Impact of Facebook Usage on Students' Academic Achievement: Role of self-regulation and trust

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Abstract

Introduction. The paper provides a preliminary analysis of the effects of Facebook usage by undergraduate students at Luleå University of Technology in Sweden. The proposed research model tests the perceived effect of personality traits, self-regulation, and trust on students' achievements. Based on flow theory, the model suggests negative mediating effects of the use and cognitive absorption on Facebook, concluding that a decrease occurs in students' academic performance but a positive effect on satisfaction with life that would limit this undesirable effect.

Method. Paper and pencil survey was run with undergraduate students from Luleå University of Technology and data from 239 students was used to test the model. SmartPLS software was employed to test the proposed structural equation model.

Results. Results indicated an extensive use of Facebook by students with extraverted personalities leading to poor academic performance. However, students who are more self-regulated more effectively control their presence on these platforms. Trust in people does not affect their presence and interaction on this platform. Yet students' cognitive absorption with Facebook is only regulated by their self-control and their personality traits, which determines how much time they spend on Facebook. Multitasking skills moderate the effect of cognitive absorption on academic achievement, but they do not impede the time spent, frequency, or nature of use or their effect on academic results. Although students' satisfaction with life significantly declined due to cognitive immersion into Facebook, it appeared not to play an effective role in the students' academic achievement. However, their performance goal orientation was shown to be a crucial determinant of their university accomplishments, which would limit the critical effect of their presence on the Facebook platform.

Discussion and Conclusion. Results support in part earlier conclusions about personality traits that rule the presence on Facebook. Trust does not impede on Facebook usage as it determines surfers' use of Internet. Self-regulation and performance goal orientation characterized the students who are more in control of this social activity. In turn, this prohibits the apparent negative effect on their academic performance. Results help students to understand the preliminary consequences of their extensive usage of Facebook and to better manage their social activities on this platform.

Keywords: Facebook usage, academic achievement, cognitive absorption, self-regulation, trust, personality traits, satisfaction with life.

Impacto del uso de Facebook en el rendimiento de los estudiantes: El papel de la Autorregulación y la Confianza

Resumen

Introducción. Este trabajo ofrece un análisis preliminar sobre los efectos del uso de Facebook en los estudiantes universitarios de la Universidad de Tecnología Luleå, en Suecia. El modelo de investigación propuesto examina el efecto percibido de los rasgos de personalidad, la autorregulación y la confianza sobre el rendimiento de los estudiantes. Basándonos en la teoría del flow, el modelo sugiere efectos mediadores negativos y absorción cognitiva por el uso de Facebook, concluyendo que existe una disminución en el rendimiento académico de los estudiantes, pero un efecto positivo sobre la satisfacción vital, la cual limitaría este efecto no deseable.

Método. Se administró una encuesta en soporte impreso a estudiantes universitarios de la Universidad de Técnología Luleå, y se emplearon los datos de 239 estudiantes para probar el modelo. Se utilizó el software SmartPLS para comprobar el modelo de ecuaciones estructurales propuesto.

Resultados. Los resultados indicaron un abundante uso de Facebook por estudiantes de personalidad extrovertida, lo cual llevaba a un rendimiento académico pobre. Sin embargo, los estudiantes más autorregulados controlaron más eficazmente su presencia en estas plataformas. La confianza en las personas no afectaba su presencia ni su nivel de interacción en esta plataforma. La absorción cognitiva de los estudiantes con Facebook sólo se regulaba por su autocontrol y sus rasgos de personalidad, los cuales determinaban cuánto tiempo dedicaban a Facebook. La capacidad de realizar varias actividades a la vez (multitasking) modera la incidencia de la absorción cognitiva en el rendimiento académico, pero no impide el tiempo dedicado, la frecuencia o la naturaleza del uso o su incidencia en los resultados académicos. Aunque la satisfacción vital de los alumnos decreció de manera significativa debido a la inmersión cognitiva en Facebook, no parecía desempeñar un papel eficaz en el rendimiento académico de los alumnos. Sin embargo, se mostró que su orientación de meta al rendimiento era un determinante crucial de su rendimiento universitario, lo cual limita el efecto crítico de su presencia en la plataforma de Facebook.

Discusión y Conclusiones. Los resultados respaldan en parte otras conclusiones anteriores sobre los rasgos de personalidad que rigen la presencia en Facebook. La confianza no impide el uso de Facebook tal como determina el uso de Internet de los navegantes. Los estudiantes que tienen más control sobre esta actividad social se caracterizan por la autorregulación y la orientación de meta al rendimiento. Éstas, a su vez, evitan el efecto aparentemente negativo en su rendimiento académico.

Los resultados sirven para que los estudiantes entiendan mejor las consecuencias preliminares de un abundante uso de Facebook, y para que gestionen mejor sus actividades sociales en esta plataforma.

Introduction

Facebook has recently attracted considerable attention among researchers. As a social networking site, Facebook can be defined as an online platform where users create profiles, generate and share contents and information, and interact with other known and unknown contacts (Boyd and Ellison, 2007). Facebook has experienced vast expansion during the last few years, leading to extensive use by people from all generations. Today, Facebook has 661.3 million users and experienced an annual growth of 45.2% (Inside Facebook gold, June 2011). Its business value surged to 50 billion US dollars after the Goldman Sachs bank invested in this social networking website in early 2011.

