EXPLORING THE IMPACT OF INTERNET ADDICTION
ON ACADEMIC ENGAGEMENT: A PRELIMINARY STUDY
ON UNDERGRADUATES

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ABSTRACT

Previous studies have routinely reported negative associations between Internet addiction and academic performance. However the ways in which such addictive Internet use disrupts student learning has not been researched in detail. For one, not much is known about the effect of Internet addiction on students’ engagement with their studies. This preliminary study explores the impact of Internet addiction on three aspects of academic engagement namely dedication, absorption and vigor among university students, a population segment that has high propensity of developing Internet addiction. Data was collected from 175 undergraduates in a public university in Malaysia through self-administered questionnaires. Partial least squares structural equation modeling was used to analyze the data. The analysis revealed that the measurement items used in this study were psychometrically valid and reliable. The analysis also showed that Internet addiction has a significant, negative impact on vigor. Interestingly, Internet addiction was not found to have any impact on dedication and absorption. The implications of the findings are accordingly discussed along with some suggestions for future research.

Keywords: Internet addiction, problematic Internet use, engagement, academic performance.
Introduction:

The growing concerns regarding the adverse impact of the Internet has led to a rise in research on Internet addiction. Past studies have identified Internet addiction as an individual’s problematic, excessive, pathological, maladaptive, compulsive or unhealthy use of the Internet (Fu et al., 2010; Griffiths, 2000; Scherer, 1997; Young, 1998). In essence, Internet addiction can be defined as a maladaptive pattern of Internet use characterized largely by an inability or difficulty to control the amount of time spent online (Beard, 2005) resulting in significant psychological, social, school and work impairments or distress to the individual’s life (Chou & Hsiao, 2000). It has also been likened to a non-substance-related or behavioral addiction (Griffiths, 2000), an impulse control disorder (Pezoa-Jares et al., 2012) or a combination of both (Laconi et al., 2014).

Among all segments of society, the university or college student cohort has been deemed as more susceptible to developing such problematic or excessive Internet usage (Lee, 2010; Nalwa & Anand, 2003; Yang & Tung, 2007). Young adult users especially undergraduates aged between 19 to 24 years old have a higher risk of succumbing to Internet addiction compared to older users (Soule et al., 2003; Thatcher & Goolam, 2005) given the copious amount of time they spend using the Internet, computers, tablets and smartphones (Chathoth et al., 2014). This situation is exacerbated by the popular use of social media and mobile Internet technology (Mishra et al., 2014). Their inclination to be over-involved in their Internet usage is motivated by their drive to develop a firm sense of identity, desire to form meaningful and intimate relationships and the implicit or explicit encouragement received to use the Internet in this information technology age (Kandell, 1998). Also, the transition from high school, a highly structured environment to college, a relatively unmonitored and unconfined setting presents to them newly acquired freedom to spend their time as they how they wish (Panek, 2014).

Researchers (e.g. Akin & Iskender, 2011; Chou & Hsiao, 2000; Frangos et al., 2011; Ramayah et al., 2006; Yeap et al., 2015) have indicated that Internet addiction does exist among university and college students. However, the prevalence of Internet addiction among university/college students varies across studies and regions, ranging from 4% to 25% (Morahan-Martin & Schumacher, 2000; Wang, 2001; Chou & Hsiao, 2000; Niemz et al., 2005; Tsai et al., 2009; Huanga et al., 2009; Jelenchick et al., 2012). Internet addiction could lead to students’ academic failure and other negative consequence across campus life (Kandell, 1998; Chou et al., 2005; Douglas et al., 2008). In China, the phenomenon of Internet addiction among the university/college student cohort was severe enough to the extent of it being the main reason for students dropping out of universities/colleges (Zhang et al., 2003). Despite the negative repercussions that Internet addiction has on students’ academic performance, the ways in which such addictive Internet use disrupts student learning has not been researched in detail. For one, not much is known about the effect of Internet addiction on students’ academic engagement.

It is important to assess the impact of Internet addiction on academic engagement given that academic engagement improves academic performance (Bakker et al., 2015; Fredericks et al., 2004; Schaufeli et al., 2002). Engaged students have been described as more motivated to invest their time, commitment and efforts in learning, attending classes and participating in study activities (Bakker et al., 2015). It is vital for students to be actively engaged with their education in order to acquire the knowledge and skills required for a successful transition into their future careers (Wang & Eccles, 2013). For this reason, examining Internet addiction as a factor affecting engagement can offer insights on student performance, progression and retention at the tertiary level (Casuso-Holgado et al., 2013). Accordingly, in this study we explore the effect of Internet addiction on three particular aspects of academic engagement namely dedication, absorption and vigor among undergraduate students.

