attention-deficit/hyperactivity disorder. *Psychiatry Research and Behavior Management, 225*(1–2), 122–128. doi:10.1016/j.psychres.2014.11.003

Davis, R. A. (2001). A cognitive–behavioral model of pathological Internet use. *Computers in Human Behavior, 17*(2), 187–195. doi:10.1016/S0747-5632(00)00041-8

Dong, G., Hu, Y., Lin, X., & Lu, Q. (2013). What makes Internet addicts continue playing online even when faced by severe negative consequences? Possible explanations from an fMRI study. *Biological Psychology, 94*(2), 282–289. doi:10.1016/j.biopsycho.2013.07.009

Griffiths, M. D. (1996). Gambling on the Internet: A brief note. *Journal of Gambling Studies, 12*(4), 471–473. doi:10.1007/BF01539190

Griffiths, M. D. (2008). Videogame addiction: Further thoughts and observations. *International Journal of Mental Health and Addiction, 6*(2), 182–185. doi:10.1007/s11469-007-9128-y

Griffiths, M. D., & Hunt, N. (1998). Dependence on computer games by adolescents. *Psychological Reports, 82*(2), 475–480. doi:10.2466/pr0.1998.82.2.475

Ha, J. H., Yoo, H. J., Cho, I. H., Chin, B., Shin, D., & Kim, J. H. (2006). Psychiatric comorbidity assessed in Korean children and adolescents who screen positive for Internet addiction. *Journal of Clinical Psychiatry, 67*(5), 821–826. doi:10.4088/jcp.v67n0517

Han, D. H., Lee, Y. S., Na, C., Ahn, J. Y., Chung, U. S., Daniels, M. A., . . . Renshaw, P. F. (2009). The effect of methylphenidate on Internet video game play in children with attention-deficit/hyperactivity disorder. *Comprehensive Psychiatry, 50*(3), 251–256. doi:10.1016/j.comppsych.2008.08.011

Han, D. H., Lee, Y. S., Yang, K. C., Kim, E. Y., Lyoo, I. K., & Renshaw, P. F. (2007). Dopamine genes and reward dependence in adolescents with excessive internet video game play. *Journal of Addiction Medicine, 1*(3), 133–138. doi:10.1097/ADM.0b013e31811f465f

Han, D. H., & Renshaw, P. F. (2012). Bupropion in the treatment of problematic online game play in patients with major depressive disorder. *Journal of Psychopharmacology, 26*(5), 689–696. doi:10.1177/0269881111400647

Irmak, A. Y., & Erdogan, S. (2016). Digital game addiction among adolescents and young adults: A current overview. *Turkish Journal of Psychiatry, 27*(2). doi: 10.5080/u13407

Kaptsis, D., King, D. L., Delfabbro, P. H., & Gradisar, M. (2016). Withdrawal symptoms in internet gaming disorder: A systematic review. *Clinical Psychology Review, 43*, 58–66. doi:10.1016/j.cpr.2015.11.006

Kardefelt-Winther, D. (2014). A conceptual and methodological critique of internet addiction research: Towards a model of compensatory internet use. *Computers in Human Behavior, 31*, 351-354. doi:10.1016/j.chb.2013.10.059

Kesici, A., & Tunç, N. F. (2018). Investigating the digital addiction level of the university students according to their purposes for using digital tools. *Universal Journal of Educational Research, 6*(2), 245–241. doi:10.13189/ujer.2018.060204

Kim, M. G., & Kim, J. (2010). Cross-validation of reliability, convergent and discriminant validity for the problematic online game use scale. *Computers in Human Behavior, 26*(3), 389–398. doi:10.1016/j.chb.2009.11.010

King, D. L., & Delfabbro, P. H. (2014). Internet gaming disorder treatment: a review of definitions of diagnosis and treatment outcome. *Journal of Clinical Psychology, 70*(10), 942–955. doi:10.1002/jclp.22097

King, D. L., Delfabbro, P. H., Griffiths, M. D., & Gradisar, M. (2012). Cognitive-behavioral approaches to outpatient treatment of internet addiction in children and adolescents. *Journal of Clinical Psychology, 68*(11), 1185–1195. doi:10.1002/jclp.21918

Király, O., Nagygyörgy, K., Griffiths, M. D., & Demetrovics, Z. (2014). Problematic Online Gaming *Behavioral Addictions: Criteria, Evidence, and Treatment* (pp. 61–97): Elsevier. doi: 10.1016/B978-0-12-407724-9.00004-5

