An Investigation into the Problematic Use of Facebook

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Abstract
Social networking sites (SNSs) have become new phenomena in social communication and interaction patterns which have profound impact in the way people communicate and connect with one another. The aim of this study is to test the advanced cognitive-behavioral model of generalized problematic Internet use (GPIU) in the context of Facebook use. The findings suggested that a preference for online social interaction and use of Facebook for mood regulation significantly explained the deficient self-regulation of Facebook use. Deficient self-regulation in turn showed great influence on and led to negative outcomes associating with the problematic Facebook use. Results indicated the data fit the model well and the variables in the current model accounted for 36 percent of the variance in mood regulation, 35 percent in respondents’ deficient self-regulation, and 56 percent of variance explained in the negative outcomes. The findings provided important implications for both researchers and practitioners.

Key words: Problematic Facebook use, Social networking sites, Facebook, Generalized problematic Internet use, Preference for online social interaction, Deficient self-regulation, Mood regulation

1. Introduction

1.1. Background of Facebook

Social networking sites (SNSs), being one of the user-created contents (UCC) site, is now the most popular and fastest-growing sector in online business market [1]. Although the ancestors of current SNSs have existed for over 25 years [2], certain SNSs, including Facebook, Twitter, and MySpace, are now the focus of the world’s Internet users and business organizations. The market for SNSs in year 2010 reached $2180 million and is expected to grow up to $3669 million by year 2014 [3].

Facebook is one of the most popular SNSs. It is created in February 2004 and is operated and privately owned by Facebook Incorporation. By 2010, Facebook was reported to have more than 500 million active users, generating more than 1.6 billion page views each day. More than half of the users log onto Facebook every day. Each user of Facebook has 130 or more friends on average and users spend over 700 billion minutes per month in total on Facebook [4]. The use of Facebook has become our daily life activities. Facebook users can make their own personal profile under restricted framework, meet friends, make instant chatting, utilize the email-like messages exchanging services, and receive updates from the automatic notification functions. Moreover, users can join groups sharing similar interests by “liking” the pages organized by individuals, workplaces, schools, or colleges.

1.2. Key Issues and Problems being Addressed

Facebook offers lots of innovative social and communication features which bring convenience to users. On the flip side of the coin, these embedded social features of Facebook could be highly problematic. Sickfacebook.com [5], an Anti-Facebook Blog, estimated that over 350 million people were brought with all kinds sufferings from Facebook Addiction Disorder (FAD). FAD is a new term introduced by the American psychologists for describing individuals addicted to Facebook and being unable to control their activities on it.

Though “Problematic Facebook Use” has not yet been officially recognized as a kind of mental disorder, a large number of psychologists and researchers have shown their concerns over the issue, especially for the undesirable sufferings brought by “Problematic Facebook Use”. The Telegraph [6], a newspaper in United Kingdom, warned the general public that excessive involvement in Facebook may harm moral values. Researchers [7] pointed out that the social features embedded in the Internet have created risks in causing problematic use. The interactive and
The collaborative nature of Facebook may also create similar problems to users.

Past studies on SNSs however mostly focused on the positive usages of Facebook. Boyd [8] investigated why youth engage in SNSs, Steinfield [9] conducted a longitudinal study in examining the relationship between social capital and Facebook use. In our review of prior literature, there is a lack of theoretical and empirical examination of the problematic use of Facebook. In the current study, the generalized problematic Internet use model, derived from the cognitive-behavioral theory of Davis [10], was adopted to investigate the problematic use of Facebook. There are two key objectives of this study: (1) To empirically test the advanced Generalized Problematic Internet Use model [11] in the context of Facebook, (2) To empirically examine the relationships between problematic Facebook use and its antecedents.

Borrowing the definition of problematic Internet use from Beard and Wolf [12], problematic Facebook use is defined as “the use of Facebook that creates psychological, social, school and/or work difficulties in person’s life”.

