

Internet Addiction and Identity: A Systematic Research Review

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Abstract

Within the last decade, human dependency on the internet has increased in both work and leisure activities. While numerous research studies have documented how internet use has positively contributed to life and society, a small but growing body of research documents how internet misuse can lead to negative outcomes for individuals. One particularly important area of public concern is the connection between addictive internet usage and human identity. Inspired by Goffman's theory of the presentation of self, this study aims to address the impact of excessive internet use on real-world identity and virtual-world identity. To achieve this goal, the researcher synthesized 34 studies conducted from 2008 to 2018 about the influence of internet addiction on identity construction. The results revealed that internet addiction and identity have been given increased attention by academics despite the lack of current literature in this field. Most research studies (89%) focus on young individuals aged nine to 30 years old, while less attention is given to those over 30 years old. Switching between an online and an offline identity was proven in a number of studies based on participants' statements. Moreover, of the literature reviewed, online gaming addiction and identity studies are addressed in 30% while internet addiction and identity are addressed in 39%; this could be linked to the official recognition of an online gaming disorder in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM). The present study calls for scientists and psychologists to include internet addiction as a disorder in future editions of DSM alongside online gaming addiction.

Keywords: Internet addiction, Online identity, Offline identity, Self-presentation,
Systematic review

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Introduction

The entry of technology into different aspects of human lives is undeniable, and human dependency upon this technology is evident. While internet technology has made human lives easier and facilitated communication with other people and cultures, internet, as with any other new technology, is a two-sided invention. The internet is not only a blessing; it can be a curse, too. The enhancement and the alluring features of internet technology have simultaneously improved human engagement while arguably complicating individuals' control over this technology (Kuss et al., 2014; Kuss & Lopez-Fernandez, 2016).

Day after day, cyberspace platforms develop in new ways that ease people's use of them. In addition, such improvements also make the internet more attractive because of the widespread availability of diverse applications. Therefore, an increasing number of people are depending on the internet now more than ever either for business use or for leisure and personal use (Kuss & Lopez-Fernandez, 2016).

Recently, excessive internet use has been linked to an addictive disorder. Internet addiction is defined as "an impulse-control disorder that does not involve an intoxicant" (Young, 1998, p. 238). Throughout the last two decades, academic studies have raised concerns about how excessive internet use could lead to long-term psychological problems related to online addiction and identity crises (Kuss et al., 2014; see also Koo & Kwon, 2014; Kuss & Lopez-Fernandez, 2016). For instance, a recent meta-analysis which examined internet addiction in Korea found identity to be one factor associated with internet addiction (Koo & Kwon, 2014).

While it could be hard now to treat internet addiction and its influence on identity, it is crucial to understand how identities are constructed within the growing complex nature of technology and communications. Being aware of the possible drawbacks on identity from excessive internet use would help individuals to reconsider before acting in the same way as

addicted individuals. Also, enhanced awareness of this issue would help to explain why people behave differently in virtual reality and actual reality. Not only would such studies benefit users, but they would also direct scholars and scientists to examine the gap in knowledge exhaustively.

A number of academic studies have linked the excessive use of the internet to identity construction issues. For instance, researchers have shed light on how identity could be affected by certain behaviours, e.g., role-play games, that are practiced online (Jenson et al., 2015; see also Bacchini et al., 2017; Kelly, 2004; Lemenager et al., 2013). Also, the nature of some online platforms has been linked to the possibility of an individual presenting different identities online and offline. For instance, online chatting groups and social media platforms allow anyone to easily register with nicknames, an option which could promote having another identity online (Viveiro et al., 2014).

While few studies have paid attention to the impact of internet problematic use on identity, online gaming addiction studies are largely present in databases such as Web of Science, Scopus, PsycINFO and 1finder. This can be connected to the inclusion of internet gaming addiction in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5). surprisingly, the broader term “internet addiction” is not mentioned in this publication. This exclusion has led to a shortcoming of studies focusing on this addictive behaviour; furthermore, such an absence could also be linked to the lack of psychiatric involvement in helping people overcome the negative outcomes of internet addiction.

Concerns about whether spending more time online could lead to excessive internet use that may result in adopting or presenting another identity/self which is different from the one presented to the real world have encouraged this researcher to conduct a systematic review of what has been published on this matter. Accordingly, this research paper aims to systematically explore the existing empirical studies investigating the link between internet

addiction and identity over the last decade. This 10-year period reflects the time during which internet service became more accessible to people, especially through the introduction of smart phones and other handheld devices.

Another more specific objective of this review is to investigate the challenges associated with internet addiction and the construction of one's virtual identity online in juxtaposition with one's real-life identity. Additionally, this review aims to identify the gaps in knowledge or areas that have not been extensively studied regarding this connection. It is hoped that doing so will direct researchers to closely investigate these issues and possibly present more evidence-based work on the impact of internet addiction on identity. Furthermore, the cooperation of researchers from different fields such as communication and psychology could help to boost the scientific inventory with more information about identity and excessive internet use.

Therefore, the purpose of this systematic review is to examine the current research investigating the connection between internet addiction and identity. The review focuses on peer-reviewed research published between 2008 and 2018 to capture the current state of knowledge about internet addiction and identity.

Literature Review

Many people believe that the surrounding environment could play a key role in shaping human behaviour (Lazarus & Cohen, 1977; Matei, 2017). To some extent, the impact of surrounding circumstances cannot be ignored. Regardless of whether such an impact is positive or negative, external circumstances may have an impact on human beings. Such an influence could arise as a method for humans to adapt to certain circumstances, such as cavemen learning to hunt in order to eat, or it could be a matter of humans fulfilling their special needs. Indeed, Maslow's hierarchy of needs is applicable theory to introduce the motivation behind human behaviours and their desire to meet certain psychological needs (Maslow, 1943). According to Maslow, each individual has certain needs that should be satisfied to maintain psychological well-being, and these needs always motivate the person to meet them. Once a need is met, a person then works to meet another need, and so on. Ultimately, Maslow maintains that human behaviours are not controlled by a single motive, and these motives may vary according to the specific social settings and circumstances surrounding the person.

In a similar vein, James Clear believes that the environment can be an invisible hand that leads human beings to act in certain ways (Clear, 2018). According to the *Cambridge English Dictionary*, "environment" has two meanings: one is allocated to the natural world, including elements such as air and water that are important to sustain and ensure the life of living beings. The second meaning signifies the other conditions that surround and could have an influence on living beings (*Cambridge English Dictionary*, n.d.). Thus, virtual cyberspace can be considered a social setting that allows one to study its elements as if they were real-world elements. Being able to study the online world as much as one can examine the offline world seems to support the idea of a circle of influence as well as a circle of concerns associated with this virtual world. Accordingly, the following sections summarize

some of the current academic literature published on each aspect of this project's focus: internet addiction and online and offline identity.

Internet Addiction

It has only been a few decades since the concept of the internet was introduced to the world. Following the invention of computers, which were first presented in the twentieth century, the internet was first accessed publicly in 1990 when the World Wide Web was invented (Andrews, 2019). As with any other innovation, internet technology passed through various evolutionary phases to become a leading component of development in the era of globalization. Who would have imagined that a new limited-access invention would become the dominant means of functioning in various aspects of one's life? Who would have imagined the significant number of inventions that arose because of the internet? Furthermore, who can imagine life in the future without the internet?

The internet is a broad concept that may include several meanings, but all meanings share some core relation to the broader concept. Generally, the internet can be referred to as the large network that connects computer systems all over the globe (Andrews, 2019). For the sake of clarity, any mention of the internet in this systematic review is mostly intended to refer to the platforms that allow users to access information, contribute content, and interact with others within cyberspace. In other words, the researcher allocates this working definition to focus on the subjective experience of being an internet user instead of the objective technical specifications of what it means for the internet to exist.

There is no doubt that any new technology may have an influence on users, and the internet is not an exemption. One of the earliest papers that introduced the issue of internet addiction (IAD) was an article written by O'Reilly (1996) which was published in *The Canadian Medical Association Journal*. O'Reilly reported discussions with a number of physicians and scientists on their internet use and how they could be "net junkies" or

“hooked” to the internet even while using it for work (OReilly, 1996). He concluded that IAD is analogous to other addictions in that subjects display similar symptoms and experience some of the same consequences.

