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How Compulsive Use of Social Media Affects Performance: Insights from the UK by Purpose of Use

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Abstract

Positive outcomes of social networking use in both informal and non-educational settings have attracted significant research attention. These benefits include social capital formation, higher job performance and satisfaction, an increased sense of belonging, improved knowledge management skills, and enabling of life-long learning opportunities. Compulsive use of social networking, however, remains a major issue among the younger users, potentially leaving a long lasting impact on the younger population. Concerns have been raised regarding links between compulsive use of social media and individual academic, social and physical performance. This study explores the motivations for social networking use, their relations to compulsive use, and implications for academic, physical and social performance, in an effort to inform strategies for the appropriate adoption and utilization of social networking technologies. The study employs a finite mixture approach to segmenting the sample, and results show that two distinct groups motivated by utilitarian and social objectives respectively drive compulsive use by British students. Unlike previous studies, the UK sample does not display differences in terms of age or gender. This finding highlights the trend of gender agnostic views of social platforms by developers. The paper concludes with a discussion of the implications for practice and future research.

Keywords**:** compulsive use, social media, academic performance, social performance, physical performance

1. Introduction

In recent years, the use of social media tools has become increasingly ubiquitous, affording users with varied collaborative, capital building, and content sharing opportunities not possible in the past (Anderson & Caumont, 2014; Boyd & Ellison, 2007; Dittrich & Giuffrida, 2011). As such tools become increasingly prominent in people's everyday lives, the need for focused research related to the impacts of these tools on various aspects of those lives becomes particularly important (Jansen, Sobel, & Cook, 2010; Lenhart, Purcell, Smith, & Zickhuhr 2010; Quan-Haase & Young, 2010). One segment of the population for which such research is particularly important is students, as past research has cited negative impacts of both technology and social media use by them. For example, research has cited negative effects of students' interactions with online gaming, social networks, and virtual worlds, including distraction from academic tasks, compulsive use and addiction, isolation, and decreased student achievement (Jacobsen & Forste, 2011, Mäntymäki & Riemer, 2011; Mooney, Wright, & Higgins, 2010). Thus, as virtual social interactions are increasingly replacing real-world social interactions (Morrison & Gore, 2010), it is critical to develop a comprehensive understanding of factors that influence the use of social media by students in an effort to mitigate potential negative academic, social, and physical consequences (Caplan, 2003; Hafner, 2009; Hartshorne, Ajjan, & Cao, 2016 Mazzoni, Cannata, & Baiocco, 2017), while also extending the positive consequences of social media use that has been espoused in the research (Boulos & Wheelert, 2007; Ferdig, 2007; Franklin & Van Harmelen, 2007; Maloney, 2007; Sturm, Kennel, McBride, & Kelly, 2008; Valenzuela, Park, & Kee, 2009). Hence, this study focuses on this segment as the most susceptible to compulsive social media use and its consequences on performance (Bernoff & Schadler, 2010; Dahlstrom, 2012; Jacobsen & Forste, 2011). Such an exploration will inform higher education stakeholders on developing more effective and innovative technology-rich learning environments, as well as

provide a foundation for future development of robust learning analytics model related to the use of social networking among college students.

UK social platform users are fortunate to have access to smart devices and computers from an early age, one of the earliest ages in Europe. A UK child, for example, typically receives a smart phone around the age of 12. The natural consequence of this is that, from an early age, children spend a significant amount of their time on the Internet. When compared to other European countries, such as Belgium and Romania, UK users show an increasing level of excessive Internet use, owed somewhat to smart device proliferation (Škařupová, Ólafsson, &, Blinka, 2016). While the use of the Internet and social media has significant positive impacts, such early use has been seen in a largely negative context over the years (Stavropoulos et al., 2018). However, a recent report in Britain by the EduPolicy Institute on the mental health of children and Internet use in the UK has highlighted that younger users value social networks as a way of connecting with friends and family, maintaining their networks of friends over time and long-distance connections. Further, students see social networking as a comfortable medium for sharing their issues and finding solutions to common problems, such as social isolation and loneliness. Younger users are also more likely to seek help in areas such as health advice, unknown experiences, and help with exams and study techniques (Firth, 2017). Due to the complex nature of social media use, research examining social media use or non-use decisions must examine the numerous determinants that may play a role in influencing such decisions (Bolton et al., 2013; Cheung, Chiu, & Lee, 2011; Correa, Hinsley, & De Zuniga, 2010; Gil de Zúñiga, Jung, & Valenzuela, 2012). Further, decomposing key determinants is essential for providing such a comprehensive picture of social media use in students. In an effort to explore these issues, this research addresses the following research questions: What factors determine the compulsive use of

social media by students? What are the performance outcomes (academic, social, and physical) of social media compulsive use by students?