2. Literature Review

2.1. Prior Studies on Facebook

Facebook has become hugely popular in the last few years. We have witnessed a significant number of studies related to Facebook usage in the recent years. For example, Nyland et al. [13] identified five motives relating to the use of social networking sites, including meeting new people, entertainment, maintaining relationships, social events, and media creation. Ellison et al. [14] examined how Facebook usage affects the formation and maintenance of social capital. Shi et al. [15] integrated expectation disconfirmation theory and identified factors that drive continuance of Facebook usage. Cheung and Lee [16] argued that Facebook usage is a collective behavior and used the three major social influence processes (subjective norm, group norm, and social identity) to explain we-intention to use Facebook. Our review of existing publications on Facebook revealed that researchers mostly focus on the positive usage of Facebook, there is a lack of theoretical understanding of the problematic use of Facebook. Particularly, we do not know what drives people to be inclined to Facebook and results in problematic use.

2.2. Problematic Use of Information Technologies

Over the years, researchers have explored problematic Internet use. Chen and Han [17] examined the possibility of the non-detrimental effects of Internet dependency and proposed an instrument to measure both positive and negative Internet dependency. Song et al. [18] identified new gratification factors specific to the problematic Internet use. Young and Rodgers [19] investigated how personality affected the development of problematic Internet use.

Studies of problematic, dependent or addictive Internet use have initiated the line of problematic or addictive use of information technologies which in turn built a strong foundation for the future research of the field to base on or extend beyond. Besides problematic Internet use, researchers have also started to examine the problematic use of other forms of Information technologies, such as online game. Wan and Chiou [20] found that flow state was negatively correlated with addictive inclination and psychological needs of online game players. Lu and Wang [21] indicated that perceived playfulness and descriptive norms affect online game addiction formation. A number of researchers [22][23][24], suggested that personality, including locus of control, aggression and narcissism, are significantly associated with online gaming addiction. Our reviews have shown that there are a variety of factors affecting the problematic use of information technologies.

2.3. Research Framework on Problematic Internet Use

Though research on the problematic use of Information technologies remains fragmented, some researchers [11][25] have proposed research models and empirically examined the relationships among the key constructs. For instance, Caplan [11] used the cognitive and behavioral model of generalized problematic Internet use to explain the negative outcomes of online social behaviors. The original model [25][26] has seven dimensions, including mood alternation, social benefit, negative outcomes, compulsivity, excessive time, withdrawal and interpersonal control. The researchers have continued to test and revise the model. The most recent model [11], namely the generalized problematic Internet use 2 (GPIU2), has included four key constructs, including preference for online social interaction, mood regulation, deficient self-regulation, and negative outcomes. The GPIU has been widely used and adopted in the field. The model highlighted social interaction and engagement as important elements contributing to the development of problematic Internet use. Since Facebook is collaborative and social
in nature, the model of GPIU provides a good start for the current investigation into the problematic use of Facebook.

3. Research model and Hypotheses

3.1. Key constructs in the research model

In the current study, a research model of the problematic use of Facebook is developed. In this section, the key constructs of the research model and their interrelationships are discussed.

Davis [10] introduced the cognitive-behavioral theory of generalized Problematic Internet Use (GPIU). Building on Davis’s [10] studies, recent research identified certain specific cognitive and behavioral constructs concerning with the negative outcomes of Internet use, including preference for online social interaction, mood regulation, and deficient self-regulation (with two dimensions: cognitive preoccupation and compulsive behavior).

3.2. Negative outcomes

Negative outcomes refers to interpersonal, social, and professional problems resulting from one’s problematic Facebook use, which will consequently exacerbate existing psychopathologies, resulting in a vicious dysfunctional cycle. As suggested by Davis [10], problematic cognitions and behaviors intensify and accumulate over time, and continue to produce negative outcomes, resulting in a diminished sense of self-worth and increased social withdrawal. Individual suffering from the negative consequences at work/school would deny or lie about their use, and use Facebook to escape from problems in real life.