In the *Oxford Dictionary of Psychology*, Colman (2009) specifies internet addiction syndrome as:

A condition resembling an impulse-control disorder, first identified in the US in 1994... characterized by excessive or pathological Internet surfing, indicated by such signs and symptoms as being preoccupied with the Internet; recurrent dreams and fantasies about the Internet; lying to family members or therapists to conceal the extent of time spent online; attempting repeatedly and unsuccessfully to cut down or to stop spending time online, and becoming restless or irritable while doing so; using the Internet as an escape from worry or unhappiness; and jeopardizing a significant job, relationship, or educational opportunity by spending excessive time online.

Previous academic studies have examined the influence of the excessive use of internet on users. For example, studies have explored the impact of internet usage on academic performance (Chen & Peng, 2008; Lin, Ko, & Wu, 2011); analyzed the relationship between heavy internet usage and the individual's disengagement with his/her family and work (Chen & Peng, 2008; Milani, Osualdella, & Di Blasio, 2009); and examined the correlation between self-esteem and excessive internet use (Armstrong, Phillips, & Saling, 2000; Caplan, 2002; Ko, Yen, Yen, Lin, & Yang, 2007). Boyd (2014a) explains how some youth may be negatively affected by this technology: “for some, an obsession with gaming or social media can wreak havoc on their lives, affecting school performance and stunting emotional development” (p. 78). This research raises concerns about how excessive internet

use could lead to long-term psychological problems related to online addiction and identity crises. For instance, a recent meta-analysis which examined internet addiction in Korea found identity to be one factor associated with internet addiction (Koo & Kwon, 2014).

The conceptualization of excessive internet use as an addiction provides a unique perspective on excessive internet use and the human condition. Looking first at the scientific meaning of addiction provided by the American Society of Addiction Medicine (ASAM), rather than being a behavioural problem, addiction is “a chronic disease of brain reward, motivation, memory and related circuitry”. Moreover, if there is any dysfunction affecting these circuits, problems related to biological, psychological, and social and spiritual characteristics could occur (“ASAM Definition of Addiction,” 2011). Furthermore, Goodman (1990) characterized addiction as a “process whereby a behavior, that can function both to produce gratification and to provide escape from internal discomfort, is employed in a pattern characterised by loss of control and continuation despite significant negative consequences” (p. 1406).

Accordingly, internet addiction is defined as “an impulse-control disorder that does not involve an intoxicant” (Young, 1998, p. 238). Also, based on their behavioural evaluation of people with problematic internet use, Shapira, Goldsmith, Keck, Khosla, and McElroy (2000) described problematic internet use as “uncontrollable, markedly distressing, time-consuming or resulting in social, occupational or financial difficulties and not solely present during hypomanic or manic symptoms” (p. 268). Subsequently, Ha et al. (2006) simplified the internet addiction definitions proposed by Shapira et al. (2000) and Young (1996) by stating that internet addiction is the situation when people lose control over their lives because of their excessive internet use. However, there is no standardized definition for internet addiction disorder.

Young (1998) developed a diagnostic questionnaire modified from pathological gambling to measure internet addiction level. According to this test, an addicted internet user is a person who responds 'yes' to five or more questions from the total of eight questions. Respondents were asked to self-report certain questions, such as "how many hours per week they estimated spending on-line", and "what problems, if any, did their Internet use cause in their lives" (Young, 1998, p. 238).

Although internet addiction is not officially recognized as a disorder within the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-V), there is a concerted effort to have this addiction included in future editions of DSM (Block, 2008; Gregory, 2018; Poli, 2017). This inclusion would bring further attention to the negative aspects of internet use as a potentially threatening psychological disorder requiring professional intervention.

Identity

Addiction to the internet could lead to uncountable significant issues. One of the key elements that could be affected by internet usage is identity (Mazalin & Moore, 2004; Valkenburg & Peter, 2011). James (1890) describes personal identity as a "consciousness of personal sameness" (as cited in Hammack, 2015, p. 4). Similarly, Danesi (2016) sees the consciousness of one's identity as the ability to be aware of one's personal uniqueness and individuality among a group. However, one's identity is not fixed; instead, it "changes according to age and situation, but remains largely embedded in the linguistic and cultural realities of one's rearing experiences" (Danesi, 2016, p. 156). In addition, Hammack (2008) defines identity as an "ideology cognized through the individual engagement with discourse, made manifest in a personal narrative constructed and reconstructed across the life course, and scripted in and through social interaction and social practice" (p. 222). Another important aspect of identity is a situation in which a person, especially an adolescent, struggles to develop his sense of individuality and is confused about defining his own character or

adopting a ready-to-wear identity made by his environment (Motti-Stefanidi, 2015). This situation is called identity confusion.

However, the concept of adopting a new identity or changing or modifying one's current identity is not new in the academic field. Turkle in *Life on the Screen* (1995) writes, "When we step through the screen into virtual communities, we reconstruct our identities on the other side of the looking glass" (p. 177). Some scholars believe that identity can be fluid according to different social settings and situations (Erikson, 1968; Goffman, 1959; Donahue, Robins, Roberts, & John, 1993).

Erik H. Erikson was one of the most influential theorists to study identity. In his book entitled *Identity: Youth and Crisis*, sees identity development as an engagement of three sub-identities: ego identity, personal identity, and social identity. Lacan (1977) claimed that a person's sense of identity passes through different phases of development (as cited in Woodward, 1997). For instance, children start recognizing themselves in the "mirror stage" followed by the "imaginary phase" when they still think they are not separate from their mothers. The actual recognition of self begins when children know they are separate from their mothers and they have their own structures (Woodward, 1997).

In *The Saturated Self*, Gergen (1991) argues that the individuality of persons is based on their relationships, and that there is no concrete self. The self, according to Gergen, is a reflection of communal formation. To support this idea, Gergen (1991) introduces the concept of "pastiche personality" that describes a situation in which a person borrows "bits and pieces of identity from whatever sources are available and construct[s] them as useful or desirable in a given situation" (p. 150). The author adds that that the appropriate management of identity can lead to significant advantages as long as the person ignores his/her real identity and focuses on "the moment at hand" (p. 150). Gergen (1991) also discusses how one's real identity could slowly fade away as one begins to blend into a broader social group.

In such a case, one's identity is determined by his/her role and participation in the group, causing an eclipse of his/her personal being (Gergen, 1991). Similarly, Stryker and Burke (2000) define identity as being "internal, consisting of internalized meanings and expectations associated with a role" (p. 289). The authors agree with Gergen (1991) in that identity is determined by specific situations, settings, and roles that a person plays. Therefore, identity is perhaps best viewed as inconstant.

Focusing on young adults, different studies have proven that some young people are aware of their second online identity. For example, Luppicini and Barber (2013) concluded that nearly 60% of university students admitted they had a "unique online identity that was not the same as their offline identity" (p. 165). While the rest of the participants claimed that they had the same identity on the internet and in real life, they related this situation to having the same social networks while online and in reality. Having a second online identity does not only mean having another identity, it also requires managing one's online identity by producing an alternative presentation of self. This self-presentation works as an advertisement of self. One student said, "I have the chance to carefully think about what I share with the online world, and manipulate it to my advantage. It's almost as if I am advertising myself for the world..." (Luppicini & Barber, 2013, p. 166).

Another study conducted by Hu, Zhao, and Huang (2015) revealed the motivations of people to adopt new identities on social network sites. The study focused on six motives including privacy concerns, avoidance of old social networks, engaging with new networks, enjoyment, disinhibition, or vanity. Additionally, Zhao, Grasmuck, and Martin (2008) explored online identity construction in a non-anonymous setting such as Facebook. Zhao et al. concluded that a user's online identity varied according to their social setting. Therefore, one's online identity is not only different from their real-life identity, it is also shaped by the

characteristics of any given online environment (2008). These results showcase Goffman's dramaturgical model.

Factors affecting identity. Identity can be affected by different factors throughout individuals' lives. These determinants include the ethnic group a person belongs to, his nation, his gender, and his language (Danesi, 2016). All of these factors combined shape the identity of human beings differently.

Motti-Stefanidi (2015) maintains that the ability of young individuals to develop "positive identities" is related to their adaptive behaviours which, in turn, are related to two factors: one is the internal resources and the surrounding external conditions that lead them to successfully navigate their own personal identities, and the other is their self-esteem which plays a key role in defining identity and which increases the chance of developing positive identities.