2. Literature Review

2.1 Social Media Compulsive Use

As social media applications continue to permeate numerous facets of our lives while also constantly improving features and functionality, compulsive use, or social media addiction, is becoming an increasingly prominent concern, particularly among students (Anderson & Caumont, 2014; Barassi & Treré, 2012; De Cock et al., 2013; Hartshorne et al., 2016; Kim et al., 2012; LaRose, Kim, & Peng, 2011; LaRose, Wohn, Ellison, & Steinfield, 2011; Safko, Brake, & Brake, 2009). Consequently, there is a growing body of research related to the compulsive use of social media. In their examination of ways in which social media use influences various aspects of the lives of heavy users, Powell, Gray, & Reese (2013) found that compulsive users use social media to avoid daily responsibilities, have high rates of use throughout the day, and typically indicated the desire to reduce their use of social media tools, often viewing themselves as social media addicts. Other research has echoed these themes. For example, Hofmann, Vohs, and Baumeister (2012) espoused that social media can be more addicting than cigarettes or alcohol. Further psychological distress and victimisation as well as social rejection are common among young social networking users. Ophir (2017) shows that social rejection and distress sharing are associated with high social media use of young individuals, highlighting the importance of studying compulsive use in more detail.

2.2 Factors Influencing Social Media Compulsive Use

In recent years, there has been an increase in researchers examining factors that influence adoption or non-adoption decisions of social media applications, including hedonic, utilitarian, and sociability factors (Mäntymäki & Riemer, 2011). Hedonic factors are related to the perceived entertainment or enjoyability of the use of social media, and are a primary

reason for the increasing popularity of social media use among young people (Safkso, Brake, & Brake, 2009; Yen, 2011). This echoes past research, which has cited hedonic factors as having a significant impact on compulsive use of websites and other technologies (Chou & Ting, 2003; Turl & Serenko, 2012). However, the role of hedonic factors not been sufficiently explored in relation to compulsive use of social media applications. Utilitarian outcomes are related to the user perceptions of social media applications to support goal attainment related to social and information interactions (Mäntymäki & Riemer, 2011). While there is limited research related to compulsive use of social media and the impact of utilitarian factors, Masur, Reinecke, Ziegele, & Quiring (2014) argued that goal attainment may play a significant role in influencing social media compulsive use. Lastly, sociability factors are related to perceived social relations developed in social media applications, such as perceived social status (Mäntymäki & Riemer, 2011). Past research has shown that feelings of social gratification are likely to lead to increased social media use and can serve as predictors of intentionality to use social media applications (Chen, 2011; Griffiths, 2011; Lee & May, 2012). Research related to factors that influence social media compulsive use is limited and compartmentalized. Thus, in this study, we examine the complicated interconnectedness of hedonic, utilitarian, and sociability factors as predictors of the compulsive use of social media.

2.3 Social Presence and Interactivity

Past research has cited both interface interactivity and social presence as factors that influence technology and Internet usage. Interactivity refers to the real-time personalization and customizability of the user interface (Steuer, 1992). Due to the dynamic nature of social media applications, the ability to continually personalize and modify shared content affords a uniqueness not present in traditional technological applications. Huang, Hsieh, and Wu (2014) found that this ability to personalize and modify user interfaces (i.e., status updates,

sharing images) impacts both positive perceptions of the user experience, as well as the likelihood of increased future social media use. Further, interactivity can enhance perceived value of the social media use experience through an enhanced perception of control and autonomy in the environment (Animesh, Pinsonneault, Yang, & Oh, 2011). Social presence refers to the extent to which an application allows a user to perceive and experience conversations and relationships with others in the social media environment (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011; Shen, 2012), and is critical to bridge real and virtual worlds and relationships (Kietzmann et al., 2011). Past research has noted that both intimacy and immediacy of relationships within the medium influence social presence (Kaplan & Haenlein, 2010; 2012). Increased social presence can also increase perceived usefulness and enjoyment within a social media application, resulting in increased use (Choi, Lee, & Kim, 2011; Shen, 2012).