3.3. Deficient self-regulation

Deficient self-regulation refers to a failure and state of inadequacy in monitoring one’s use, judging one’s use behaviors and adjusting one’s use pattern [27][28]. Kubey et al. [29] contended that deficient self-regulation might result in negative consequences like difficulties in face-to-face interpersonal relationship. Deficient self-regulation is suitable in clarifying GPIU owning to its higher-order constructs that show interactions between obsessive cognitive and compulsive behavioral symptoms of GPIU. Cognitive preoccupation is the status of obsessive thinking patterns engaging online activities, like “When I haven’t been to Facebook for some time, I become preoccupied with the thought of going Facebook”. Shapira et al. [30], and Caplan and High [31] proposed a similar view on cognitive preoccupation and stated that there was a direct relationship between the cognitive preoccupation, problematic Internet usage and its associated negative outcomes. Deficient self-regulation also took the form of compulsive Internet use for the behavioral aspect [32][33].

Davis [10] argued that the cognitive and behavioral processes work together to develop negative consequences, and those cognitive and behavioral symptoms are highly related to online social interaction featured activities. Applying the model to the context of Facebook, users who became compulsive and obsessive in Facebook activities were most likely to result in negative outcomes in other aspects, such as missing classes, making troubles in work and deteriorating the relationships with family and friends.

H1: Deficient self-regulation has a positive relationship with negative outcomes arising from one’s Facebook use.

3.4. Mood regulation

Mood Regulation refers to the way of mitigating one’s anxiety about self-presentation and the relating issues in interpersonal communications. Regulating mood by Internet use is one of the cognitive symptoms of GPIU as suggested by prior studies [34][35][36]. Early in 2002, Caplan [34] realized that mood regulation served as an important cognitive predictor for negative consequences relating Internet use. Caplan [35] supplemented his earlier findings by pointing out in the later study that people who were socially anxious showed preference on using online interactions as a means to palliate anxiety of self-presentation in face-to-face interactions. LaRose et al. [36] examined the cognitive model of problematic Internet usage and put emphasis on the role of mood regulation in developing deficient self-regulation.

LaRose et al. [36] and Lee and Perry [37] claimed that using the Internet for mood regulation was one of the leading factors to deficient self-regulation. As stated in their studies, the formations of problematic using behaviors arose if the behaviors act as an important and exclusive mechanism for relieving anxiety, depression, loneliness or stress.

H2: Using Facebook for mood regulation has a positive relationship with deficient self-regulation of Facebook use.
3.5. Preference for online social interaction (POSI)

Prior studies [25][35][38] have shown that POSI was a cognitive individual-difference construct. The construct was characterized by the beliefs that one would feel safer, more efficient, more confident, and more relaxing when an individual is pursuing online social interaction, like visiting Facebook, than in traditional face-to-face interaction, especially for those who were lonely, socially anxious and lacked social skills. Building on the cognitive behavioral theory [10], a considerable number of researchers [25][32][33][38] have identified POSI as one of the important cognitive symptom of GPIU.

Considerable amount of research [33][38] have found that POSI also predicts the degree of compulsive use, which is one of the indicators of deficient self-regulation.

H3: Preference for online social interaction has a positive relationship with mood regulation.

H4: Preference for online social interaction has a positive relationship with deficient self-regulation of Facebook use.

4. Methodology

4.1. Measures

The measures of the constructs in the current study are listed in Table 1. They are borrowed from Caplan’s [11] Generalized Problematic Internet Use Scale 2. The scale has been continuously updated and well-validated. Measures have been modified with the specific focus on Facebook and are measured in a seven-point Likert scale, from “1 = strongly disagree” to “7 = strongly agree”.

4.2. Data Collection

A convenience sample of Facebook users was created by inviting volunteers through Facebook. Facebook users were chosen to be the subjects of the study because they were believed to have developed different level of using pattern and knowledge relating to Facebook. Questionnaires were administered in an online surveying system, Qualtrics and the URL of the online questionnaire was distributed through a Facebook event. The study was voluntary and an incentive of US$15 vouchers of lucky draw was offered as prize to encourage more participation.