Literature Review and Research Hypotheses:

In many ways, the Internet is very beneficial to students. It is a useful source of information, an excellent research tool and it also facilitates communication. Academically, the Internet helps students in their studies by widening their knowledge and enabling them to learn more effectively. However, students seemingly spend significant amounts of time using the Internet for various leisure activities like text messaging, social networking and online video viewing rather than academic purposes (Panek, 2014). More often than not, students use the Internet excessively at the expense of their studies. Consequently, their academic performances are affected.

Previous studies have routinely reported negative association between Internet addiction and academic performance. For instance, students reported a decline in study habits, a significant drop in grades, missed classes or being placed on probation and even faced expulsion from the university due to uncontrollable Internet use (Young, 1998). Chou (2001) as well as Tsai and Lin (2003) have reported cases whereby students become so
engrossed with using the Internet that they miss classes or skip exams, even when they are aware that they might fail their classes. Kirschner and Karpinski (2010) reported that Facebook users recorded lower mean GPAs and spent fewer hours studying on average compared to Facebook non-users. In short, Internet addiction disrupts students’ active participation and emotional commitment to their learning, otherwise known as their academic engagement (Casuso-Holgado et al., 2013).

Engagement is a good predictor of academic performance because engaged students invest high levels of effort and energy, are dedicated to their studies, and they are often immersed in their study activities (Bakker et al., 2015). Schaufeli et al. (2002) describes engagement as a multidimensional phenomenon composed of three distinct aspects namely vigor, dedication and absorption. In the student context, vigor refers to “high levels of energy and mental resilience while studying and the willingness and ability to invest effort in one’s studies” (Schaufeli et al., 2002, p. 465). On the other hand, dedication refers to the “sense of significance, enthusiasm, inspiration, pride and challenge” (Schaufeli et al., 2002, p. 465) while absorption refers to “being fully concentrated and happily engrossed in one’s studies to the extent that one feels time passes by quickly and carried away by one’s studies” (Schaufeli et al., 2002, p. 465).

Internet addiction can impair a student’s engagement (vigor, dedication and absorption) with their studies. For example, addicted or problematic Internet users stayed up late at night or even lose sleep for late-night Internet use (Nalwa & Anand, 2003; Young, 2004). In contrast to normal Internet users, those addicted to the Internet had problems falling asleep, lower habitual sleep efficiency, poorer sleep quality, more sleep disturbances and daytime dysfunction and used sleep medication more frequently (Cheung & Wong, 2011). Therefore students who use the Internet until late into the night would find themselves plagued by excessive sleepiness the next day which depletes them of their energy and mental agility in studying. Therefore, it is hypothesized that:

**H1:** Internet addiction has a negative impact on a student’s vigor.

Apart from that, there are evidences pointing to the destructive nature of social media overuse. College students who use Facebook heavily are prone to develop higher levels of envy because they are exposed to a lot of personal information from users in their networks which typically revolve around their successes, vacations, material goods, positive relationships, etc (Tandoc Jr., 2015). Furthermore, constantly checking out other users’ information on Facebook can also lead to depression when users start feeling envious of other users’ positive experiences (Tandoc Jr., 2015). When such feelings of envy, jealousy of depressive mood becomes severe enough, it might overwhelm the addict of his or her initial enthusiasm or sense of significance placed on their studies. Fixation on other activities such online gaming or watching videos online could also diminish one’s dedication towards his or her studies as more time is poured into those activities instead of studying. For these reasons, it is postulated that:

**H2:** Internet addiction has a negative impact on a student’s dedication.

In addition, students who are addicted to the Internet using instant text messaging and social networking sites may find themselves having problems staying focused on or being immersed in their studies. Paul et al. (2012) found a statistically significant relationship between time spent on online social networking sites and attention deficit. In other words, those who are addicted to social networking sites tend to have short attention spans. On another note, Levine et al. (2007) found that those who spent time instant messaging during study are more easily distracted when performing academic tasks. In another study, it was reported that students who replied to instant messages as they read an academic passage online took longer time to complete the reading compared to those who did not message although both groups of students showed equal comprehension of the passage they read (Bowman et al., 2010). Such distractions disrupt the students’ flow of concentration as they are studying, thereby giving much reason to surmise that:

**H3:** Internet addiction has a negative impact on a student’s absorption.

**Method:**

**Sample:**

As many as 175 undergraduate students of a public university located in Malaysia participated in this cross-sectional, preliminary study which is part of a larger, ongoing research on Internet addiction among university students in Malaysia. Majority of the respondents were female (75.4%) while the average age of the respondents was 23 years (SD=1.02). Most of them were Malaysians (93.1%) who comprised students of Chinese ethnicity (62.3%), followed by the Malays (30.9%), Indians (4.0%) and finally other ethnicities (2.9%).
Instruments:
Respondents completed a questionnaire which assessed their Internet usage activities, addiction towards the Internet and engagement with their studies. Internet usage was assessed using several commonly used online services and applications in this digital age (1=not at all, 2=less than once a week, 3=once a week, 4=several times a week, 5=once a day, 6=several times a day). In addition, participants were also asked how much time they spent online daily, the number of Internet-enabled devices they own and whether they subscribe to a mobile internet data plan.

Measures of Internet addiction were adopted from the Short and Modified Internet Addiction Test (s-IAT) (Pawlikowski et al., 2013). There were 6 items measuring each of the two symptoms that define Internet addiction namely loss of control and social problems. The items were measured on a 5-point Likert scale (1=not at all, 2=rarely, 3=sometimes, 4=often and 5=always).

Academic engagement was measured using the Utrecht Work Engagement Scale for Students (UWES-S) developed by Schaufeli et al. (2002). There were 5 items each for vigor and dedication and 4 for absorption. The items were anchored on a 7-point Likert scale (1=never, 2=almost never, 3=seldom, 4=occasionally, 5=frequently, 6=almost always and 7=always).

Data Analysis:
SPSS 20 was used to compute the descriptive statistics (frequencies, percentages, median) for the respondents’ demographic profile and Internet usage characteristics while SmartPLS 3 (Ringle et al., 2015) was used for the partial least squares analysis of the study’s measurement model and structural model (see Ramayah et al., 2013).

Results:
Internet usage Profile:
Generally the respondents spent a lot of time using the Internet with a big percentage of them spending around 1 to 5 hours (45.4%) or 6 to 10 hours (33.3%) online. Six online services/applications which were highly-used by the respondents include search engines (Mdn=6), social networking sites (Mdn=6), instant messaging applications (Mdn=6), e-mails (Mdn=5) and video-streaming sites (Mdn=5). They owned an average of 2 (M=2.35) Internet-enabled devices which were usually their laptops and mobile phones. Seventy-seven of them (44.3%) subscribed to a mobile Internet data plan while the rest relied on free Wi-Fi within campus and other public areas.

Common Method Bias:
Measurement items used in this study were tested for common method bias which is variance attributed to measurement method rather than variance explained by the study’s constructs. To test for this bias, the Harman’s single factor test was employed. There is evidence for common method bias if one principal factor counts for the majority of variance explained (Podsakoff & Organ, 1986) that is if the percentage of variance explained for a single component in the factor analysis exceeds 50 percent. In our principal components factor analysis the principal factor explained as much as 14.418% indicating no domination of a single factor as well as the lack of substantial common method bias.

Evaluation of Measurement Model:
In this study, Internet addiction was conceptualized as a higher order construct which is represented by two first-order constructs i.e. loss of control and social problems. The indicators measuring loss of control and social problems were reflective in nature and subsequently loss of control and social problems were modeled as formative components that make up Internet addiction. This was done on the grounds of simplifying the model setup by reducing Internet addiction into a single dimension. Apart from that, vigor, dedication and absorption were modelled as reflective constructs in this study. Table 1 lists the item loadings, composite reliabilities (CR) and average variance extracted (AVE) for all the reflective constructs listed in the measurement model. All the item loadings were above the critical value of 0.70 except for IAT3, IAT4, IAT6 and IAT10 which were slightly below the critical value (Hair et al., 2014). Nevertheless, since the criteria for composite reliability values (within 0.70 to 0.90) and average variance extracted values (above 0.50) (Hair et al., 2014) have been fulfilled; all those four items were retained. However, three problematic reflective indicators were removed (i.e. IAT5, ACE3 and ACE11) given their loadings were below 0.50. In short, convergent validity has been established.
The validity of the formative constructs Loss of Control (LOC) and Social Problems (SP) were also established whereby 1) the indicator weight of each construct was significant based on its t-values (LOC: t-value=18.225, p<0.05; SP: t-value=14.617, p<0.05); 2) the variance inflation factor (VIF) of LOC and SP were equally 1.463 which were below 5.00 indicating no multicollinearity (Hair et al., 2014) and; 3) both LOC (r=0.917; p<0.01) and SP (r=0.846, p<0.01) were found to be significantly correlated with their latent construct Internet Addiction, signifying that the indicators are absolutely important to the formation of Internet Addiction (Cenfetelli & Bassellier, 2009).