Ko, C. H., Yen, J. Y., Chen, C. S., Yeh, Y. C., & Yen, C. F. (2009). Predictive values of psychiatric symptoms for internet addiction in adolescents: a 2-year prospective study. *Archives of Pediatrics and Adolescent Medicine, 163*(10), 937–943. doi:10.1001/archpediatrics.2009.159

Ko, M., Yang, S., Lee, J., Heizmann, C., Jeong, J., Lee, U., . . . & Chung, K. M. (2015). *NUGU: a group-based intervention app for improving self-regulation of limiting smartphone use.* Paper presented at the Proceedings of the 18th ACM conference On Computer Supported Cooperative Work & Social Computing, Vancouver, Canada. doi: 10.1145/2675133.2675244

Kuss, D. J., & Billieux, J. (2017). Technological addictions: Conceptualisation, measurement, etiology and treatment. *Addictive Behaviors, 64*, 231–233. doi:10.1016/j.addbeh.2016.04.005

Kwee, A. W., Komoru-Venovic, E., & Kwee, J. L. (2010). *Treatment implications from etiological and diagnostic considerations of Internet addiction: Cautions with the boot camp approach.* Paper presented at the Proceedings of the International Conference of e-CASE, Singapore.

Lapointe, L., Boudreau-Pinsonneault, C., & Vaghefi, I. (2013). *Is smartphone usage truly smart? A qualitative investigation of IT addictive behaviors.* Paper presented at the

Proceedings of the 2013 46th Hawaii International Conference on System Sciences. doi: 10.1109/HICSS.2013.367

Lee, H., Ahn, H., Choi, S., & Choi, W. (2014). The SAMS: Smartphone Addiction. Management System and verification. *Journal of Medical Systems, 38*(1), 1. doi:10.1007/s10916-013-0001-1

Lee, R. S. C., Hoppenbrouwers, S., & Franken, I. (2019). A systematic meta-review of impulsivity and compulsivity in addictive behaviors. *Neuropsychology Review, 29*(1), 14–26. doi:10.1007/s11065-019-09402-x

Lee, U., Lee, J., Ko, M., Lee, C., Kim, Y., Yang, S., . . . Song, J. (2014). *Hooked on smartphones: An exploratory study on smartphone overuse among college students.* Paper presented at the ACM CHI Conference on Human Factors in Computing Systems, Toronto, Canada. doi: 10.1145/2556288.2557366

Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2009). Development and validation of a game addiction scale for adolescents. *Media Psychology, 12*(1), 77–95. doi:10.1080/15213260802669458

Li, H., & Wang, S. (2013). The role of cognitive distortion in online game addiction among Chinese adolescents. *Children and Youth Services Review, 35*(9), 1468–1475. doi:10.1016/j.childyouth.2013.05.021

Li, L., Xu, D. D., Chai, J. X., Wang, D., Li, L., Zhang, L., . . . & Xiang, Y. T. (2018). Prevalence of Internet addiction disorder in Chinese university students: A comprehensive meta-analysis of observational studies. *Journal of Behavioral Addictions, 7*(3), 610–623. doi:10.1556/2006.7.2018.53

Lin, X., Dong, G., Wang, Q., & Du, X. (2015). Abnormal gray matter and white matter volume in 'Internet gaming addicts'. *Addictive Behaviors, 40*, 137–143. doi:10.1016/j.addbeh.2014.09.010

Lin, Y. H., Lin, Y. C., Lee, Y. H., Lin, P. H., Lin, S. H., Chang, L. R., . . . & Kuo, T. B. (2015). Time distortion associated with smartphone addiction: Identifying smartphone addiction via a mobile application (App). *Journal of Psychiatric Research, 65*, 139–145. doi:10.1016/j.jpsychires.2015.04.003

Montag, C., Kannen, C., Lachmann, B., Sariyska, R., Duke, É., Reuter, M., & Markowetz, A. (2015). The importance of analogue zeitgebers to reduce digital addictive tendencies in the 21st century. *Addictive Behaviors Reports, 2*, 23–27. doi:10.1016/j.abrep.2015.04.002

Montag, C., Wegmann, E., Sariyska, R., Demetrovics, Z., & Brand, M. (2019). How to overcome taxonomical problems in the study of Internet use disorders and what to do with "smartphone addiction"? *Journal of Behavioral Addictions*, 1–7. doi:10.1556/2006.8.2019.59