A total of 200 online questionnaires were collected. The sample size has met the recommended sample size as indicated by considerable amount of researchers [39][40].

4.3. Survey Response

Among the 200 respondents, 48% were male and 52% were female. About 87.5% were aged 16-25 and only 1.5% were aged 36 or above. Of the 200 participants, 60.5% were degree holder or with higher education background. In terms of the using behavior of Facebook, about 89% users view the updated information from their friends’ personal page, and 33.5% users reported that they visited Facebook for 15-30 minutes a day, and 18.5% reported 2-3 hours or above usages, and out of 18.5%, 4.5% users claimed that they visited Facebook for more than 5 hours.
Table 1. The generalized problematic Internet use scales [11]

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Items</th>
<th>Item Wording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficient self-regulation (α = 0.89)</td>
<td>DS1</td>
<td>I want to, or have made unsuccessful efforts to, cut down or control my use of Facebook</td>
</tr>
<tr>
<td></td>
<td>DS2</td>
<td>I have attempted to spend less time on Facebook but have not been able to</td>
</tr>
<tr>
<td></td>
<td>DS3</td>
<td>I have tried to stop using Facebook for long periods of time.</td>
</tr>
<tr>
<td></td>
<td>DS4</td>
<td>I am preoccupied with Facebook if I cannot log on for some time</td>
</tr>
<tr>
<td></td>
<td>DS5</td>
<td>When not on Facebook, I wonder what is happening there</td>
</tr>
<tr>
<td></td>
<td>DS6</td>
<td>I feel lost of can't go Facebook</td>
</tr>
<tr>
<td>Mood regulation (α = 0.85)</td>
<td>MR1</td>
<td>I have used Facebook to talk with others when I was feeling isolated</td>
</tr>
<tr>
<td></td>
<td>MR2</td>
<td>I use Facebook to make myself feel better when I'm down</td>
</tr>
<tr>
<td></td>
<td>MR3</td>
<td>I have gone Facebook to make myself feel better when I was down or anxious</td>
</tr>
<tr>
<td>Negative outcomes (α = 0.86)</td>
<td>NO1</td>
<td>I have gotten into trouble with my employer or school because of visiting Facebook</td>
</tr>
<tr>
<td></td>
<td>NO2</td>
<td>I have missed classes or work because of visiting Facebook</td>
</tr>
<tr>
<td></td>
<td>NO3</td>
<td>I have missed social engagements because of visiting Facebook</td>
</tr>
<tr>
<td>Preference for online social interaction (α = 0.87)</td>
<td>POSI1</td>
<td>I am treated better on Facebook relationships than in my face-to-face relationships</td>
</tr>
<tr>
<td></td>
<td>POSI2</td>
<td>I am more confident socializing on Facebook than I am offline</td>
</tr>
<tr>
<td></td>
<td>POSI3</td>
<td>I am more comfortable with Facebook than people</td>
</tr>
</tbody>
</table>

5. Data Analysis

Smart Partial Least Squares, Version 3 was used and the two-step approach analytical procedure was adopted to analyze the data. The measurement model was first examined, and followed by the structural model [41].