Risk is another factor that affects identity contexts and roles. For example, Harter (1998) found that risk can be a barrier against adolescents being able to effectively navigate the self and may lead to the development of certain personality characteristics that encourage having multiple selves (as cited in Motti-Stefanidi, 2015). Furthermore, according to McAdams and McLean (2013), risk can also affect the information adolescents may release or hide about their lives (as cited in Motti-Stefanidi, 2015). One could therefore ask what the risks may be that lead people to change their identities in an online setting. In fact, this question mirrors the focus of this research. Knowing the risks associated with identity construction online could be at least half the answer — if not the full answer — to determining the relationship between excessive use of the internet and identity adjustment.

Theoretical background: Self-presentation and identity

Inspired by the idea brought by Erving Goffman (1959) that people usually tend to behave as if they were acting in the theatre, presenting or pretending to have a different

identity online could be explained by Goffman's perspective. One theory that could help explain possible identity crises arising from problematic internet use is self-presentation or dramaturgy theory. According to Goffman (1959), people usually behave as if they are acting in a theatre. Their performances change in accordance with the roles they are involved in so that they adopt different personas in different social settings. In other words, the way people represent themselves to their family differs from the way they represent themselves to their friends and colleagues. These representations may even differ from who they actually are. Goffman identified these interchangeable personas as a dramaturgy. Goffman in *The Presentation of Self in Everyday Life* (1959) drew an analogy between interchangeable personalities and theatre performance from the perspective of dramaturgical principles. Just as a theatre has a front stage and a back stage, people also have their public identity and their private identity.

However, the asymmetrical personas that someone may choose may affect or overlap with the original persona. Meyrowitz (1985) built up a third situation in which the back stage and the front stage overlap to produce what is called a "middle stage" identity (as cited in Cirucci, 2013). On the other hand, Harbitz and Boekle-Giuffrida (2009) claimed that "Upon birth, or shortly thereafter, everybody is given a cultural identity and, in the great majority of cases (which sadly exclude as many as 50 million children under the age of five), a matching legal identity" (as cited in Rothblatt, 2013, p. 107). Moreover, Dicken-Garcia (1998) claims that identity or what people say about themselves online is as important as face-to-face offline communication (as cited in Dunn, 2013).

Recent academic approaches have examined the presentation of the self on the internet using theatrical metaphors. In *Social Networking and Identity*, Barker (2013) uses the term "homo machinus" to describe people who adopt different identities or wear multiple masks in the virtual cyberworld. Inspired by Andrews and Baird (1986), Barker (2013)

claims that having multiple selves online could be the result of a fear of rejection if one's true self as practiced online is not accepted by others. On the other hand, Dunn (2013) believes that the nature of the internet itself provides a space for individuals to participate in this virtual cyberspace and construct themselves to be the way they want to be. In their study, Lemus, Seibold, Flanigan, and Metzger (2004) proved that "the anonymity of the Internet leads individuals to voice more opinions and agree less" (as cited in Dunn, 2013, p. 32). This anonymity could encourage people to express themselves on a deeper level than how they may be able to express themselves in their real lives (Bargh, McKenna, & Fitzsimons, 2002; Joinson, 2001; Keipi, Oksanen, & Rasanen, 2015).

According to Shaw and Black (2008), internet addiction has been perceived differently among academics: some have said it is a kind of addictive disorder, others have said that it is an obsessive-compulsive disorder, and still others have included it in the impulse-control disorder category. These categories reflect the need to officially recognize internet addiction as a specific kind of disorder and establish the roots for this field to guide research into this new direction.

Different studies have examined the relationship between internet addiction and certain parts of one's identity such as self-esteem and self-concept formation. For instance, a study conducted on a general-population-based sample found that high addictive use of the internet was associated with reports of low self-esteem by participants, and vice versa (Sevelko et al., 2018). Similarly, Andreassen, Pallesen, and Griffiths (2017) found that high rates of social networking addiction as measured on the Bergen Social Media Addiction Scale (BSMAS) were associated with lower self-esteem among the presence of other factors such as narcissism, lower ages, and lower education levels. Turning now to self-concept formation and internet addiction concerns, Lemenager et al. (2018) found that addicted internet users

suffer from high deficits with respect to self-concept formation compared to a healthy control sample and individuals with only problematic internet use.

Another study focusing on the predictors that may cause problematic internet use found that there is a linear relationship between the need to fulfill adolescent psychological needs and a higher possibility of an adolescent suffering from internet addiction (Çetin & Ceyhanb, 2015). The internet, with its variety of platforms, attracts people from different ages to explore it. Everyone can find what he/she needs.

The aim of this systematic review paper is to investigate the challenges associated with internet addiction and the identity construction of one's virtual identity practiced online in juxtaposition with one's real-life identity through answering the following question: How is internet addiction connected to identity construction?

Methodology

Research design

A systematic research review design is chosen for this research paper to explore the state of research knowledge on internet addiction and identity. The systematic review is defined as “the application of scientific strategies that limit bias to the systematic assembly, critical appraisal, and synthesis of all relevant studies on a specific topic” (Cook, Sackett, & Spitzer, 1995, p. 167). This methodology was first introduced in the 1980s to reduce the problems associated with the traditional “narrative” reviews where bias, random, and “idiosyncratic techniques” or informal interpretation could affect the quality of the research (Briner & Denyer, 2012; Lewis-Beck, Bryman, & Futing Liao, 2004). The systemic review is valuable as a research methodology because it can “provide policymakers and practitioners with a rigorous and transparent shortcut to the voluminous research literature, reduce an overreliance on single studies, and shed light on contradictory findings from different research studies” (Harden & Thomas, 2010, p. 2). The most important phase of conducting a systematic research review is to develop a synthesis. *Oxford English Dictionary* classifies synthesis as “a body of things put together; a complex whole made up of a number of parts or elements united” (“synthesis, n.,” n.d.). In other words, the synthesis identifies the main themes discussed in the sample of academic articles to deduce the influence of internet addiction on online and offline identity.

Data collection and analysis

Data collection and sampling

To access a great variety of empirical studies that have discussed identity and problematic internet use, three databases known as multidisciplinary sources, namely PsycINFO, Scopus, and Web of Science, were used to call scholarly literature. First, the researcher identified two main search keywords — internet addiction and identity — and then

added their synonyms to bring more results. The advanced search was used in all three databases with the following search keywords:

((“internet addiction” OR “Compulsive Internet Use” OR “Problematic Internet Use” OR “Internet Addiction Disorder” OR iDisorder) AND (identity OR “online identity” OR “off?line identity” OR “ identity develop*” OR “identity construct*” OR “identity crisis” OR “identity navigation” OR “identity management” OR “identity formation”)). Results were limited to English publications, including journal articles and peer-reviewed journals. The search, which took place on December 6, 2018, was limited to a period of 10 years (2008-2018). The period of coverage was originally intended to include all studies published between 2008 and 2019. However, no databases used in the search called for any studies published in 2019. Therefore, the specified 10-year coverage period was chosen for greater accuracy. On February 20, 2019, the same keywords were searched again to ensure all studies published in the chosen area were identified.

The 10-year period was chosen to cover the last decade when more studies focused on the topic area. Although a few studies were published between the 1990s and 2008, a screening of their titles and abstracts revealed that they had little to do with the concept of internet dependency highlighted in this research. Also, the widespread use of new smartphone and handheld devices in the last years has allowed for easy access to the internet, thereby accelerating people’s use of and dependency on such technologies (*A decade of digital dependency*, 2019). Furthermore, researchers have only recently identified the problem of internet addiction and called for it to be labelled a disorder (Cash et al., 2012). In addition, problems related to internet addiction, such as identity development, are a more recent study area since the internet technology was lately introduced.

Regarding exclusion criteria, any study that was not accessible through the online database was excluded. Any study in which the title and abstract were not relevant to the

research question was eliminated. Duplicate results were removed. When a study abstract was found to be vague, a skimming of the full article text was completed. Finally, studies that were neither empirical nor written in English were excluded. Therefore, the list of tentative research studies was limited from a total of 188 identified results to 44 included articles, which were then screened. Out of the 44 articles, only 34 were used in the systematic review analysis. The other 10 papers were deemed irrelevant to the research area despite passing the first phase of screening (i.e., the review of title, abstract, and keywords). See Appendix A for the full list of 34 studies examined.

