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MEASURING INTERNET ADDICTION AND ITS RELATIONSHIP TO STUDENT GRADE POINT AVERAGE IN UNDERGRADUATE ACADEMIC PERFORMANCE

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ABSTRACT

The purpose of this study is to develop a research model using prior research and to investigate the influence of self-control, time spent on Internet and relationship satisfaction on Internet addiction. The model includes the impact of self-control, the time spent on the Internet, and the relationship satisfaction on Internet addiction. We postulate that Internet addiction in its turn impacts academic success. The model was tested by using survey data and the results showed a relationship between self-control and time spent on Internet and Internet addiction. The study data did not support any significant connection between relationship satisfaction and the Internet addiction, as well as between Internet addiction and academic success.

Keywords: Internet Addiction, Academic Success, Self-Control

INTRODUCTION

Internet addiction (IA) has become a prevailing problem in today's digital society where people are relying on technologies in every sphere of life including education, leisure or work. The communication overload created by constant usage of social media, chat applications and just by being constantly available on the Internet has serious implications for society in large. Students of the digital world, especially typical undergraduate young adults, are vulnerable in carefully treading the line of "enough Internet usage" and falling prey to excessive and addictive use of the Internet. For students, shifts in attention are mentally taxing and impede memory and learning. Furthermore, when much attention is diverted to non-work activities, the lack of work focus affects job performance (Coker 2011). The term addiction can be defined as "compulsive, uncontrollable dependence on a substance, habit, or practice to such a degree that cessation causes severe emotional, mental, or physiological reactions" (Mosby's Medical Nursing & Allied Health Dictionary, 1998). Internet addiction could be perceived as, "an individual's inability to control his or her use of the internet, which eventually causes psychological, social, school, and/or work difficulties in a person's life" (Chao and Hsiao, 2000).

Internet addiction also conveys the use of the Internet to the extent that it impacts the quality of work, study, and social life (Fitzpatrick, 2008). There is no general agreement on definition or understanding of Internet addiction in research community and there is a lack of acceptable method to screen IA in users (Buyn et al, 2009). It became recognized in psychology as an addiction only in the mid-90s (Beato, 2010). Research literature in this area lists variety of activities or Internet habits that can fuel addictive behavior. Some of these are: playing excessive online games, social media sites, usage of pornographic images or services, gambling practices etc. Saisan et al (2013) argue that Internet addiction could lead to mental health issues (such as not being excited about social engagement, lack of focus and productivity) and physical health issues (muscular problems in neck and back area due to the posture, insomnia or poor quality of sleep) for people suffering from this disease. Waugh (2012) suggests that adolescent mind could be damaged due to addiction to Internet usage.

Studies in this area suggest that excessive use of IT is likely to lead to undesirable outcomes and serious challenges for individuals when it becomes addictive (Turel, Serenko & Bontis 2011). Especially in young users such as college students, this can result in academic challenges, sleep deprivation and mental health issues (Vaghefi and Lapointe,

2013). While there are an abundance of studies about IA, most of them stem from a general definition of addiction. This study considers IA to be a special addiction type and was set out to measure its impact on academic success. In most studies that we examined, the authors reported a negative impact of addictions on academic success. Misapplied Internet usage resulting in academic performance decrements in subsequent grade tabulations were forecast and followed in a major study in the early years of student Internet pursuit (Kubey, Lavin & Barrows, 2001). Any kind of addiction takes immense will power and time to get over it. Students having issues with Internet addiction typically do not dedicate enough time to academic studies or developing personal and social relationships.

The goal of this study is to investigate the negative impact of IA on academic success of college students. In order to better understand Internet addiction, we have also looked at its potential determinants and examine its relationship with IA. A critical review of the extant research literature was conducted to understand the determinants of Internet addiction and three major factors impacting IA are identified: self-control, time spent, and relationship satisfaction. The model was tested using cross sectional survey designed using existing items, based on literature, for the construct measurement and some new items were developed as well. The research framework contributes to IA research by explaining the determinants of IA for college students and its impact of academic success of the student.

The remainder of the paper is organized in the following stages. The next section presents a critical review of the literature in the area of Internet addiction and its relationship with academic success. This section also presents the development of research model. Following research framework development, a concise methodology section is presented. This section presents the data collection and analysis strategies for this study. The discussion section, presents an analysis of the implications of the findings. Finally, future research directions are presented, limitations are discussed and relevant conclusions are drawn.