5.1. Measurement Model

To validate the measurement model, convergent validity and discriminant validity need to be assessed.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item Loading</th>
<th>t-value</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficient self-regulation</td>
<td>DS1</td>
<td>0.81</td>
<td>25.23</td>
<td>3.71</td>
</tr>
<tr>
<td></td>
<td>DS2</td>
<td>0.84</td>
<td>29.17</td>
<td>3.64</td>
</tr>
<tr>
<td></td>
<td>DS4</td>
<td>0.85</td>
<td>32.39</td>
<td>3.14</td>
</tr>
<tr>
<td></td>
<td>DS5</td>
<td>0.80</td>
<td>23.63</td>
<td>3.68</td>
</tr>
<tr>
<td></td>
<td>DS6</td>
<td>0.88</td>
<td>50.02</td>
<td>2.85</td>
</tr>
<tr>
<td>Mood regulation</td>
<td>MR1</td>
<td>0.79</td>
<td>25.31</td>
<td>3.85</td>
</tr>
<tr>
<td></td>
<td>MR2</td>
<td>0.93</td>
<td>89.14</td>
<td>3.84</td>
</tr>
<tr>
<td></td>
<td>MR3</td>
<td>0.92</td>
<td>64.51</td>
<td>3.73</td>
</tr>
<tr>
<td>Negative outcomes</td>
<td>NO1</td>
<td>0.87</td>
<td>36.02</td>
<td>3.13</td>
</tr>
<tr>
<td></td>
<td>NO2</td>
<td>0.90</td>
<td>49.67</td>
<td>2.91</td>
</tr>
<tr>
<td></td>
<td>NO3</td>
<td>0.89</td>
<td>51.89</td>
<td>2.61</td>
</tr>
<tr>
<td>Preference for online social</td>
<td>POSI1</td>
<td>0.89</td>
<td>49.78</td>
<td>3.47</td>
</tr>
<tr>
<td>interaction</td>
<td>POSI2</td>
<td>0.91</td>
<td>35.27</td>
<td>3.41</td>
</tr>
<tr>
<td></td>
<td>POSI3</td>
<td>0.88</td>
<td>43.31</td>
<td>3.74</td>
</tr>
</tbody>
</table>

5.1.1. Convergent Validity. Convergent validity indicates the degree to which the items of a scale that are theoretically related are also related in reality. It was examined by the use of composite reliability (CR) and average variance extracted (AVE). The critical values for CR and AVE are 0.70 and 0.50 respectively [42].

As shown in Table 2, all CR and AVE values fulfill the recommended levels, with CR ranging from 0.91 to 0.92 and the AVE ranging from 0.69 to 0.79. For the item loadings, all of them meet the recommended level which are higher than 0.70.

5.1.2. Discriminant Validity Discriminant validity is the degree to which the measurement is not a reflection of some other variables. It is indicated by low correlations between the measure of interest and the measure of other constructs [42]. Evidence of discriminant validity can be demonstrated when the squared root of the average variance extracted (AVE) for each construct is higher than the correlations between it and all other constructs. As summarized in Table 3, the square root of AVE for each construct is greater than the correlations between them and all
other constructs. The results suggest an adequate discriminant validity of all measurements.

<table>
<thead>
<tr>
<th>Table 3. Correlations of constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficient Self-Regulation</td>
</tr>
<tr>
<td>Mood Regulation</td>
</tr>
<tr>
<td>Negative Outcomes</td>
</tr>
<tr>
<td>POSI</td>
</tr>
</tbody>
</table>

***p<0.001
Notes: Bolded diagonal elements are the squared root of AVE for each construct. Off-diagonal elements are the correlations between constructs

5.2. Structural model

Figure 2 shows the overall explanatory power, estimated path coefficients (all significant paths are indicated with asterisks), and associated t-value of the paths of the research model.

The results illustrate that the exogenous variables explain 56% of variance in negative outcomes, 35% of variance in deficient self-regulation and 36% of variance in mood regulation. All the structural paths are found to be statistically significant in the research model and all hypotheses are supported. Deficient self-regulation is found to be statistically significant to the negative outcomes concerning problematic Facebook use, with path coefficient at 0.75(p<0.001). POSI and mood regulation are found to have significant effects on deficient self-regulation, with path coefficients at 0.37(p<0.001) and 0.28(p<0.001) respectively. The POSI is found to have strong impact on mood regulation, with path coefficient at 0.60(p<0.001).

6. Discussion and Conclusions

The purpose of this study is to empirically test the advanced Generalized Problematic Internet Use model in the context of Facebook. The research model is built on the cognitive-behavioral theory, and consisted of four constructs, including POSI, mood regulation, deficient self-regulation and negative outcomes. An exploratory study is then conducted which gives us further insights into the relationships among problematic Facebook use, its antecedents and the relating negative outcomes. Resulting relationships between POSI, mood regulation, deficient self-regulation and negative outcomes, are discussed in the following section.