2.4 Social Media Compulsive Use Impacts

The far-reaching implications of social media compulsive use has r increasingly attratcted attention from various researchers and scholars (LaRose et al., 2011; Meerkerk, Eijnden, & Garretsen, 2006; Meerkerk, Van Den Eijnden, Vermulst, & Garretsen, 2009; Wallace, 2014, Kumar, Kumar, & Bhasker, 2018). Further, as past research has cited more negative impacts of both technology and social media use on specific populations (Stavropoulos et al., 2018), social media compulsive use research has increasingly focused on students (Bernoff & Schadler, 2010; Dahlstrom, 2012; Jacobsen & Forste, 2011; LaRose, et al., 2011). For example, in their research of social media use by students, LaRose, et al. (2011) concluded that compulsive use of web applications has negative academic, personal, and professional consequences, with compulsive use potentially resulting in diminished self-regulation, loss of self-control, and increased dysphoria. Further, compulsive use negatively impacted adjustments to University life, with both academic adjustment and expectations, and

psychological well-being, negatively influenced by compulsive use (LaRose et al., 2011). Masur et al. (2014) found that social media addiction often resulted in wasting time, diminishing social relations, decreased work and school performance, loss of control, and withdrawal syndrome.

Negative impacts of compulsive use have been echoed in the findings of other researchers. Škařupová et al (2016) showed the excessive use is associated with the daily use of online games and social networking sites. Wallace (2014) also cited a connection between compulsive use and Internet addiction related to social media, gaming, and mobile applications, with young people being particularly vulnerable. Further, Wallace (2014) espoused that such compulsive use decreases academic performance for many students, as increased time interacting with social media results in diminished time being spent on academic activities. Additional related research has cited depression and stress in young people as psychological consequences of gambling via social media and impulsive use of cell phones, and potentially leading to more significant moral, psychological, and social issues (Griffiths & Parke; 2010; Griffiths, 2010; Lee & May, 2012). Other researchers have found a number of other negative psychological traits related to social networking addiction, including concealing addictive behaviours and escapism (Chou, Condron, & Belland, 2005; Kuss & Griffiths, 2011; Widyanto & Griffiths, 2006). Overwhelmingly, parents and education institutions report a general loss of control and involvement as the younger generation are left to their own devices and peer-learning while navigating the social technologies landscape (Benson, 2017). While there is an increasingly growing body of research related to compulsive use and students, we aim to extend the current research base by exploring the complex interconnections of the impact of social media compulsive use on academic, social, and physical performance of students.

2.5 UK Context

According to studies from the UK Educational Policy Institute (Firth, 2017), British social networking users see social media technological applications as opportunities to find people with similar interests, as well as support team work in school projects and charities. In unsettled economic and political times, students find social networks as a means to being heard and allowing for involvement in political activism, as well as volunteering and participating in charitable activities. Social networks also enable users to engage with creative projects. For example, many young artists are noticed through the opportunities afforded by the rich interactivity of social media. Users looking at pursuing careers in art or other creative industries turn to social platforms in order to create their portfolios, as well as engage in co-creation. These opportunities have a positive impact on the formation of the younger character as well as developing individual identity and choosing a career path or becoming a social platform entrepreneur. These choices are made at an early age and social networks are enriching young people's lives. The young age of access to smart devices (Škařupová et al, 2016) and social network registration in the UK makes British social platform users a distinct group worthy of research attention related to their performance and social networking use. Studies conducted exploring the negative consequences of social networking in the US have shown that gender differentiates users in terms of drivers towards compulsive use of social platforms (Hartshorne et al., 2016). Yet, when studying British professionals and their purpose of use for social platforms, other studies (Benson & Filippaios, 2015) found that personality, rather than gender, drives adoption decisions. This study, therefore, investigates the drivers and purpose of social media use and the relationship of use to performance, while simultaneously identifying links to the compulsive use of social media.

The dark side of social networking is comprised of an extensive list of negative influences, ranging from time wasting, compulsive use, cyber bullying, radicalisation,

addiction, stress, and grooming (Jacobsen & Forste, 2011; LaRose et al., 2011). As Sigman (2009) notes, a pronounced change in the behavior of UK citizens is the reduction of time spent in (face-to-face) social interactions and an increase in electronic media use. This leaves a greater proportion of people in the UK, particularly students, vulnerable to the downsides of social media use. Unsurprisingly, governments are concerned with such negative impacts of social networking on users. The growing worry over the uncontrolled nature of social networking has prompted actions from parents and policy makers alike. The matter of children roaming freely on social networks became an issue in the recent government elections and received coverage in the electoral manifesto of the Conservative Party. A hallmark promise from the Conservative Party was "Safety for children online, and new rights to require social media companies to delete information about young people as they turn eighteen" (Conservatives Manifesto, 2017). It is a tall order erasing profiles of millions across a range of social platforms with global data storage and fragmented regulation. They go further by suggesting "We will also create a power in law for government to introduce an industry-wide levy from social media companies and communication service providers to support awareness and preventative activity to counter Internet harms" (Conservatives Manifesto, 2017, p.32). Supporting awareness is an important step towards conscious social media use. However, despite the continuing efforts at educating children about the dangers of compulsive use, many are weary of the negative impacts technology may have on the overly social users escaping control. The growing attention from researchers, industry, policy makers and educators towards the adverse effects of social platforms on the performance of younger users provided the impetus for this study on British social networkers.