RESEARCH FRAMEWORK

Research Model

The definition of addiction is similar across all theories that we have reviewed: a person is considered addicted if he or she (a) performs the same action for which he/she gets a reward and (b) is not able to stop the action, even if other important aspects of life suffer (such as social life, family, work, and school). Addiction is often referred to as dysfunctional symptoms (Sim et al., 2012). In many theories the definition of Internet Addiction stems from the definition of addiction. Despite the encouraging positive effects of wide-spread and pervasive usage of the Internet at the collegiate level, there is a growing perception and subsequent reality of the effects on students who increasing fall prey to its unintended negative consequences (Chou, 2000). Previous research findings have shown that excessive use of the Internet adversely affects one's health, well-being, family life, relationships and academic performance (Akhter, 2013).

There is a lack of theory of addiction and this leads to confusion and controversy of what Internet addiction actually is. Historically, the addiction construct has functioned as a psychiatric label for the clinical impairment caused by drug use (Zwanenburg, 2013). Of critical importance to the study is the theory that college students tend to develop a dependence on the Internet that exceeds other segments of their societal experiences (Kandell, 2013). In this study we use the following approach: we are aware of the problems, have examined them and want to test their effect on academic performance standards.

Based on the research literature in the area of Internet addiction, this study proposes a model identifying three antecedents of Internet addiction and the impact of IA on academic success of a student (see Figure1).The first antecedent to IA identified in this model is "Self-control" of an individual and its direct influence of internet addiction is hypothesized (section 2.2). Second antecedent proposed in the model is "time-spent" on the Internet by an individual as determinant of IA (section 2.3). The third antecedent of IA is proposed to be "relationship status" of an individual (section 2.4). Lastly, the model proposes a direction impact of Internet addiction on academic success of a student (section 2.5).

Self-control and IA

Self-control or lack of it has been used studied extensively in addiction research. Self-control, sometimes called self-regulation, is the ability to control emotions, anxiety, and behavior to gain possible rewards or avoid punishment (Timpano et al. 2013). Self-control could also be defined as the capacity to override impulses and to regulate behavior, thoughts, and emotion in favor of goals or plans (De Ridder et al. 2012). Undoubtedly, this capacity varies between individuals (trait or dispositional self-control) and within individuals, across time and situations (Zwanenburg, 2013). People low (vs. high) in trait self-control are poor in impulse control and report more deviant behavior and addiction (Lubman et al. 2004). Low trait self-control thus predisposes individuals to develop IT addiction.

In different theories that were reviewed, a variety of causes were found that lead to addiction. For example, Muraven, Pogarsky, and Shmueli (2006) assume that any addiction stems from the lack of self-control and proposes the measurement of addiction that directly correlates with the subject's degree of self-control. In this theory Self-control is defined as "the differential tendency of people to avoid criminal acts whatever the circumstances in which they find themselves" (Gottfredson and Hirschi, 1990). The theory of self-control was mostly applied to criminal addiction cases, but it may be transferred to other addictions, such as the addiction to Internet. Self-control could also affect the addiction in mobile devices, Internet and gaming behavior (Khang et al, 2013).

Rotsztein (2003) investigated the relationship between Internet use and locus of control among college students. In this context, locus of control was defined as the perception of the extent to which individuals can control events in their lives. The study concluded that students who report symptoms of problem Internet use are more likely to be associated with external locus of control.

Multiple research studies that were reviewed have identified lack of social skills, acceptance, or lack of good social relationships as one of the major reasons that lead to Internet addiction. Although there was not reported relationship between Internet addiction and aggression (Sahin, 2014), several researches indicate that increased defensiveness may be a sign of addiction (e.g. Sim et al, 2012) and lack of self-control.

This leads to our first hypothesis:
H1: The lack of "self-control" in an individual life is positively related to Internet addiction

Time-spent and IA

Previous research studies on the impact of obsessive use of technology, in terms of time spent on the Internet, on academic achievement are not clearly correlated with each other. Many studies have produced differing results. Positive effects of technology on academic achievement certainly have been documented. Lei and Zhao (2005) researched the specifics of access, acknowledging that quantity is not as important as quality when it comes to technology use and student achievement.

In a much more recent environment, Kotikalapudi (2011) reported depressive symptoms erupting from extreme Internet usage resulted in detrimental academic performance and subsequent dropout from the college environment. While these incidences are at the outer edge of Internet addiction studies, they help to define the limits of the recurring crisis.