Although some studies differentiate between internet addiction and problematic internet use, such as the work of Lemenager et al. (2018), this study examines all studies that discuss the negative use or impact of the internet. Therefore, the two conceptualizations will be used interchangeably.

Data analysis

For the analysis of this research paper, the systematic review follows the assessment strategy proposed by Harden and Thomas (2008), King and Delfabbro (2014), and Koo and Kwon (2014). As indicated previously, this paper proposes to present a systematic review of the chosen sample and then develop a synthesis. This detailed analysis sheds light on the main themes in the literature related to the connection between addictive internet use and identity. Line-by-line thematic coding was applied to each document to extract information related to the main types of internet addiction, demographics studied, symptoms of addiction, impact of addiction, identity themes, strengths of the study, and weaknesses of the study.

It is worth mentioning that a line-by-line strategy was chosen to cover the studied article only, while the analysis focused on each unit of the text in order to not miss any core meaning. In the following sections, core themes are classified into main categories.

Subthemes are also identified. Finally, the synthesis of analytical themes discussed in the academic literature regarding the research area is disclosed, interpreted, and discussed.

After reviewing a number of tools used to conduct systematic reviews, a decision was made to consider the NVivo 12 Plus as the appropriate software to complete the systematic review. The NVivo 12 Plus operates smoothly, organizing data into themes and subthemes and running automatic coding queries. However, the researcher chose to code the text manually to avoid the risk of NVivo automatically coding unwanted texts, such as literature reviews and the introductions of studies.

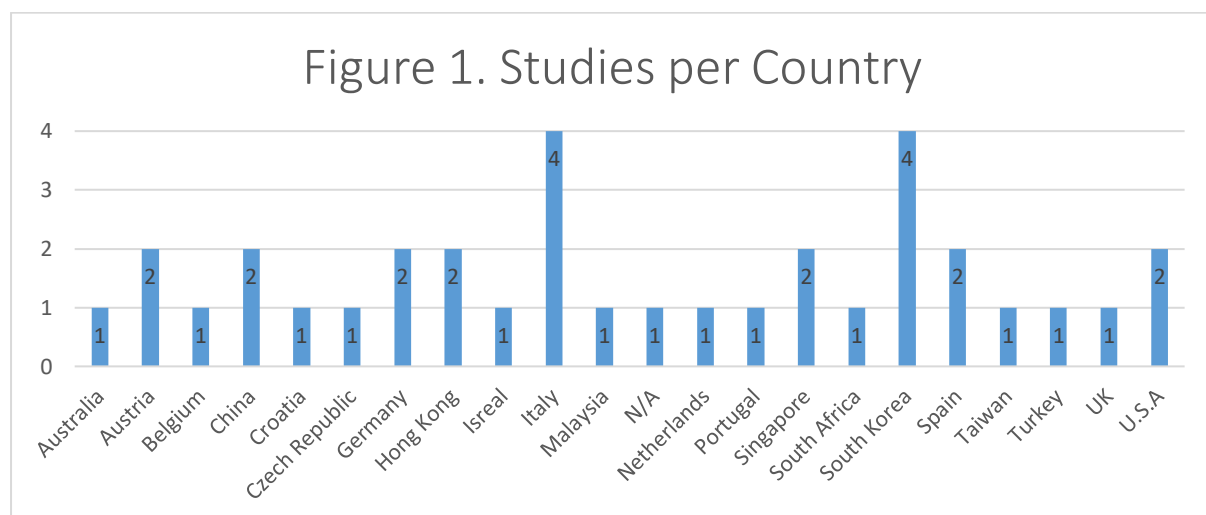
A classification sheet was formatted on Microsoft Excel. This sheet specified information about the research methodology of all studies. The extracted data included the country where the study was conducted; the community of the participants, such as school-age and gamers; sample size; demographic information; study design; measurement tools; and type of internet addiction use, such as social media, online gaming, and so forth. After the classification sheet was completed, each column was examined separately to identify results used in the final analysis.

All the studies that passed the first screening were uploaded to the NVivo 12 Plus for a full analysis. For the thematic analysis, seven initial themes were predicted based on the literature review of internet addiction. Five of these themes, also known as the nodes in NVivo, emphasized the impact of the internet on daily tasks, mental health, physical health, and social relationships. The sixth node contained information about the average internet use of the internet or any studied platform. The seventh node focused on the aim of the study as indicated in the analyzed articles to keep tracking the study's relevancy to the concern of this research. It is useful to demonstrate the general orientation of the chosen studies in the scope in order to identify gaps in the field. Later, the researcher combined the nodes into two general themes: online identity and offline identity.

Results

Based on the sample size of all studies included, there was a total of 28,343 participants. Therefore, four groups were identified. The first group represents seven studies with a sample size range of 1-100 participants (20.6%). The second group contains 13 studies with a sample size range of 101-500 participants (38.2%). The last groups contain nine studies with participants ranging from 502-1000 (26.4%) and five studies with participants ranging from 1001-6000 (14.7%), respectively.

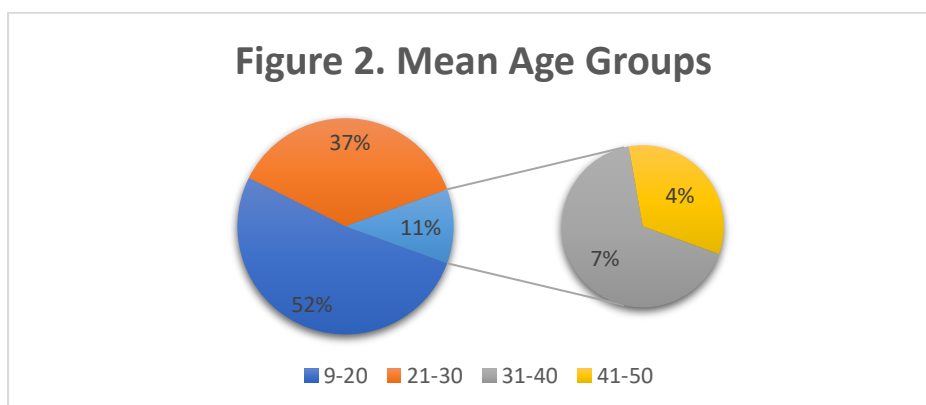
Regarding the origin of research, 35 countries were represented by the 34 studies analyzed in this paper. Italy and South Korea achieved the top place among other countries in navigating the field of internet addiction and identity with four studies each representing 22.84% of the list. The second place was shared between seven countries that published two studies (5.71%) each. Those countries are: Austria, China, Germany, Hong Kong, Singapore, Spain, and the United States of America. The rest of the countries were investigated by one study only of the examined sample. See Figure 1 for more details.



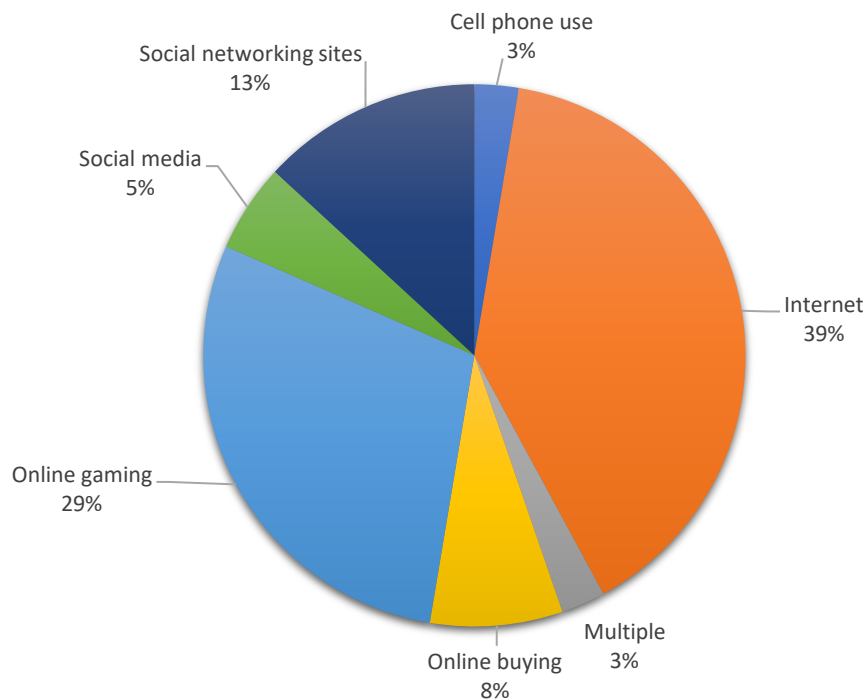
Concerning gender presence in the academic studies reviewed, the participation of males and females was similar in all but seven studies, and no significant difference was noticed between males and females. The difference between gender participation in these exceptions was either by chance, as in four cases where the majority of study participants

were male (nearly 90%) [2, 7, 16, 30], or intended to be 100% males for the individual purpose of the studies, as in the case of three studies [4, 12, 25]. However, the average ratio of gender participation was somewhat similar: 57.06% males and 42.88% females. Males were present in 100% of the studies examined in this paper while females were present in 91% of the studies. Women were excluded from three studies. Figures were calculated separately for each gender.