3. Research Model

In this study, we propose to use the social media compulsive use model shown in Figure 1 and described below (Hartshorne et al., 2016). In the model, the extent to which two

antecedents, social presence and interactivity, impact hedonic, utilitarian, and sociability outcomes is explored. Earlier studies showed that certain ways of experiencing cognitive involvement are more risky than others (Mazzoni et al., 2017). Further, past research (e.g. Stavropoulos et al., 2018) has reported varied negative outcomes of social media compulsive use, particularly for those that are unable to limit the amount of time in which they interact with social media applications. Compulsive use can be identified through behaviours such as restlessness, preoccupation with social media, moodiness, and depression, and can negatively impact personal, professional, and educational interactions, relationships, and performance (Mazer & Ledbetter, 2012). From previous research related to social media compulsive use, it is anticipated that increased social presence and interactivity will have positive influences on utilitarian, hedonic, and sociability outcomes, leading to higher compulsive use of social media. In turn, this model examines the impact of social media compulsive use on academic, physical, and social performance of students. The model, presented in figure 1, contains twelve pathways between compulsive use of social media and its antecedents and outcomes. The hypotheses underpinning these pathways, some of which have been merged, are developed in the following sections.

3.1 Social Media and Academic Performance

Previous studies identified both positive and negative impacts of social media use on academic performance. For instance, Kirschner and Karpinski (2010) found that Facebook users had lower academic achievement and spent when compared to non-users. LaRose, Donghee, Wohn, Ellison, and Steinfield (2011) and Masur Reinecke, Ziegele, and Quiring (2014) report similar findings. Conversely, Hargittai and Hseih (2010) and other researchers have found that social media use has no significant influence on academic performance. In this study, we revisit this issue and measure the impact of social media use on academic

performance, captured by perceptions of academic performance and class attendance, as outlined by Suhail and Bargees (2006). Specifically, we expect:

H1: *Compulsive use is positively and significantly related reports of reduced academic performance*.

[INSERT FIGURE 1 HERE]

3.2 Social Media and Physical Life Performance

While many news agencies and online media report negative impacts of social media on physical performance and health, there is limited research supporting such assertions. One example, though, a University of Ulster (2012) study, found that the amount of time university students spent utilizing social media resulted in less participation on team sports, and had a negative correlation with one's level of physical activity. Further, Suhail and Bargees' (2006) findings identify a positive correlation between time spent using the Internet and suffering physical symptoms. Additionally, Sigman's (2009) reported increased serious health problems among more frequent social media users. These studies provide descriptive evidence of a negative relationship between social media use and physical health. Drawing on this, we include a physical performance as an endogenous construct in our model, and we hypothesize:

H2: *A significant positive relationship exists between compulsive social media use and reported impaired physical performance*.

3.3 Social Media and Social Performance

As with academic and physical performance, research related to the impact of social media use on real-world social performance is limited, with existing research providing contradictory results. For example, in their survey of international students, DeAndrea, Ellison, LaRose, Steinfield, and Fiore (2012) found that social media use can improve social adjustment, while also serving as a tool for the development of online social capital.

However, many studies have found that social media use has no impact on real-world social performance. Pollet, Roberts, and Dunbar (2011), for instance, reported no difference in both the size and connection of real-world social networks between social media users and non-users. Other studies, though, have reported negative impacts, such as depression, loneliness, diminished social skills, or other significant psychological issues (Kim, LaRose, & Peng, 2009; LaRose et al., 2011; Morrison & Gore, 2010b). Based on extant research, we examined the impact of social media use on a number of social performance factors, including strength of online vs. real-world relationships, social event attendance, comfort in online social settings, complaints of social media use by family and friends, and the utilization of social media while feeling isolated, as outlined by Suhail and Bargees (2006). We hypothesize:

H3: *A significant positive relationship exists between compulsive social media use and reported impact on social relationships.*