When it comes to measuring Internet addiction (or trying to match a numeric value with Internet addiction) in the context of time spent on the Internet, the researchers encounter a lot of challenges and uncertainties. It is difficult to measure IA without confusing it with other types of addiction, for example addiction to porn or gambling that can be done online. Therefore, one of the challenges is to filter out other addictions and to measure IA as the whole, not as a set of addictions to social media, to online gaming, etc. Although all reviewed theories gave time spent online as one of the key values in defining Internet addiction (Sim et al, 2012), it is a challenge to filter out "useful" usage of Internet, such as the use for academic or work-related purposes. In this study we differentiated between the time spent on the Internet for academic purposes and leisure. For that purpose the results were measured for both academic and non-academic use of the Internet.

H2: The amount of time-spent on the Internet on a daily basis positively impacts the degree of Internet addiction displayed

Relationship satisfaction and IA

The third antecedent to Internet addiction, as it emerged from the critical review of the literature was satisfaction from relationships in an individual's life and their propensity to get addicted to the Internet. In the context of college students, the Internet provides a convenient and anonymous way to form relationships with individuals and allows the students to express their need for social interaction and acceptance in a fairly non-intrusive way. Research on age factors (Kim, 2004) found that college students between the ages of 19 to 24 were the most susceptible to addiction. The typical college population shows vulnerability towards such kind of addictions such as Internet. However, many students fall behind in their studies due to excessive investments in online relationships (Usamana et al, 2014). Engaging in chat room is an example of how students invest significant amount of time on Internet forming relationships which could lead to addictive behavior. The relationships that students form could be for multiple purposes.

Shaw and Grant (2002) suggest that online relationships differ fundamentally from face-to-face relationships, especially because of the anonymity accorded by the Internet. This context of anonymity encourages people to disclose more personal information more quickly than they do in face-to-face interactions, which probably leads to intimate relationships being a more frequent consequence of online interactions (Shaw and Grant, 2002). This is probably more applicable to undergraduate college students who are skilled in usage of Internet since childhood and have grown up in an environment that allows anonymous usage. Not every relationship that is encountered in the cyberspace is meant to be meaningful and it is important to be cautious about the nature of relationship that people seek in this space. Many studies have claimed that people may use the Internet in an addictive manner causing harmful effects on individuals, academic problems, changing social behavior and relationships in a negative way (Usamana et al, 2014). Clearly the satisfaction level from relationship situation of an individual could lead to excessive usage of the Internet. This leads to the third hypothesis in this study:

H3: The relationship satisfaction in an individual's life impacts the degree of Internet addiction displayed.

IA and academic success

The use of the Internet on college and university campuses parallels the strong advances of the society at large. While the primary focus of the Internet was initially that of faculty research, it has migrated to the student community, reached the stage of overwhelming acceptance, and is now poised to become a psychological addiction (Kandell, 2013). Beginning with an overview of Internet growth, its pervasive nature and influential structure leading to addiction studies (Soule, 2003) and progressing to the point of causes and effects at the academic juncture of performance relationships will clarify why the GPA is a clear measure of Internet addiction consequences at the academic level.

Internet Addiction is similar to other common addictions that plague college students. Addiction such as substance abuse, drinking, violence or lack of proper nutritional food habits (Saison, 2013). Students addicted to Internet end up having many academic issues such as poor attendance record, not being on time to classes, higher chances of academic probation and overall lack of study time (Soule, 2003). It is difficult to differentiate between Internet usages for constructive academic purposes from usage in non-healthy manner. Internet addiction could have serious consequences for students (Young, 2013).

For the purposes of this study, however, we will focus on the relationship between Internet addiction and academic performance only, tilting toward the abstract effects and consequences from matriculation to earned GPA (Grade Point Average) attenuation (Tanner, 2013). Jeong (2013) reiterates the point that this is the most informative of the various pathways to testing the serious detrimental effects of the overuse of Internet resources.

A number of researchers have found that there is a strong correlation between Internet use and academic performance (Kuvely, Lavin and Barrows, 2001). And it was noted in their study that undergraduate students have reported that

not being able to control their Internet usage has impacted their academic work. An exploratory survey study reported a negative relationship between heavy Internet usage and academic achievement as measured by self-reported GPA and hours spent studying each week (Karpinski and Duberstein, 2009).
On the other hand, there are studies that indicate that Internet addiction is negatively related to academic performance of undergraduate studies (Kirschner and Karpinski, 2010). Extensive use of Internet could very well be a part of normal academic work life of students and does not necessarily result in poor academic performance.