Another finding is related to the participants' ages in the examined studies. Researchers have studied internet addiction and its impact on identity amongst different age groups. The youngest mentioned participant's age was nine years old, while the eldest participant was 77 years old. As can be seen in Figure 2, half of the mean ages were found among the adolescent group (M = 9–20 years). Furthermore, the mean age of the young adult group represents 37% of the examined studies' participants (M = 21–30). Lastly, the mean age of +31 reflects a small minority of participants (11%). The mean age was included in the calculation according to the information written by the authors of the studies. Whenever there were two values of mean age for two groups in a study, the average of these mean ages was calculated using the following equation: (Mean age of group 1 + Mean age of group 2)/2. Additionally, seven studies did not contain information about the mean age of the study sample; therefore, these studies were excluded when calculating the average of the mean age. As a result, the average of mean ages for 27 academic studies was found to be 21.33.



Next, an analysis was conducted to identify the types of internet usage studied in each study. In other words, although the same keywords were used to determine the sample of academic articles, some studies focused on internet addiction in general while others focused on specific uses of the internet, such as online gaming. Surprisingly, addictive internet use was the main focus of only 15 of the 34 studies (39%). Online gaming addiction was the focus of 11 studies (29%). Addictive use of social networking sites such as blogs was investigated in five studies (13%). Interestingly, online shopping addiction and its impact on or by identity was the focus of three studies (8%). Social media addiction and Facebook addiction specifically were examined in two studies (5%). Addictive use of cell phones was investigated in one study (3%). Lastly, one study mentioned more than three types of internet usage and was highlighted as having “multiple” types (3%). It should be noted that some studies that focused on two or three types of cyberspace addictive use were coded twice or thrice, and each activity was placed in a suitable category. More than three types of internet usage were coded once as studying multiple aspects of addictive use activity [29]. See Figure 3 for further details.

Figure 3. Addictive Use Activity***Analysis of key themes***

Having investigated a total of 34 articles discussing the relationship between internet addiction and identity, a conclusion can be drawn about what has been contributed thus far on the topic of literature identity and internet addiction.

First: The impact of excessive internet use on self-identity (real-world identity).

Some researchers have investigated the reverse impact of this research scope and analyzed the impact of identity on internet use. In this regard, the author of this study found that identity development level plays a key role in increasing internet usage in an unhealthy way. For example, Israelashvili, Kim, and Bukobza (2012) concluded that ego development is negatively associated with excessive internet use [11]. The researchers indicate that the higher the chance that a person has a clear self-concept and developed ego, the lower the chance that the person might use the internet excessively, and vice versa.

Internet addiction could also be a sign of an insufficient or low level of ego development in the young age group. This finding was confirmed in several studies, including the work of Kim and Kim (2017), which focuses on online gaming addiction [13]. Marino et al. (2016) also confirmed the negative association between identity traits and problematic Facebook use among adolescents [19]. They discussed traits including emotional stability, extraversion, openness, and agreeableness, but not conscientiousness [19]. Marino et al. (2016) also shed light on the impact of social identity factors, such as sharing ways of thinking, attachment to peer groups, and sense of belonging to peers; and on the perceived frequency of Facebook use (PFFU), although those factors did not necessarily lead to problematic Facebook use [19].

Moreover, some studies found that the internet is used more by those who are looking to express their self-identity, or ideal self, online. For instance, Monacis, de Palo, Griffiths, and Sinatra (2017) found that people with diffuse-avoidant styles tended to be more present in online virtual communities to escape their real-life situations by expressing themselves (the conflicted self of the diffuse-avoidant style) [20]. Supporting this finding, Sahin and Deniz (2013) found that those (students) who present different identities, either by hiding their own identity or making another one, have a higher tendency of internet addiction [23].

What is more, the negative view of self was found to be associated with problematic internet use. Schimmenti and Caretti (2017) found within their two clinical studies that the tendency toward addictive internet use is predictable through the individual's view of him or herself [24]. Precisely, the more severe the negative feelings towards the self, the higher the likelihood a person will use the internet excessively [24].

Good characteristics of personal identity were found to be negatively influenced by addictive internet behaviour, especially online gaming. Seok, Lee, Park, and Park (2018) found that emotional stability was affected by online gaming addiction among all their study

participants [25]. Emotional instability was not always related to a specific reason: “many of the participants also reported feeling annoyed and angry for no apparent reason, and they experienced emotional problems while arguing with people around them” (Seok et al., 2018, p. 38) [25].

Addictive use of the internet was also linked to identity confusion. Sharif and Khanekharab (2017) discussed the relationship between identity confusion and excessive social network usage [26] and found that young people who classified as excessive social networking sites (SNSs) users might be influenced by the amount of feedback on their identity, which, in turn, might create a situation of identity confusion. This is a result of the nature of networking platforms that allow users to share their opinion about and evaluation of others [26].

Similarly, Claes, Müller, and Luyckx (2016) found the same positive relationship between identity confusion and compulsive online buying [5]. Those who suffered from identity confusion tended to acquire and buy more things [5]. Online buying fulfills the need to buy and craft an identity based on objects by allowing online buyers access to millions of products. However, the time spent on online shopping is limitless for people with identity confusion who look for things to meet their psychological needs [5]. Claes et al. (2016, p. 68) noticed that “identity synthesis” controls the severity of compulsive buying (online and offline); in particular, it decreases the tendency toward material consumption [5]. Similarly, Claes, Luyckx, Vogel, Verschueren, and Muller (2018) found that individuals who had difficulty defining themselves tended to fill the gap by purchasing more goods through online shopping, a habit which later turns into pathological buying [6].

Identity development is another factor that promotes internet addiction. A study conducted on Hong Kong adolescents found that having a clear identity could reduce the risk of suffering from pathological internet use (Shek & Yu, 2012) [27]. Shek and Yu (2012) also

found that, in some cases, excessive internet use among adolescents can be explained by their need and desire to develop their identities and build relationships with other people; therefore, they surf the internet [27]. Similarly, Sporcic and Glavak-Tkalic (2018) concluded that online gamers with lower self-concept clarity are at risk for problematic online gaming in which they escape their reality to compensate for their insufficient identity clarity [30]. Another study by Van der Merwe (2017) supported the idea of escaping real-world identities [32]. According to Van der Merwe (2017), adolescents like to “try on different identities and take new shapes at will” (p. 206) [32]. The researcher justifies this behaviour by the features of online platforms that make hiding one’s real identity much easier online than in the real world [32].

According to Stieger, Burger, Bohn, and Voracek (2013), internet use can be determined by the personality traits of users [31]. The authors illustrated their point of view with the example of Facebook users who quit using the platform due to their privacy concerns [31]. Another identity trait factor that determines online experimenting is social well-being. A team of researchers conducting a study on the relationship between online communication and social well-being found that as long as a player feels loneliness in his or her real world, he or she might try on different identities in the virtual world and vice versa (Visser, Antheunis, & Schouten, 2013) [33].

When comparing online addicted users and nonaddicted users, the results are markedly different. For instance, one study screened the brain work of two groups: massively multiplayer online role-playing game (MMORPG)-addicted gamers and nonaddicted gamers [7]. The study came up with a finding related to how online gamers perceived themselves and their avatar selves depending on their level of dependency on online games (Dieter et al., 2015) [7]. The work team found signs of addicted gamers allocating social popularity to their

avatars, while nonaddicted gamers considered their real selves to be dominant rather than their avatar characters [7].