Mostofsky, E., Mukamal, K. J., Giovannucci, E. L., Stampfer, M. J., & Rimm, E. B. (2016). Key findings on alcohol consumption and a variety of health outcomes from the nurses' health study. *American Journal of Public Health, 106*(9), 1586–1591. doi:10.2105/AJPH.2016.303336

Park, S. Y., Kim, S. M., Roh, S., Soh, M. A., Lee, S. H., Kim, H., . . . Han, D. H. (2016). The effects of a virtual reality treatment program for online gaming addiction. *Computer Methods and Programs in Biomedicine, 129*, 99–108. doi:10.1016/j.cmpb.2016.01.015

Poli, R. (2017). Internet addiction update: diagnostic criteria, assessment and prevalence. *Neuropsychiatry, 7*(1), 4–8. doi:10.4172/Neuropsychiatry.1000171

Sakuma, H., Mihara, S., Nakayama, H., Miura, K., Kitayuguchi, T., Maezono, M., . . . & Higuchi, S. (2017). Treatment with the Self-Discovery Camp (SDiC) improves Internet gaming disorder. *Addictive Behaviors, 64*, 357–362. doi:10.1016/j.addbeh.2016.06.013

Santos, V. A., Freire, R., Zugliani, M., Cirillo, P., Santos, H. H., Nardi, A. E., & King, A. L. (2016). Treatment of internet addiction with anxiety disorders: Treatment protocol and preliminary before-after results involving pharmacotherapy and modified cognitive behavioral therapy. *JMIR Research Protocols, 5*(1), e46. doi:10.2196/resprot.5278

Shapira, N. A., Lessig, M. C., Goldsmith, T. D., Szabo, S. T., Lazoritz, M., Gold, M. S., & Stein, D. J. (2003). Problematic internet use: proposed classification and diagnostic criteria. *Depression and Anxiety, 17*(4), 207–216. doi:10.1002/da.10094

Sim, T., Gentile, D. A., Bricolo, F., Serpelloni, G., & Gulamoydeen, F. (2012). A conceptual review of research on the pathological use of computers, video games, and the Internet. *International Journal of Mental Health and Addiction, 10*(5), 748–769. doi:10.1007/s11469-011-9369-7

Sioni, S. R., Burleson, M., & Bekerian, D. A. (2017). Internet gaming disorder: Social phobia and identifying with your virtual self. *Computers in Human Behavior, 17*, 11–15. doi:10.1016/j.chb.2017.01.044

Smahel, D., Wright, M. F., & Cernikova, M. (2015). The impact of digital media on health: children's perspectives. *International Journal of Public Health, 60*(2), 131–137. doi:10.1007/s00038-015-0649-z

Tao, R., Huang, X., Wang, J., Zhang, H., Zhang, Y., & Li, M. (2010). Proposed diagnostic criteria for internet addiction. *Addiction, 105*(3), 556–564. doi:10.1111/j.1360-0443.2009.02828.x

Vadlin, S., Åslund, C., & Nilsson, K. W. (2015). Development and content validity of a screening instrument for gaming addiction in adolescents: The Gaming Addiction Identification Test (GAIT). *Scandinavian Journal of Psychology, 56*(4), 458–466. doi:10.1111/sjop.12196

van Rooij, A. J., Schoenmakers, T. M., Vermulst, A. A., Van den Eijnden, R. J., & Van de Mheen, D. (2011). Online video game addiction: identification of addicted adolescent gamers. *Addiction, 106*(1), 205–212. doi:10.1111/j.1360-0443.2010.03104.x

van Rooij, A. J., Zinn, M. F., Schoenmakers, T. M., & van de Mheen, D. (2012). Treating internet addiction with cognitive-behavioral therapy: A thematic analysis of the experiences of therapists. *International Journal of Mental Health and Addiction, 10*(1), 69–82. doi:10.1007/s11469-010-9295-0

Walsh, S. P., White, K. M., & Young, R. M. (2008). Over-connected? A qualitative exploration of the relationship between Australian youth and their mobile phones. *Journal of Adolescence, 31*(1), 77–92. doi:10.1016/j.adolescence.2007.04.004