The earliest instance of academic failures and Internet usage was reported by Sanchez (1996), in which he stated that the most common factor related to collegiate freshman dropouts was the overindulgence in Internet usage, resulting in lower grade averages.

H4: The degree of internet addiction in an individual's life impacts their academic success

This leads to our research model (Figure 1).

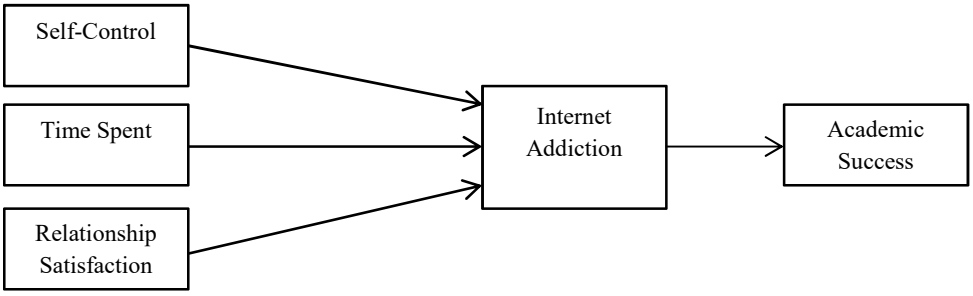

Figure 1. Research model

METHODOLOGY

Data Collection

The survey instrument used in this study has 25 items in total. The Internet addiction measurement instrument was retrieved from the current Psychology Central website (PsychCentral, 2014). The original survey was modified according to the context of the specific research problem in the study, which was Internet addiction and academic success. To measure the academic success of the students, the GPA was collected. The first part of the survey included 7 demographic questions on the survey relating to age, gender, college level, work status and student Id. The second part included 18 questions related to the Internet use habits (Table 1). The survey items were 5 point scale Likert type. SPSS was used to analyze the survey data. The mean score of all the items, to capture Internet addiction, was used to create Internet addiction index. The only measure of academic performance was the reported GPA by the students. The relationships between the constructs was determined using Spearman's correlations.

Table 1. Questions to identify IA

How much time do you spend on the Internet on a daily basis?
What percent of your time spent on the Internet is about academic activities?
What percent of your time spent on the Internet SHOULD be about academic activities?
What is the current level of stress in your life?
Does the amount of time you spend on the Internet improve your academic performance?
Are you satisfied with the amount of work you put towards your academic performance?
Do you feel disappointed (as waste of time) in yourself because of the excessive time you spend on the Internet on non-academic activities?
Do you find that you stay online longer than you intended?
Does your work (or school work) suffer because of the amount of time you spend online?
Do you form new relationships with others online?
Do you feel it is difficult to form satisfying relationships online?
Do others in your life complain to you about the amount of time you spend online?
Do you become defensive or secretive when anyone asks you what you do online?
Do you fear that life without the Internet would be boring, empty, or joyless?
Do you find yourself saying "just a few more minutes" when online?
Do you try to hide how long you've been online?
Do you choose to spend more time online over going out with others?
Have you tried to cut down the amount of time you spend online and failed?

Demographics

Data for this study was collected through an online survey that was advertised to students at a small private university. 513 students responded to the survey. Gender break down of the sample was 45.6 male and 54.4 female. Table 2 shows a breakdown of the student's year.

Table 2. Breakdown by year in school of sample

Year in School	**Frequency**	**Percent**
Freshman	97	19
Sophomore	75	14.7
Junior	91	17.8
Senior	93	18.2
Graduate Student	154	30.2

The data for GPA of students which is the measure of academic success of students is self-reported by the participants as their current GPA. Shown in Table 3 is the breakdown of the reported GPA for the sample.

Table 3. Self-reported GPA

GPA	**Frequency**	**Percent**
2-2.49	6	1.2
2.5-2.99	46	9.1
3.0-3.49	129	25.5
3.5-3.74	120	23.8
3.75 and above	204	40.4

The daily Internet usage data is presented below in Table 4.

Table 4. Daily Internet use in Hours

Hours	Frequency	Percent
2 hours	88	17.2
2 to 5 hours	264	51.5
5- 10 hours	121	23.6
More than 10 hours	38	7.4

Only 20 of the sample subjects reported not working at all, with 34.3% reporting working full time. With the large percentage of graduate students in the sample, this is not surprising. The other students reported either working part –time or as Interns.