Problematic internet use (PIU) has been linked to major identity issues. Fuchs, Riedl, Bock, Rumpold, and Sevecke (2018) noticed that “patients with PIU reported more difficulties in establishing a stable and consolidated identity and especially problems with ego strength, suggestibility, awareness of a defined core and inner substance, and understanding motives and behavior” (p. 7) [8]. In other words, problematic internet use may make individuals vulnerable to establish good relations with themselves and with other people. Problematic internet use threatens the inner peace of individuals.

Second: The impact of excessive internet use on online identity (virtual/cyberspace identity).

Carbonell et al. (2012), in their study on problematic internet use among young Spanish students, attempted to address why people tend to hide their identities or try other identities online. One possible answer is that the features of online platforms, such as chat rooms and online video games, allow real identities to be altered or concealed [3]. The researchers also found that young adolescents between the ages of 12 and 14 tended to use altered identity communication (AIC) more than university students between the ages of 18 and 25. This suggested that this kind of communication is a part of identity development [3].

Looking at brain images, researchers found interesting results about the effect of internet addiction on online identity. One recent study carried out by Choi et al. (2018) compared the neural activation of two groups: internet-addicted adolescents and online game-addicted adolescents [4]. The study focused on a situation in which a participant thinks about his game character. The results showed varied neural activation responses. While the brain images of the general internet-addicted participants showed comprehensive neural activation, the brain images of the addicted gamers showed focused activation in the medial prefrontal

cortex (MPFC) and anterior cingulate cortex (ACC) [4]. Another study published by Dieter et al. (2015) compared online gaming-addicted players with a control group of nonaddicted participants [7]. The researchers saw higher brain activation among addicted gamers when they were thinking about their avatars rather than thinking about themselves [7]. However, the researchers found no significant difference in brain activation when members of the control group thought about their online avatars or thought about their real selves [7].

Fake online identities affect the online experience of young people. According to Gonzalez and Orgaz (2014), 20% of students suffer from identity deception because they are not aware of the issues that could result from the internet's ability to present curated personal identities [9]. In contrast, Sahin and Deniz (2013) noted that the primary students who reported high internet use hid their real identities or presented different identities online [23].

Contrary to expectations, excessive online gaming is negatively associated with online identity practice [13]. This result was found in the research by Kim and Kim (2017) [13]. In other words, those who tend to play online games excessively usually present low levels of association with their online self-identity [13]. Visser et al. (2013) also reported that there was no relation between the time spent playing an online game, World of Warcraft, and identity experiments among their sample participants [33].

Just as in real life, personal characteristics play a key role in defining the degree of internet addiction. Monacis et al. (2017) found that personal differences and identity styles can determine how people practice their identities online and the severity of their addiction to online worlds, if present [20]. For example, people with a diffuse-avoidant identity style, who prefer to escape the relationships of the real world, can easily adopt the opposite behaviour in the virtual world [20]. Those people may present themselves as social individuals by building many ties with other individuals in cyberspace [20]. Therefore, they immerse themselves more and more in the online world (Monacis et al., 2017) [20].

In addition, one participant in a study by Schimmenti and Caretti (2017) described his behaviours in building a romantic relationship online, reporting that he was “literally another person when he was online, and that he was even surprised by his words and behaviours during these conversations, of which he sometimes had no memories” (p. 67) [24]. Another participant in a study by Seok et al. (2018) expressed how he feels when he plays online, saying “whenever I play games, I change completely. I feel like I am not myself” (p. 38) [25]. Moreover, Smahel, Wright, and Cernikova (2014) included a quotation from a teenage girl who expressed her feelings after she excessively presented herself in a writing platform: “I joined an online story writing club and almost lost contact with reality. I lived in the virtual world” (p. 252) [29].

Researchers have identified several reasons for trying on different identities in cyberspace. Van der Merwe (2017) specified some reasons based on the responses of her study sample [32]. One reason to present a different identity online is a desire to post personal information which cannot be violated; in contrast, a real name might be known to others [32]. Another reason is that a second identity and the anonymity that can be found online may protect people who behave improperly from social sanctions [32]. The third reason presented by Van der Merwe (2017) is to avoid embarrassment when seeking help from others in online communities such as dating sites and support groups [32]. Other reasons for adopting alternative identities include flirting, altering and improving one’s appearance, and pretending to be older [32]. In addition, Viveiro, Marques, Passadouro, and Moleiro (2014) mention the phenomenon of switching identities just for fun (69%) [34]. The authors also suggest that those who do not switch identities do not wish to be neglected if others discover that they are presenting different identities [34].

Table 1 presents a list of the research methods and measurement tools used in all the studies analyzed. It is clear that most of the studies relied on quantitative methods, such as

questionnaires and scales, to extract data from participants. On the other hand, qualitative methods were present in some studies in the form of direct questions, surveys, and interviews. A few of the studies relied on brain images screened by special tools — fMRI — which were then interpreted by scientists to show the difference between before and after participants were exposed to certain situations.

Discussion

From the analysis of the mean ages of the studies' participants, it is clear that more efforts were devoted on studying the impact of internet usage on teenagers. Few studies focused on older populations, such as middle-aged adults [5, 6, 28]. In this research field, it is logically correct to target younger generations since identity is under development during this life stage. Likewise, the previous studies which were investigated in this research have proven that young people usually score high in testing regarding internet dependency. Moreover, it can be argued that earlier psychological intervention can be more easily conducted if identity is found to be affected in the teenage population rather than in the older population. However, it is crucial to not omit the adult population from examination. This step could assist in understanding all of the dimensions associated with internet addiction and identity. Moreover, in the coming years, researchers will be able to study middle-aged adults who have been in contact with internet platforms for over 20 years. Such examination and discovery will enhance the literature with more in-depth knowledge.

Surprisingly, pathological online buying was present in the analyzed articles, and its link to identity was impressive. It was unexpected by this researcher to find this kind of online addiction. Also, studies about online gaming addiction comprised the majority of the studies analyzed [1, 2, 4, 7, 13, 16, 20, 25, 28, 30, 33]. The variety of these studies could be the result of the inclusion and the consideration of online gaming addiction as a disorder in the DSM-V. As a result of the formal recognition of internet addiction disorder, rapidly growing interest in online gaming disorder guides researchers to the weak areas in online gaming addiction literature.

A number of studies in this systematic review present online identity as indirectly beneficial. Some of the findings of the studies reviewed support the conclusion that online identity is a form of identity development that positively affects youth development.

Behaviours based on parenting and awareness of the dark side of online communication can be exercised by young adolescents while surfing the internet. Therefore, it is either time for scientists to view identity construction more positively or to show more respect for the two-faced aspects of this phenomenon.

After identifying the research methods used in each study of this systematic review, it can be seen that the majority of studies relied on scales and questionnaires (see Appendix A). For the purpose of investigating a new field such as internet addiction and identity, prepared answers may not uncover the subject from the point of view of the participants. Nevertheless, using scales such as Young Internet Addiction Test (YIAT) to introduce the research focus to participants might allow the researcher to capture a general view about his or her sample's engagement with the internet. Therefore, employing more case studies, interviews, and surveys with open-ended questions can yield more unexpected answers to research questions. In other words, qualitative research is useful and crucial in understanding a new phenomenon, especially when studying young adolescents who may not value the significant of such research. Additionally, young adolescents may not express themselves in quantitative research as they would if they were exposed to a qualitative research tool. Therefore, qualitative research produces more results than other methods (Sutton & Austin, 2015). Mixed methods research is also appreciated as it can organize data and results (quantitative) and interpret the findings (qualitative).

Limitations

This research has limitations. Firstly, there is no one accepted definition for internet addiction nor an established resource that details all of the internet addiction types. To overcome this limitation, related terms and synonyms identified in the research literature (internet addiction disorder, problematic internet use, compulsive internet use, and iDisorder) are included to provide a more comprehensive research review.

Secondly, as a result of the previous limitation, and to establish an understanding of the current academic work concerning the addiction to cyberspace in general, only the term internet and its synonyms were used in the keywords search as the broad terms for all internet addiction types. Future studies may specify the different types of internet addiction while searching the databases to enhance the findings.