Table 1: Convergent validity of the reflective items in the measurement model

<table>
<thead>
<tr>
<th>Construct</th>
<th>Items</th>
<th>Loading</th>
<th>CR&lt;sup&gt;a&lt;/sup&gt;</th>
<th>AVE&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of control</td>
<td>IAT1</td>
<td>0.786</td>
<td>0.871</td>
<td>0.530</td>
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<tr>
<td></td>
<td>IAT2</td>
<td>0.722</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>IAT3</td>
<td>0.690</td>
<td></td>
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<tr>
<td></td>
<td>IAT6</td>
<td>0.648</td>
<td></td>
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<tr>
<td></td>
<td>IAT8</td>
<td>0.775</td>
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<tr>
<td></td>
<td>IAT9</td>
<td>0.740</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Problems</td>
<td>IAT4</td>
<td>0.685</td>
<td>0.846</td>
<td>0.524</td>
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<tr>
<td></td>
<td>IAT7</td>
<td>0.776</td>
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<td></td>
<td>IAT10</td>
<td>0.696</td>
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<td></td>
<td>IAT11</td>
<td>0.729</td>
<td></td>
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<tr>
<td></td>
<td>IAT12</td>
<td>0.728</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigor</td>
<td>ACE1</td>
<td>0.794</td>
<td>0.862</td>
<td>0.612</td>
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<tr>
<td></td>
<td>ACE2</td>
<td>0.713</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ACE4</td>
<td>0.745</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ACE5</td>
<td>0.868</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedication</td>
<td>ACE6</td>
<td>0.865</td>
<td>0.916</td>
<td>0.689</td>
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<tr>
<td></td>
<td>ACE7</td>
<td>0.926</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>ACE8</td>
<td>0.864</td>
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<td></td>
<td>ACE9</td>
<td>0.773</td>
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<tr>
<td></td>
<td>ACE10</td>
<td>0.704</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absorption</td>
<td>ACE12</td>
<td>0.930</td>
<td>0.893</td>
<td>0.737</td>
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<tr>
<td></td>
<td>ACE13</td>
<td>0.780</td>
<td></td>
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<td></td>
<td>ACE14</td>
<td>0.860</td>
<td></td>
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</tbody>
</table>

Note: Items IAT5, ACE3 and ACE11 were dropped due to low loadings.

<sup>a</sup> Composite reliability = (square of the summation of the factor loadings) / [(square of the summation of the factor loadings) + (square of the summation of the error variances)]

<sup>b</sup> Average Variance Extracted = (summation of squared factor loadings) / (summation of squared factor loadings)

To assess discriminant validity between the constructs of this study, the heterotrait-monotrait ratio of correlations (HTMT) criterion was applied. Compared to the HTMT criterion, the commonly-applied Fornell-Larcker criterion has a low sensitivity, meaning that they are largely unable to detect discriminant validity problems (Henseler et al., 2015). Based on the HTMT results in Table 2, none of the inter-construct correlations were above 0.85, thereby meeting the HTMT<sub>0.85</sub> criterion. Hence, the HTMT results proved that there is a lack of discriminant validity between the constructs.
### Table 2: Discriminant validity: HTMT results

<table>
<thead>
<tr>
<th></th>
<th>Absorption</th>
<th>Dedication</th>
<th>Internet Addiction</th>
<th>Vigor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dedication</td>
<td>0.818</td>
<td></td>
<td>-0.063</td>
<td>Formative</td>
</tr>
<tr>
<td>Internet Addiction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vigor</td>
<td>0.689</td>
<td>0.832</td>
<td>-0.171</td>
<td></td>
</tr>
</tbody>
</table>