Data Analysis

A factor Analysis on the data from the questionnaire was performed to measure Internet Addiction. The results suggest three best loading factors that emerged from the data. Table 5 Shows the Rotated Component matrix for a three factor solution.

Table 5. Rotated factor matrix for three factors

	Component		
	1	2	3
14. Disappointed	.795	.078	-.083
15. Stay online longer	.735	.182	-.011
16. Work suffer	.736	.251	.040
17. New relationships	.226	.248	.644
18. Satisfying relationships	.177	.081	-.801
19. Complain	.372	.538	-.032
20. Do you become defensive	.223	.682	-.133
21. Fear that life without	.066	.637	.225
22. Few more minutes	.607	.432	.037
23. Hide how long	.280	.616	-.050
24. Going out with others	.112	.698	.219
25. Cut down	.706	.199	.085

A scale was made for the two larger factors and then used the three subscales (factors) for further analysis. A Spearman Correlation on the Internet Addiction Scale and the subscales was performed. It was expected that they would be correlated, and they are with the individual questions having a much lower correlation as seen in Table 6 below.

Table 6. Factor loadings

	Factor 1	Factor 2	Factor 3 (Q17)
Internet Addiction	.840	.847	.260

Clearly Factor 1 and Factor 2 are highly correlated with the overall Internet Addiction, so our hypothesis is accepted for those two factors.

The third Factor has a low correlation with the overall Internet Addiction. The combination of the factor analysis and Spearman correlations support the hypothesis that Internet Addiction is made up of multiple factors, but that third factor relationship status is not correlated with the overall Internet Addiction Score. The next step was to relate the overall IA and two supporting factors in our hypotheses that they relate to a person's Academic success. It has been assumed in this study that to measure academic success, GPA scores will be used. . For this, the Spearman correlation between IA and ranked GPA was a low -.087. The correlation between the two subscales (factors) was even lower

(Table 7). Thus it can be claimed that the level of Internet addiction and the level on the two subscales is not related to the subjects QPA at all.

Table 7. Correlation between subscales

	GPA
Internet Addiction	-.086
Factor 1	-.048
Factor 2	-.053

RESULTS

H1: The lack of "self-control" in an individual life is positively related to Internet addiction.

As seen above in the attached Factor analysis for development of the three factors, the questions making up the "self-control" factor were separated and a factor composite score was calculated. This had a .84 Spearman correlation with the Internet Addiction score.

Hypothesis Accepted.

H2: The amount of "time-spent" on the Internet on a daily basis positively impacts the degree of Internet addiction displayed.

As seen above in the attached Factor analysis for development of the three factors, the questions making up the "time spent" factor were separated and a factor composite score was calculated. This had a .84 Spearman correlation with the Internet Addiction score.

Hypothesis Accepted.

H3: The relationship satisfaction in an individual's life impacts the degree of Internet addiction displayed.

The third factor "relationship satisfaction" developed from the factor analysis was based on a single question relating to an individual's experience forming meaningful relationships online. In order to find out if relationship satisfaction may impact the degree of IA, we first found out whether the values correlate. Relationship satisfaction factor had a low (.260 Spearman correlation with the total IA and also had very low correlation with factor 2 "time spent" (.151) and factor 1 "relationship satisfaction" (.044). The value .044 of correlation with no statistical significance was enough to conclude that there is no significant impact of relationships satisfaction on IA.

Hypothesis rejected

H4: The degree of internet addiction in an individual's life impacts their academic success.

In this study, it was expected to measure academic success as GPA. The first step in finding out whether the degree of IA impacts an individual's academic success was to find out where these two values correlate. We found that the Spearman correlation between IA and ranked GPA was a low -.087. If we look further and compare IA to their satisfaction with the amount of work they put towards their academics, the correlation, while higher (-.291) is still low.

Hypothesis rejected.

Table 8. Summary of results

Hypothesis	Result
H1: The level of "self-control" in an individual life is positively related to Internet addiction	Accept
H2: The amount of time-spent on the Internet on a daily basis positively impacts the degree of Internet addiction displayed	Accept
H3: The relationship satisfaction in an individual's life impacts the degree of Internet addiction displayed	Reject
H4: The degree of internet addiction in an individual's life impacts their academic success	Reject

DISCUSSION

The analysis shows that defensive behavior or lack of self-control and time spent on the internet are positively correlated to Internet addiction (Table 8). The third factor, relationship status is not positively correlated to IA. The academic performance of the students in this case, is not correlated to Internet addiction.