Thirdly, the number of peer-reviewed articles found in the field is a limitation. If more empirical studies studied the influence of internet addiction on identity, the link between internet addiction and identity could easily be drawn.

Fourthly, since most of the analyzed studies were conducted by academics, the absence of psychiatrists' participation is another limitation. Such weakness in the field might be overcome once the *Diagnostic and Statistical Manual of Mental Disorders* officially includes internet addiction as a behavioural addiction in future editions.

Fifthly, although the databases used in this research are multidisciplinary resources and can be searched globally, the results may vary according to where the researcher is located geographically. This research was conducted in Canada. Further investigations may determine a method to include all existing studies from around the world concerning the research area.

Sixthly, through the review of the studied articles, one can conclude that the majority of the results of the reviewed studies describe rather than explain the relation between internet addiction and people's identity development. Further studies are required to investigate the

same scope with the goal of understanding participants' views of their identities while surfing the internet.

Conclusion

The internet certainly eases human lives, providing both work and leisure depending on what people need. In other words, internet technology is beneficial. However, the overuse of such technology could bring some potential drawbacks. These drawbacks may differ according to people's age, gender, environment, or even psychological characteristics. This systematic research review intended to investigate the previous studies conducted on the influence of internet addiction upon identity construction. After analyzing the studies, this paper highlighted the evidence-based impacts of problematic internet use on identity.

Through this review, aspects that were not covered or answered in the previous studies can be identified and proposed as topics for further empirical investigation. Additionally, this review has identified the weaknesses of the conducted studies and uncovered how to overcome these weaknesses in future studies.

Knowing that the excessive use of the internet could lead a person to adopt another identity/persona in virtual reality which differs from or conflicts with their identity practiced offline presents a fertile field of investigation for psychological studies. It would also be a matter of debate between scientists to decide what a person's real identity is. Is a person's real identity the one that is presented anonymously online, or is a person's real identity the one that is shown to people in real life? Is identity crisis a cause of internet addiction? Or does internet addiction cause identity crisis? Can people exchange trust in virtual space? The results of such queries can potentially enrich and enhance knowledge, and possibly help to identify the gaps in the field of navigating identity and internet addiction.

As well, scholars from different fields such as psychology, technology, and communication can cooperate to produce insightful studies that could explain internet addiction and identity from different perspectives. Such collaboration is essential to

understand the identity and the challenges associated with internet usage. In essence, understanding identity relates to understanding of one's self.

Finally, after a thorough examination of studies discussing this research concern of internet addiction and identity, the researcher understands that little insight was gained relative to the work left to be accomplished. The field needs more research contributions to provide solutions for those vulnerable individuals who are most at risk of identity crisis because of their excessive time spent online. Therefore, this study is a call for the authors of the DSM to include an internet addiction disorder in forthcoming editions. By its presence in the DSM, internet addiction disorder would gain the attention of more researchers, with the result being that more research questions would be addressed and answered.

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1816–1836. <https://doi.org/10.1016/j.chb.2008.02.012>

Table 1: Research methods and Measurement tools

Article	Research method	Measurement tools
1	Questionnaires	IGDS9-SF, IIP-32, HADS & AQ-28
2	Questionnaires	Italian version of U-GIDS & UADI
3	Questionnaires	CERI & CERM
4	Semi-structured diagnostic interview, questionnaires & Likert scale	K-SADS-PL & YIAS-K
5	Questionnaires	EPSI, s-IAT, SI-R, MVS & PHQ-9
6	Liker scales & questionnaires	DIDS, PBS, PHQ-9, s-IAT & SI-R
7	Questionnaires & fMRI scan	IACA-30 & GT
8	Structured interview & questionnaires	SCID-II, CBCL and YSR, AIDA, CIUS, ICD-10 & cyberbullying
9	Survey & questionnaires	I-POE, TSI, Internet use characteristics questions & Marlow-Crowne Desirability Scale
10	Surveys	Scales for: Attitudes, Subjective norms, Perceived Behavioral Control (PBC), Neuroticism, Extraversion, Need to belong, Self-identity, Self-esteem, SNSs Excessive Use & SNSs Addiction
11	Questionnaires	Internet use questions, YIAQ-H, AEIS, SCQ & SCCS
12	Questionnaires	K-AIAS, IQ, K-SADS-PL-K & fMRI scanning

13	Surveys	EFL, EONB, SOFFB, EOGU & online self-identity
14	Questionnaires	CIAS & FDS
15	Survey	Scales for: relationship with father/mother, Depression, Loneliness, Self-reactive outcome expectation, Self-identity, Deficient self-regulation, SNSs habit strength & Time spent on SNSs
16	fMRI	SCID I and II, AICA-C, FKB-20, VAS & fMRI scanning
17	Survey	Gratifications of the Internet, IAS, Questions about internet risk & Social media use
18	Questionnaires	OOIS, IDBQ, IADQ, SWLS, UCLA loneliness scale & CBF-PI-B
19	Questionnaires	PFU, PFFU, Italian version of the Big Five Questionnaire & Social influence processes
20	Questionnaires	Italian version of: IAT, IGDS9-SF, BSMAS, ISI-5 & ASQ
21	Survey	Questions about: national origin, general privacy coping behaviors, content-sharing behaviors, internet addiction & perceptions of online identity
22	Questionnaires	Target behavior of SNWs, TPB including variables: intention, attitudes, subjective norm and PBC, self-identity, belongingness, past behavior & addictive tendencies
23	Questionnaires	IAT & one-way ANOVA

24	Clinical vignettes	IAT, DES-II & RQ
25	Interviews, focus groups & photovoice	Attitude, perceptions, purpose & problems
26	Survey	Short version of MVS, SCCS, Excessive SNS usage Scale adopted from Mueller et al. & CBS
27	Questionnaires	YIAT, CPYDS, CBC, PA, PIT, GPYDQ & ASC
28	Questionnaires	Questions about gaming hours and non-gaming hours (on the internet) per week, IGDS, SPS-S & PAI
29	Interviews & focus groups	Dimensions of online problematic experience, Relationships with peers and friends, Romantic relationships, Relationships with parents, School, Sexuality, Identity, Health and well-being & Morality
30	Questionnaires	MOGQ, IGD-9, SCC and questions about gaming behavior
31	Questionnaires	PCS, IAT & mini-IPIP
32	Interview & survey	Think aloud' Interview & Virtual World Usage Survey
33	Surveys	Offline social competence scale, UCLA, Variety of online communication partners & Online identity experiments
34	Questionnaires	Internet use characteristics, IIU, BIU & YIAT

Appendix A: The list of articles

The following list includes a total of 34 articles extracted from three databases: PsycINFO, Scopus, and the Web of Science.

Number	Reference
1	Arcelus, J., Bouman, W. P., Jones, B. A., Richards, C., Jimenez-Murcia, S., & Griffiths, M. D. (2017). Video gaming and gaming addiction in transgender people: An exploratory study. <i>Journal of Behavioral Addictions</i> , 6(1), 21-29. https://doi.org/10.1556/2006.6.2017.002
2	Bacchini, D., De Angelis, G., & Fanara, A. (2017). Identity formation in adolescent and emerging adult regular players of massively multiplayer online role-playing games (MMORPG). <i>Computers in Human Behavior</i> , 73, 191-199. https://doi.org/10.1016/j.chb.2017.03.045
3	Carbonell, X., Chamarro, A., Griffiths, M., Oberst, U., Cladellas, R., & Talam, A. (2012). Problematic Internet and cell phone use in Spanish teenagers and young students. <i>Anales de Psicología</i> , 28(3), 789-796.
4	Choi, E. J., Taylor, M. J., Hong, S.-B., Kim, C., Kim, J.-W., McIntyre, R. S., & Yi, S.-H. (2018). Gaming-addicted teens identify more with their cyber-self than their own self: Neural evidence. <i>Psychiatry Research: Neuroimaging</i> , 51-59. https://doi.org/10.1016/j.psychresns.2018.05.012
5	Claes, L., Müller, A., & Luyckx, K. (2016). Compulsive buying and hoarding as identity substitutes: The role of materialistic value endorsement and depression. <i>Comprehensive Psychiatry</i> , 68, 65-71. https://doi.org/10.1016/j.comppsy.2016.04.005