3.4 Social Media and Perceived Utilitarian, Hedonic, and Social Outcomes

The interconnectedness between social media use and perceived utilitarian, hedonic, and social outcomes is complex, with all three factors being predictors of social media use (Mantymaki & Merikivi, 2010; Premkumar, Ramamurthy, & Liu, 2008; Yen, 2011). Merged with utilitarian factors, hedonic factors have been found to be dual factors in facilitating social media use, as hedonic factors play a prime role in determining a user's attitude toward social media use and are positively correlated to continuous use intention (Cyr & Head, 2008; Ernst, Pfeiffer, & Rothlauf, 2013; Mantymaki & Merikivi, 2010). The utilitarian value of social media applications is associated with user ability to distribute information of a particular social media tool, with improved utilitarian factors providing for enhanced production, productivity, and performance. As with hedonic factors, utilitarian factors have a

significant positive impact on social media continuous use intention (Cyr & Head, 2008; Mantymaki & Riemer, 2011).

Sociability includes opportunities for individuals to interact with social groups, influencing social image, acceptance, recognition, and needs (Pihlström & Brush, 2008; Sheth, Newman, & Gross, 1991), and is a critical factor in facilitating relationship development between individuals and their environment, as well as reconciling complex interactions with environmental and social surroundings (Leong, 2011), affording opportunities to connect individual and groups in time and space (Animesh et al., 2011). As with hedonic and utilitarian factors, sociability factors have a significant positive impact on social media continuous use intention. Consequently, we hypothesize:

H4: *Significant and positive relationships exist between perceived hedonic, utilitarian, and sociability outcomes and compulsive use.*

3.5 The Relationship of Social Presence and Interactivity with Perceived Outcomes

Due to its ability to increase perceived hedonic factors related to social media use, a key determinant of the perceived value of ones' experience with social media is interactivity, or "the degree to which two or more communication parties can act on each other, on the communication medium, and on the messages and the degree to which such influences are synchronized" (Liu & Shrum, 2002, p. 54). Past research has purported that affording users with highly interactive environments result in increased perceptions of hedonic value (Fiore, Jin, & Kim, 2005). Further, there is also a direct positive correlation between interactivity and utilitarian factors, effects that can have an increasing impact on hedonic factors (Yoo, Lee, & Park, 2010). Interactivity can also lead to increased utilitarian value of the use of the media as well as its perceived hedonic value. Lastly, research has also identified positive impacts of social media interactivity and sociability (Rafaeli & Sudweeks, 1997). For example,

interactivity in social media applications can facilitate interpersonal connections among both individuals and groups (Barnes, 2001). Thus, in this study, we explore the impact of social media interactivity factors hedonic, utilitarian, and sociability outcomes. Interactivity factors examined include: 1) user ability to modify content, 2) user ability to create new content, 3) user ability to modify page settings, and 4) user ability to modify page appearance, as outlined by Animesh et al. (2011). This leads us to hypothesize:

H5: *Significant and positive relationships exist between interactivity and hedonic, utilitarian, and sociability perceptions and outcomes.*

Social presence refers to the extent to which an application allows a user to perceive and experience conversations and relationships with others in the social media environment (Aragon, 2003; Kietzmann et al., 2011; Mäntymäki & Riemer, 2011; Shen, 2012; Swan & Shih, 2005). Past research has found that social presence is a critical bridge between real and virtual settings, and there is a positive correlation between social presence and social media continuous use intention (Mäntymäki & Riemer, 2011; Xu, Ryan, Prybutok, & Wen, 2012). However, there is little empirical research exploring the impact of the user perception of social presence on hedonic, utilitarian, or sociability outcomes, although we would expect the relationships to be positive. Thus, in an attempt to extend the current research base, in this study we explore the impact of perceived social presence factors on hedonic, utilitarian, and sociability outcomes. Social presence factors explored include: 1) tone of interactions with others, 2) closeness of interactions with others, and 3) emotionality of interactions with others, as outlined by Animesh et al. (2011). We hypothesize:

H6: *Significant and positive relationships exist between social presence and hedonic, utilitarian, and sociability perceptions.*

4. Method

In this study, we used the research model outlined in Figure 1 (Hartshorne et al., 2016). From this model, a survey instrument was developed in an effort to examine compulsive use of social media by university students in the United Kingdom as well as the impact on academic, social, and physical performance (see Table 1).

[INSERT TABLE 1 HERE]

4.1 Sample

In this study, students across a range of subjects at universities in the United Kingdom were surveyed. To recruit participants, students were solicited via an e-mail campaign. Ultimately, there were 240 respondents, 28.3% of which were male, and 70.4% were female. Additional descriptive statistics of the sample are shown in Table 2.