### Evaluation of Structural Model:

In this study, Internet addiction was hypothesized to have a negative impact on the students’ vigor, dedication and absorption towards their studies. Through the partial least squares analysis, we found that of all the three dimensions of academic engagement, Internet addiction was found to have a negative impact only on vigor ($\beta = -0.188$, $p<0.05$), explaining roughly 4 percent of variance in vigor ($R^2=0.035$). In addition, the effect size of an $R^2$ is important because it determines the strength of the variance explained. Cohen (1988) considers an effect size of 0.02 as small, 0.15 as medium and 0.35 as large. Thus according to Cohen’s criteria, the impact of Internet addiction on vigor is considered as a small effect. Though it is a small effect size, the fact remains that Internet addiction does negatively affect a student’s vigor in his studies. Based on the analysis of the structural model, only H1 is supported. Figure 1 shows the results of the structural model.

### Discussion and Conclusion:

This objective of this preliminary study was to examine the impact of Internet addiction on three aspects of academic engagement namely vigor, dedication and absorption among a sample of undergraduate students. As hypothesized, Internet addiction was found to have an adverse effect on students’ vigor. Looking at the students’ Internet usage characteristics, it can be seen that the students were indeed heavy and active users of the Internet, spending a significant amount of time online engaged in activities such as surfing social networking sites, instant messaging and watching videos of which they usually do so by alternating between their laptops and mobile phones. Online videos and social networking sites are especially addictive and tests the self-control of students to a greater degree compared to other applications (Panek, 2014). Students who are addicted to such applications on the Internet tend to use the Internet irrepressibly for prolonged hours at the expense of their health. When health is compromised, the vigor or vitality of an individual is naturally affected.

There are a myriad of ways in which Internet addiction can affect vitality as a result of changes in one’s lifestyle. For instance, being engrossed with the Internet may cause a person to forgo a balanced diet, regular meals or even
taking nutritional supplements (Jean et al., 2010). Physical inactivity levels may increase due to a sedentary lifestyle associated with Internet addiction thereby raising the risk for obesity (Chathoth et al., 2014; Jean et al., 2010). Migraines or headaches and eye strain could develop as a result of staring at computing devices for an extended period of time (Shuhail & Bergees, 2006). Furthermore, sleep patterns are disrupted due to prolonged use until late nights resulting in excessive fatigue or daytime sleepiness the following day (Choi et al., 2009). Such physical problems drain the students’ physical energy as well as alertness resulting in them becoming lazy or late in attending classes or showing up in class feeling lethargic. Worse still, their immune system may be affected as a consequence of these health problems, leaving them prone to disease, further weakening their constitution.

Contrary to expectations, Internet addiction demonstrated no significant, negative impact on dedication or absorption. A plausible explanation could be that the effect of Internet addiction on dedication and absorption may not be as straightforward as it was originally conjectured. It is likely for Internet addiction to affect dedication and absorption indirectly through the depletion of vigor. To put it simply, Internet addiction reduces one’s vitality which in turn causes the student to lose interest in his/her studies as well as develop problems in concentrating on their studies. Accordingly researchers can conduct follow-up studies by first testing the impact of Internet addiction on vigor and subsequently test out the influence of vigor on absorption and dedication. In relation to that, future studies can focus specifically on addiction towards online streaming videos because there is little research investigating the extent to which streaming video applications distract students (Panek, 2014) as well as disrupt their academic engagement.

This study is not without its limitations. It should be cautioned that the sample of this study was restricted to only one university thus generalization of this study’s findings to the entire population of undergraduates is limited. The focus on undergraduates as the sample of this study also limits the generalization of this study’s findings across other segments of society. Nevertheless this preliminary study has provided an initial glimpse into the impact of Internet addiction on academic engagement; showing that students’ academic engagement can be affected by problematic, addictive Internet use via the depletion of physical and mental energy. Such decrease in vigor is detrimental because it can potentially lead to a disruption in the process of learning and commitment towards their studies. For this reason, university authorities ought to acknowledge Internet addiction as a grave issue and in doing so have proper mechanisms to detect the severity of Internet addiction among students and provide early counselling and interventional therapy for those who have been diagnosed as Internet-addicted.

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References:


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