6	Claes, L., Luyckx, K., Vogel, B., Verschueren, M., & Muller, A. (2018). Identity processes and clusters in individuals with and without pathological buying. <i>Psychiatry Research</i>, 467-472. https://doi.org/10.1016/j.psychres.2018.06.003
7	Dieter, J., Hill, H., Sell, M., Reinhard, I., Vollstädt-Klein, S., Kiefer, F., ... Leménager, T. (2015). Avatar's neurobiological traces in the self-concept of massively multiplayer online role-playing game (MMORPG) addicts. <i>Behavioral Neuroscience</i>, 129(1), 8-17. https://doi.org/10.1037/bne0000025
8	Fuchs, M., Riedl, D., Bock, A., Rumpold, G., & Sevecke, K. (2018). Pathological internet use - An important comorbidity in child and adolescent psychiatry: Prevalence and correlation patterns in a naturalistic sample of adolescent inpatients. <i>BioMed Research International</i>, 2018. https://doi.org/10.1155/2018/162914
9	Gonzalez, E., & Orgaz, B. (2014). Problematic online experiences among Spanish college students: Associations with Internet use characteristics and clinical symptoms. <i>Computers in Human Behavior</i>, 151-158. https://doi.org/10.1016/j.chb.2013.10.038
10	Ho, S. S., Lwin, M. O., & Lee, E. W. J. (2017). Till logout do us part? Comparison of factors predicting excessive social network sites use and addiction between Singaporean adolescents and adults. <i>Computers in Human Behavior</i>, 75, 632-642. https://doi.org/10.1016/j.chb.2017.06.002
11	Israelashvili, M., Kim, T., & Bukobza, G. (2012). Adolescents' over-use of the cyber world - Internet addiction or identity exploration? <i>Journal of Adolescence</i>, 35(2), 417-424. https://doi.org/10.1016/j.adolescence.2011.07.015

12	Kim, Y.-R., Son, J.-W., Lee, S.-I., Shin, C.-J., Kim, S.-K., Ju, G., ... Ha, T. H. (2012). Abnormal brain activation of adolescent internet addict in a ball-throwing animation task: Possible neural correlates of disembodiment revealed by fMRI. <i>Progress in Neuro-Psychopharmacology & Biological Psychiatry</i> , 39(1), 88-95. https://doi.org/10.1016/j.pnpbp.2012.05.013
13	Kim, Y.-Y., & Kim, M.-H. (2017). The impact of social factors on excessive online game usage, moderated by online self-identity. <i>Cluster Computing-The Journal of Networks Software Tools and Applications</i> , 20(1), 569-582. https://doi.org/10.1007/s10586-017-0747-1
14	Ko, C.-H., Yen, J.-Y., Yen, C.-F., Chen, C.-S., & Wang, S.-Y. (2008). The association between Internet addiction and belief of frustration intolerance: The gender difference. <i>Cyberpsychology and Behavior</i> , 11(3), 273-278. https://doi.org/10.1089/cpb.2007.0095
15	Lee, E. W. J., Ho, S. S., & Lwin, M. O. (2017). Extending the social cognitive model: Examining the external and personal antecedents of social network sites use among Singaporean adolescents. <i>Computers in Human Behavior</i> , 67, 240-251. https://doi.org/10.1016/j.chb.2016.10.030
16	Lemenager, T., Dieter, J., Hill, H., Koopmann, A., Reinhard, I., Sell, M., ... Mann, K. (2014). Neurobiological correlates of physical self-concept and self-identification with avatars in addicted players of Massively Multiplayer Online Role-Playing Games (MMORPGs). <i>Addictive Behaviors</i> , 39(12), 1789-1797. https://doi.org/10.1016/j.addbeh.2014.07.017
17	Leung, L. (2014). Predicting Internet risks: a longitudinal panel study of gratifications-sought, Internet addiction symptoms, and social media use

	among children and adolescents. <i>Health Psychology and Behavioral Medicine</i> , 2(1), 424-439. https://doi.org/10.1080/21642850.2014.902316
18	Lin, X., Su, W., & Potenza, M. N. (2018). Development of an online and offline integration hypothesis for healthy internet use: Theory and preliminary evidence. <i>Frontiers in Psychology</i> , 9(APR). https://doi.org/10.3389/fpsyg.2018.00492
19	Marino, C., Vieno, A., Pastore, M., Albery, I. P., Frings, D., & Spada, M. M. (2016). Modeling the contribution of personality, social identity and social norms to problematic Facebook use in adolescents. <i>Addictive Behaviors</i> , 51-56. https://doi.org/10.1016/j.addbeh.2016.07.001
20	Monacis, L., de Palo, V., Griffiths, M. D., & Sinatra, M. (2017). Exploring individual differences in online addictions: The role of identity and attachment. <i>International Journal of Mental Health and Addiction</i> , 15(4), 853-868. https://doi.org/10.1007/s11469-017-9768-5
21	Nemati, H., Wall, J. D., & Chow, A. (2014). Privacy coping and information-sharing behaviors in social media: A comparison of Chinese and US users. <i>Journal of Global Information Technology Management</i> , 17(4), 228-249. https://doi.org/10.1080/1097198X.2014.978622
22	Pelling, E. L., & White, K. M. (2009). The theory of planned behavior applied to young people's use of social networking web sites. <i>Cyberpsychology & Behavior</i> , 12(6), 755-759. https://doi.org/10.1089/cpb.2009.0109
23	Sahin, M., & Deniz, L. (2013). Internet addiction among Turkish primary school students. <i>Journal of Instructional Psychology</i> , 40(4), 101-103.

24	Schimmenti, A., & Caretti, V. (2017). Video-terminal dissociative trance: Toward a psychodynamic understanding of problematic Internet use. <i>Journal of Treatment Evaluation</i> , 14(1), 64-72.
25	Seok, H. J., Lee, J. M., Park, C.-Y., & Park, J. Y. (2018). Understanding internet gaming addiction among South Korean adolescents through photovoice. <i>Children and Youth Services Review</i> , 94, 35-42. https://doi.org/10.1016/j.childyouth.2018.09.009
26	Sharif, S. P., & Khanekharab, J. (2017). Identity confusion and materialism mediate the relationship between excessive social network site usage and online compulsive buying. <i>Cyberpsychology, Behavior, and Social Networking</i> , 20(8), 494-500. https://doi.org/10.1089/cyber.2017.0162
27	Shek, D. T. L., & Yu, L. (2012). Internet addiction in Hong Kong adolescents: Profiles and psychosocial correlates. <i>Journal on Disability and Human Development</i> , 11(2), 133-142.
28	Sioni, S. R., Burleson, M. H., & Bekerian, D. A. (2017). Internet gaming disorder: Social phobia and identifying with your virtual self. <i>Computers in Human Behavior</i> , 11-15. https://doi.org/10.1016/j.chb.2017.01.044
29	Smahel, D., Wright, M. F., & Cernikova, M. (2014). Classification of online problematic situations in the context of youths' development. <i>Communications-European Journal of Communication Research</i> , 39(3), 233-260. https://doi.org/10.1515/commun-2014-0111
30	Sporcic, B., & Glavak-Tkalic, R. (2018). The relationship between online gaming motivation, self-concept clarity and tendency toward problematic

	gaming. <i>Cyberpsychology-Journal of Psychosocial Research on Cyberspace</i> , 12(1), UNSP 4. https://doi.org/10.5817/CP2018-1-4
31	Stieger, S., Burger, C., Bohn, M., & Voracek, M. (2013). Who commits virtual identity suicide? Differences in privacy concerns, internet addiction, and personality between Facebook users and quitters. <i>Cyberpsychology, Behavior, and Social Networking</i> , 16(9), 629-634. https://doi.org/10.1089/cyber.2012.0323
32	Van der Merwe, P. (2017). Adolescent identities in the cyberworld. <i>Journal of Psychology in Africa</i> , 27(2), 203-207. https://doi.org/10.1080/14330237.2017.1303129
33	Visser, M., Antheunis, M. L., & Schouten, A. P. (2013). Online communication and social well-being: How playing World of Warcraft affects players' social competence and loneliness. <i>Journal of Applied Social Psychology</i> , 43(7), 1508-1517. https://doi.org/10.1111/jasp.12144
34	Viveiro, C., Marques, M., Passadouro, R., & Moleiro, P. (2014). Teens and the internet: Patterns of (ab)use. <i>Adolescencia e Saude</i> , 11(2), 7-18.