[INSERT TABLE 2 HERE]

4.2 Measures

The constructs shown in figure 1 were measured using scales derived from previous literature. Expert scholars and practitioners with extensive experience in both survey development and social media use and research then reviewed a draft questionnaire based on these scales. The survey was then modified based on expert feedback (Nunnally & Bernstein, 1994) and subsequently pilot tested with a small group of university students (representing the target sample for the survey). Additional modifications were made to the survey based on pilot group feedback. The final survey consisted of 34 items, each of which used a five point Likert scales (1 as *Strongly Disagree* to 5 as *Strongly Agree*).

5. Results

5.1 Measurement model

The model in figure 1 was estimated using the Smart PLS software (Ringle, Wende & Becker, 2015). Partial Least Squares (PLS) is a composite-based approach to structural equation modelling (see e.g. Lohmöller, 1989). Our objective was to assess the extent to

which compulsive social media use predicts performance outcomes, and the extent to which a range of antecedents predicts compulsive use. Hence, we adopted PLS as it is a more prediction-oriented SEM method than Covariance-Based SEM (Rigdon, 2012). First, the reliability and validity of the measures used were assessed. Reliability was assessed via the Cronbach's alpha and Composite Reliability indices. As shown in table 3, all of the measures achieve satisfactory values (above 0.7). The Average Variance Extracted (AVE) was calculated as a construct level measure of convergent validity, similar to communality. Values above 0.5 indicate a sufficient degree of convergent validity (as it shows that the construct is able to explain more than half of the variance of its indicators). As table 3 shows, all of the constructs have AVE values above 0.5.

[INSERT TABLE 3 HERE]

Discriminant validity refers to the extent to which constructs are distinct from each other and can be assessed using the Fornell and Larcker criterion that the square root of the AVE of a construct should be greater than its correlation with other constructs. Table 4 shows that the square roots of the AVE values, shown in bold on the top-left to bottom-right diagonal are greater than the inter-construct correlations.

[INSERT TABLE 4 HERE]

5.2 Path model

The path coefficients were estimated using the PLS algorithm and one-tailed significance tests conducted using bootstrapped standard errors (using 5,000 samples). The estimated pathway coefficients, significance tests, and goodness of fit statistics are shown in table 5. As table 5 shows, we found significant pathways between compulsive social media use and all three aspects of performance: academic, physical, and social, supporting H1 – H3. We also found interactivity and social presence to have significant relationships with hedonic, sociability, and utilitarian perceptions of social media use (supporting H5 – H6). However,

rather surprisingly, we found no significant relationship between hedonic, sociability, and utilitarian perceptions of social media and compulsive use (not supporting H4). Our findings regarding H4 could reflect that there is no relationship between these constructs, or that the nature of the underlying relationship differs across unobserved segments in the sample. To explore whether this result stems from the presence of unobserved heterogeneity, we employed a finite mixture approach to segmenting the sample called FIMIX-PLS (Herrmann, Hahn, Johnson, & Huber, 2002). This allows us to identify any subgroups in the data with distinct patterns of relationships between our variables.

[INSERT TABLE 5 HERE]

As Herrmann et al. (2002) noted, when applying FIMIX-PLS the number of segments has to be inferred from the data. Table 6 shows model fit criteria identified by Hair, Sarstedt, Matthews and Ringle (2016) to perform strongly (Akaike's Information Criteria with factor 4, Bayesian Information Criteria and Consistent Akaike Information Criteria) along with an entropy measure for four possible numbers of segments. The lower the mode fit information criteria, the better the fit; conversely the higher the entropy index the better the separation between the segments.

[INSERT TABLE 6 HERE]

AIC4, BIC and Entropy all indicate a two-segment solution; CAIC indicates a one-segment solution; however, this index is known to underestimate the number of segments. Consequently, we adopted a two-cluster solution; estimated path coefficients for the two segments are given in table 7.

[INSERT TABLE 7 HERE]

The results obtained for the two segments show some clear differences compared to the results presented in table 5. Whereas in table 5, none of the antecedents of compulsive social media use were significant, in table 7 we see one segment (segment 1) where

perception of sociability is a significant predictor of compulsive use, but hedonic and utilitarian perceptions are non-significant, and a second segment (segment 2) where utilitarian perception of social media use is a significant predictor of compulsive use, but hedonic and sociability are non-significant. Both of these segments however, show significant relationships between compulsive use and impaired performance. Having identified the segments, we tested cluster membership for association with gender or age. Neither gender nor age showed significant associations with segment membership (gender: $\chi 2 = 0.138$, df = 1, p = 0.711; age: $\chi 2 = 2.078$, df = 5, p = 0.838).