6.1. Discussion of Results

The measurement model is confirmed with adequate convergent validity and discriminant validity of all measures. The structural model explains 56% of the variance in negative outcomes associating with problematic Facebook use. Those finding are notably encouraging given that previous studies have yielded much smaller effects [25][38]

In the current study, deficient self-regulation is found to have a direct and significant impact on negative outcomes. The result is consistent with the cognitive-behavioral theory that individual with deficient self-regulation might finally result in negative consequences. The results also show the relationship between deficient self-regulation and its two key determinants. The two key determinants, POSI and mood regulation, are found statistically significant and explained 35% of the variance in deficient self-regulation. The results are consistent with prior studies that both POSI and mood regulation predict the degree of deficient self-regulation.

POSI also has strong and significant impact on mood regulation. Facebook users prefer engaging in online social activities for regulating their mood and alleviating stress. The results show that the interactive and social features embedded in Facebook make it an ideal tool in regulating one’s mood.

Together, POSI, mood regulation, and deficient self-regulation play important roles in GIPU model. These variables accounted for a substantial proportion of variance in explaining negative outcomes.

6.2. Implication for Research

The results of this study is expected to contribute to the research communities First, the current study addresses an important and complicated area in user behaviors in Facebook. Facebook has widely appreciated as one of the most popular platform for online social interaction. A number of baffling and outstanding issues, for instance the addictive and the problematic use of Facebook, however, still needs further investigation.

Second, this research contributes greatly to the existing problematic Facebook use research in several ways. Generally speaking, the empirical study depicts the relative importance of antecedent factors for the development of problematic Facebook use and its resulting consequences. It also adds to the limited research done with problematic Facebook use, and allows future studies to be based on. Finally, the empirical research helps operationalizing and
validating the instruments for the investigation of problematic Facebook use.

### 6.3. Implication for Practice

The research model is built upon the GPIU model and explains relationships among POSI, mood regulation and deficient self-regulation and the leading negative outcomes. By including both behavioral and cognitive variables in the model, it is likely to give practitioners and educators knowledge in evaluating the degree to which users or students are developing problematic Facebook use.

Upon notifying the cognitive and behavioral symptoms of problematic Facebook use, they can provide Facebook users with advices and assistances, such as, reminder on the Facebook using time or information on getting rid of problematic Facebook use and etc. For example, a message box could be prompted every 2 hours to remind users of their login duration.

It is believed that the results of the study are helpful in providing substantial insights and guidelines for the educators and practitioners, as well as any social networking platform administrators, so as to create a sustainable and healthy social networking sites using environment.

### 6.4. Limitations of the current study

The reported results support the hypothesized model, but several limitations in the current methodologies deserve attention. First, the current study relies heavily on the self-report data in operationalizing the GPIUS2 measures, and does not obtain and include objective measure like direct observation and non-self-report data owning to the difficulties, which would in turn greatly enhance the validity and reliability of the results.

The second limitation of the current study relates to the sample. Though there are participants over 35 years old, the predominant groups of participants are aged 16-25. A sample with majority of students was used for the reason that students are frequent and heavy Facebook users. Any study aiming at investigating the problematic and addictive uses, however, should include those frequent users of the media rather than simply students.

### 6.5. Directions for future research

GPIU have been extensively studied and advanced. Much work, however, have to be done. Regarding the advanced GPIU2 model, continuous studies are required to further assess its validity and reliability. For instance, researchers can conduct test-retest for assessing the reliability of the measurements. Data can be collected from diverse or specific groups of respondents to evaluate the model fit of measurements.

Finally, though the hypothesized model of the current study accounted for 35% of the variation in deficient self-regulation and 56% variation for negative outcomes, there is still more variation to be accounted for. Future studies should consider including personal characteristics and psychological constructs (e.g. psychosocial well-being: depression, self-esteem, loneliness and shyness), so as to further improve our understanding of the formation of the problematic use of Facebook.

### 7. References