Wolfling, K., Beutel, M. E., Dreier, M., & Muller, K. W. (2014). Treatment outcomes in patients with internet addiction: A clinical pilot study on the effects of a cognitive-behavioral therapy program. *BioMed Research International, 2014*, 8. doi:10.1155/2014/425924

World Health Organisation. (2018). *World Health Organization. (2018). International classification of diseases for mortality and morbidity statistics (11th Revision)*. Retrieved from https://icd.who.int/browse11/l-m/en

Yayan, E. H., Arikan, D., Saban, F., Gürarslan Baş, N., & Özel Özcan, Ö. (2017). Examination of the correlation between internet addiction and social phobia in adolescents. *Western Journal of Nursing Research, 39*(9), 1240–1254. doi:10.1177/0193945916665820

Yen, J. Y., Liu, T. L., Wang, P. W., Chen, C. S., Yen, C. F., & Ko, C. H. (2017). Association between Internet gaming disorder and adult attention deficit and hyperactivity disorder and their correlates: Impulsivity and hostility. *Addictive Behaviors, 64*, 308–313. doi:10.1016/j.addbeh.2016.04.024

Young, K. S. (1996). *Internet addiction: The emergence of a new clinical disorder*. Paper presented at the Meeting of the American Psychological Association, Toronto, Canada. doi: 10.1089/cpb.1998.1.237

Young, K. S. (2009). Internet addiction: Diagnosis and treatment considerations. *Journal of Contemporary Psychotherapy, 39*(4), 241–246. doi:10.1007/s10879-009-9120-x

Zhang, J. T., Yao, Y. W., Potenza, M. N., Xia, C. C., Lan, J., Liu, L., . . . Fang, X. Y. (2016). Effects of craving behavioral intervention on neural substrates of cue-induced craving in Internet gaming disorder. *NeuroImage. Clinical., 12*, 591–599. doi:10.1016/j.nicl.2016.09.004

Zwi, M., Jones, H., Thorgaard, C., York, A., & Dennis, J. A. (2009). Parent training interventions for attention deficit hyperactivity disorder. *Cochrane Database Systematic Reviews, 3*, CD003018. doi:10.1002/14651858.CD003018.pub2

Definisanje digitalne zavisnosti:
ključne karakteristike iz literature

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Poslednjih godina ima sve više zabrinutosti u društvu u vezi kompulzivne i prekomerne upotrebe digitalnih uređaja i uređaja povezanih na Internet, poput korišćenja društvenih mreža ili igranja onlajn igara, te negativnih psiholoških i fizičkih posledica koje iz toga proističu. Međutim, problematična upotreba (Interneta, prim. prev.) i digitalna zavisnost još uvek nisu zvanične dijagnostičke kategorije mentalnih poremećaja ni u jednoj dijagnostičkoj klasifikaciji bolesti zapadnih zemalja, a konceptualizacije ovih fenomena su još uvek nekonzistentne. Sa željom da doprinesemo razvoju naučnih znanja o ovoj temi, u ovoj studiji smo napravili pregled trenutnih konceptualizacija digitalne zavisnosti i identifikovali zajedničke odredbe postojećih definicija. Definicije ovog fenomena su preuzete iz 47 studija i analizirane metodom analize sadržaja. Najpre su postojeće odredbe sagledane u odnosu na karaksterstike digitalne zavisnosti u vezi s upotrebom Interneta, igranja kompjuterskih igara i korišćenja pametnih telefona. Identifikovane su dve teme višeg reda, od kojih je jedna bila fokus na teškoće koje su izazvane ovim fenomenima, a druga se odnosila na ponašanja korisnika u vezi sa fenomenom (digitalne zavisnosti, prim. prev.). Utvrđeno je takođe da ključni konstrukti nisu specifični za pojedine domene upotrebe, bilo da se radi o igranju igara, upotrebi Interneta ili upotrebi pametnih telefona. Nekoliko ključnih karakteristika digitalne zavisnosti je utvrđeno pregledom različitih konceptualizacija u literaturi, ali je takođe utvrđeno i da su neke od njih subjektivne i da se nekonzistentno koriste. Ukoliko je potrebno doneti odluku da li se ovi fenomeni mogu smatrati mentalnim poremećajima, potrebno je jasnije ih definisati.

Ključne reči: problematična upotreba Interneta, bihejvioralne zavisnosti, zavisnost od Interneta, korišćenje pametnih telefona, poremećaj igranja kompjuterskih igara