6. Discussion

The findings of our study show two distinct groups of users illustrating different drivers of compulsive use:

1) Compulsive use of social networking is driven by utilitarian motivation.
2) Compulsive use is driven by social motivation.

Each of the two groups is gender agnostic, which is a unique finding when compared to a comparable study with a US population (Hartshorne et al., 2016). A similar trend in international samples showed that neither gender nor age represent drivers of social networking use in studies of professional, rather than explicitly educational, use (Benson & Filippaios, 2015). However, British student behaviour is distinctive from their American counterparts (Hartshorne et al., 2016). Our results indicated that social media compulsive use leads to lower academic, physical, and social performance for participants, regardless of age or gender, supporting hypotheses 1, 2, and 3. Interestingly, hypothesis 4 was only partially supported, as hedonic outcomes were not a significant determinant of social media compulsive use, neither in the model-estimated full sample, nor in the FIMIX results; but perceived utilitarian outcomes of social media and perceived sociability were both significant determinants of compulsive use, but for different groups of users. Further, hypotheses 5 was

only partially supported, as we found significant positive relationships between interactivity and hedonic perceptions, perceived utilitarian outcomes, and perceived sociability (in segment 1 but not segment 2). Hypothesis 6 was partially supported, as there was no significant relationship between social presence and hedonic perceptions in segment 2, but significant relationships were found in segment 1and in the full sample model. There was also a significant positive relationship between social presence and both perceived utilitarian outcomes and perceived sociability.

This study's findings afford a number of important insights. First, as compulsive use of social media has significant negative impacts on academic, physical, and social performance, it is critical to manage the various factors that influence compulsive use, for both male and female students. As illustrated in the study results, the perceived utilitarian outcome of social media use was a critical determinant for the level of compulsive use for a subset of participants. This suggests that, for these participants at least, the use of social media is closely aligned with the perceived usefulness of the tool to accomplish practical tasks, such as managing productivity and accessing or organizing content, rather than hedonic or sociability factors. This is encouraging, as hedonic and sociability factors may be useful in reducing the negative impact of compulsive use of social media, and also hints that social media compulsive use may result in increased productivity in other aspects of life. Thus, educators should develop and integrate social media implementations that supplement useful applications of these tools with both social and enjoyable applications of the tools to support academic, social, and physical activities. Further, students must be cautioned regarding concerns related to compulsive use of social media and the potential negative impacts on academic, physical, and social performance.

As previously mentioned, we found perceptions of utilitarian outcomes to be a primary determinant of compulsive use for a subset of users. Further, we found social

presence and interactivity with social media use to be drivers of perceived utilitarian outcomes. This is an expected finding, as previous research has found that social presence and interactivity can enhance the perceived value of social media use (Animesh et al., 2011; Choi et al., 2011; Shen, 2012). We also found that interactivity is a driver of hedonic and sociability perceptions, and social presence is a driver of perceived utilitarian, sociability, as well as hedonic outcomes. Thus, it is critical for stakeholders to manage interactivity factors, such as the ability to personalize and share various forms of content; and social presence factors, such as strength and comfort with online relationships vs. real-world relationships and feelings of isolation, when utilizing social media in a manner that balances hedonic and sociability perceptions with utilitarian outcomes. For example, social media applications designed to allow users to experience conversations, networking, and attending meetings, while also allowing for increased interactivity among individual users as well as the interface, tend to reduce the likelihood of compulsive use. Aligning such uses with utilitarian applications can be useful for providing robust social media experiences, while mitigating the negative impacts of compulsive use on academic, physical, and social performance. Again, it is critical that various stakeholders of social media use thoroughly examine and address these issues through diverse informational dissemination methods, as well as and other techniques.

7. Limitations

Our study is not without its limitations. One of them is the self-reported data collection approach to time spending on social networking sites, which may be subject to social desirability bias. It has been show in some studies that a more insightful explanatory value can be obtained by addressing user behaviours by means of a qualitative research approach. In this case, data mining of existing social media use data amongst students may eliminate limitations associated with self-reported data and social desirability bias. We suggest the findings reported in this paper are tested in a series of settings and more social platforms using observations and

experimental approaches. We welcome further testing of our hypotheses in order to obtain more insights from the existing research instrument. Additionally, although the data is collected from a significant UK population of social platforms, the sample size is comparatively small in relation to the social media user base and refers to a single time frame. Further, the sample is disproportionately represented by female participants (70.4%), and future studies should seek more equilibrium among participant gender. A longitudinal study, particularly addressing the progression of social media use by teens under parental control to adulthood where such supervision is relinquished, may provide additional insights into what preventative controls are necessary to avoid compulsive use development for future generations. Finally, a large-scale study could incorporate a control group (non-SNS users) in the design. Therefore, whilst our results (as with all results based on recall data) should be interpreted with some caution, they are stimulating for practice and future empirical work in the field.