The results of our analysis concerning the lack of self-control or defensive behavior and time spend on the Internet confirm the findings of prior research, which indicate that the more control students have over Internet surfing behavior and time spent, less addicted they are to Internet. In our analysis, we looked further and compared IA to their satisfaction with the amount of work they put toward their academics, the correlation, while higher (-.291) is still low compared to students who are satisfied with their work. It can be said that students who aren't satisfied with their effort score higher on the IA scale, but the correlation is still low. This suggests a keen insight into the mindset of undergraduate students in today's environment. The students are aware of the fact that they are not putting enough effort towards their academics activities and it might hinder their academic success but they still are spending lot of time in non-academic activities on the internet to the extent that it could become addictive habit.

The test results of other two hypothesis including relationship status and academic performance are somewhat interesting. The third hypothesis, relationship status does not correlate with Internet addiction and is consistent with research findings from other studies. Relationship status does not emerge as a factor by itself correlating with Internet addiction. The item, question 17, used for this factor was eluding to forming "meaningful relationship" on the internet. Another item, question 18, relates to the previous item even though it did not load on this factor in the factor analysis. This item was about forming new relationships on the Internet, not necessarily meaningful relationships though. A correlation between question 17 (new relationships) and composite IA score suggests a moderate Spearman correlation of the value (.428). This implies that the nature or satisfaction level of new relationships formed on the internet may not be important to the students as long as they are forming some kind of relationship via this medium. Several studies have identified that people who are shy, have poor social skills, or experience a high level of interpersonal anxiety may be drawn to cyberspace relationships (Liu and Kuo, 2007). These studies indicate that cyber-relationships can provide a sense of belonging, warmth, and well-being (Liu and Kuo, 2007). In case of university students, high social anxiety may turn them to the Internet as a way of escaping social fears.

Finally the last hypothesis, claiming that Internet addiction could directly influence the academic success of students was rejected in this study. There have been several studies in the past that have been found similar relationship with these two constructs (see section 2.4). However, in this particular study, it turned out that using a single item as the measure of academic success (GPA) might not be the best route. The GPA data was self-reported and there was no identifier in the survey that could enable us to pull out the actual GPA scores. The students use the Internet extensively for academic purposes. For example they use google docs for collaborative group projects or use search engines and databases for wiring term papers. In this scenario, it is essential to distinguish between time-spent for academic purposes versus time-spent for non-academic purposes. The challenge lies in creating this distinction in self-reported data through survey. This finding challenges the notion that more time spent on the Internet necessarily means less impressive academic performance.

CONTRIBUTIONS AND FUTURE RESEARCH

The implications of this study are manifold. The main implication of this study is that Internet addiction does not have significant influence academic success of a student. This is a finding which is not surprising considering many studies have supported this notion. This is a significant contribution of this study as it challenges the common notion that addiction to the internet usage would significantly reduce academic success of a student.

This study investigates the three factors influencing Internet addiction, namely self-control, time spent on Internet and relationship satisfaction and also the influence of Internet addiction on academic success. There are multiple streams of research that can originate from this study. A potential venue for follow-up research could include developing and testing alternative models with a focus on the effects of moderation and mediation role of Internet addiction on academic success. Also, the factor defensive behavior or self-control needs to be further developed. What are the antecedents of this construct? What leads to lack of self-control and why does this behavior correlate with Internet

addiction? Another interesting area of study would be using a more robust scale for measuring academic success such as actual GPA, SAT scores, High school GPA to name a few.

There are some limitations evident in this study. First, like all other self-reported data, the results could potentially be impacted by bias in the data. This is a potential source of bias in all survey based studies. This survey is conducted at one University and it may not be generalizable to other institutions of different sizes, locations and constituencies.

CONCLUSION

In this study, a research model was developed based on prior research to investigate the influence of self-control, time spent on Internet and relationship satisfaction on Internet addiction. The study also hypothesizes the relationship between Internet addiction and academic success. The model was tested by using survey data and the results showed that among four hypotheses, self-control and time spent on Internet emerged to have statistically significant relationships with Internet addiction. The relationship satisfaction hypothesis was rejected and the hypothesis about IA impacting academic success was not supported by the data. Implications are drawn, limitations noted and future research directions are suggested.

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