8. Implications

The goal of this study was to extend existing literature through assessing the impact of social media compulsive use on academic, physical, and social performance for students in the UK, as well as factors that influence compulsive use. With the continued pervasiveness of social media applications in all aspects of our lives, it is becoming increasingly critical that educational institutions develop and facilitate practices that not only inform stakeholders of the negative impacts of the compulsive use of social media, but also provide mechanisms, information, and resources related to mitigating the negative impacts of the compulsive use of social media. Consequently, the results of this research have potentially extensive implications for both research and practice in varied settings and for diverse stakeholders.

8.1 Implications for Research

The goal of this study was to explore factors that influence compulsive use of social media by university students in the United Kingdom as well as the impact of compulsive use on

academic, social, and physical performance. Further, this study serves as a starting point for the various stakeholders to examine their role in influencing beneficial social media, and provides a research framework that can be extended to numerous contexts and with additional, varied respondents. For example, with the increase in utilization of social media in varied formal and informal educational settings, such as workplace training settings, the impact of compulsive use on academic, social, and physical performance, as well as factors that influence compulsive use of social media, could be explored with a much more extensive and diverse population. This could be extended further through examinations of differences in populations in varying countries. While this study provided initial results related to compulsive use among students in the UK, new questions and concerns have emerged. Thus, the results of this study provide a foundation for future research examining the impacts of compulsive use, as well as factors that influence compulsive use, allowing a foundation for a closer examination of participants and moderating factors, such as network accessibility, social capital, and others.

8.2 Implications for Practice

The results of this study of social media compulsive use showed that individual motivations for use matter, rather than demographic characteristics, such as age and gender, and have several implications for practitioners and other stakeholders in social media use. Users who are highly sociable and are driven by friends towards compulsive use of social media suffer in both physical and social performance levels. On the other hand, hedonic motivations (fun-seeking) show no significant relationship with compulsive use. This explains why UK young users see social networking as a positive phenomenon enriching their social life and as a positive experience. There is clearly potential to harness these positive perceptions. While social networking providers must play their part in ensuring safety of the younger users, educators should also communicate openly with their students' social networking activity

and expected standards of its use. It is also critical that educators and students are afforded with mechanisms to both identify early symptoms of compulsive use, such as isolation from peers and lack of completing course activities, as well as associated interventions, such as providing coping strategies (i.e. counselling services) and technical resources (i.e., software for managing time on social media) for managing social media use. Students are looking for answers to their problems and questions as they go through challenging time; teachers, family and friends can make the most of providing support through the medium that provide students with the most comfort.

The negative implications of compulsive use have tangible effects on student life; differences in psychological predispositions of users driven by learning difficulties and medical problems warrant further need for extending the compulsive use model in future studies. We open this for further research from both application and psychological perspectives. Future directions of research on compulsive use of social networking in relation to the younger population segment, control and supervision are offered for discussion.

9. Conclusion

Social networking use and social networks have been seen as transformational technologies in recent years, changing the ways in which people connect and interact. While social media use is prominent among many demographic groups, research shows that different population segments view social networks and social network use in very different ways. While younger users were at the forefront of the development and use of social media applications, older users have formed the highest proportion of newly registered users in recent years. Reaching maturity (in technology terms) over the length of 15 years since their inception, social networks have benefited from intense research attention. Positive outcomes of social networking have been shown to include social capital formation, higher job performance and satisfaction, sense of belonging, knowledge management, and serving as an enabler of life-

long learning opportunities. However, the effects of the impacts of compulsive use of social media on social, physical, and academic performance, as well as factors that impact compulsive use, has not been extensively explored. This study of UK users shows that for some users, compulsive use is driven by utilitarian motivations (which has implications for research and practice in both educational and non-educational settings) whilst for others it is driven by social motivations.

It is critical for researchers, practitioners, and other stakeholders in the use of social media to consider the complex relationship between social media applications, compulsive use, factors that influence compulsive use, and their influence on academic, social, and physical performance. This research study serves as a starting point for the various stakeholders to examine their role in social media use in ways in which the benefits of social media use can be maximized, while simultaneously minimizing the drawbacks, in an effort to use social media to positively impact physical, academic, and social performance. Further, the results of this study inform higher education stakeholders on factors to consider when designing, developing, implementing and evaluating innovative learning environments that utilize social media, as well as provide a foundation for future development of robust learning analytics model related to the use of social networking among college students.

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