Several studies have examined the attraction and persuasive character of this online platform and similar networking sites (e.g., Fogg and Iizawa, 2008) as well as the reasons that lead people from all walks of life and age ranges to join this community or other similar communities. Many people actively participate in the content generation and value creation for social networks. Researchers (e.g. Vasalou et al., 2010; Young et al., 2009) have examined the profiles of these website users to determine to what extent such individuals are keen on posting their entire identity, sharing their pictures and videos, and stating their religious affiliation, marital status, and political orientation on the Internet. In turn, they interact, exchange information about their interests, raise discussions about news topics, follow news about specific topics on Twitter (e.g., companies, political parties, favorite websites, entertainers), and enjoy sharing private videos for songs, funny stories, or documentaries on YouTube. However, few studies have examined the return on investment in these networks for the companies and individuals' beneficial outcomes from such usage. However, according to some studies, these platforms intensively support individuals' social capitalization and increase interactions within a large community, where individuals share common traits and interests, as largely proven via Facebook (Burke et al., 2010; Ellison et al., 2007; Ellison et al., 2010; Ginger, 2007; Yoder & Stutsman, 2011).

Meanwhile, some exploratory studies (Canales et al., 2009; Karpinski & Duberstein, 2009) have shown that the extended presence of students and employees on Facebook has a harmful effect on their productivity and task performance. These two studies demonstrated that long hours spent on Facebook seem to decrease students' academic performance and, consequently, their achievement grades. Students spend an average of 30 to 35 minutes a day

surfing Facebook (The Learning Network blog, Schulten, 2009). Many students note that they actually spend only 3 to 4 minutes during each visit to check updates, making several visits a day; other spend up to 8 hours a day on the website. Many students acknowledged that they find the website totally distracting and time consuming, but they also noted that they cannot quit visiting the website because they like it and can use it to keep in contact with all their friends and even family members, whether they meet them every day or not (Facebook, 2010). Some people also recognized that they "have outsourced their social life exclusively to Facebook"; others noted feeling that using Facebook means allowing this application to take over their daily lives, so they decided not to have a profile on this platform. Still others feel that they are more organized since putting their profile on Facebook, primarily in regards to contacts management and information sharing among their networks (The Learning Network blog, Schulten, 2009). A recent study (Rouis, 2011) found that Facebook usage does not have a negative effect on Tunisian students' academic achievements and might instead have a positive impact as it appeared that this interdependency is significantly moderated by students' interest in the university and multitasking capabilities.

These controversial results, in addition to the actual picture from Facebook and students' comments on different Facebook groups, indicate that students with particular profiles focus more on bridging social networks, keeping in touch with old contacts, and developing new friendships. Some students are likely to spend more time than others on the social network; they would be also more immersed in related tasks as they spend long hours surfing the website, thereby promoting their distraction from any tasks performed in parallel. For example, users become interested in sharing information with their contacts (i.e., "friends") and participating in discussions as well as uploading or watching videos and pictures. Students and other active users engage in long discussions about daily issues, checking their Facebook profiles from home and from their cell phones. Students also check updates while preparing their homework, which interferes with their homework preparation. They are distracted from their main occupation, and their working memory load allocated to these tasks makes it difficult for them to be focused and prepare their homework effectively. This would lead to instable results and likely decreases in their global achievements due to their participation with Facebook.

However individuals participate on these networking activities differently according to their personalities and cultural disparities. Several studies have discussed people's attitudes

related to the Internet, showing that their interests and activities on this tool vary according to their age, gender, and personality traits (Hofstede & Hofstede, 2005; Nazir et al., 2009). Cultures are delineated by countries' history, politics, and socio-economic situations. Cultural background also determines individuals' personalities during social learning processes and through inherited human nature, which shape individual common characteristics. Each individual is associated with a group of people as well as with a region within its original country; breaching the external environment or other countries and communities contributes to modeling characteristics that subsequently affect attitudes and behaviors (Hofstede & Hofstede, 2005; Nazir et al., 2009). These differences in cultural backgrounds and characteristics demonstrate the need to address the impact of students' Facebook usage, which leads to the question about the unpredictability of the effect of Facebook among students with different characteristics and in different cultural contexts.

We address this question in a diverse context with students from a European country with different cultural contexts, focusing on key preliminary determinants in interactions on the Internet—namely, personality traits, trust in people, and the psychological characteristic of self-regulation. This study subsequently attempts to answer the following question: Does Facebook usage damage students' academic results in the Swedish living context? The main objective of this research is to understand students' usage of Facebook and its impact on their academic performance. The purpose is to assess the role of personality traits, trust in people, and self-regulation in delineating the use and cognitive absorption on Facebook as well as to observe whether the usage varies in this European context. To this end, we review the theoretical background and depict the proposed research model; we then present the methodology adopted to test the model and analyze the results. Finally, we draw conclusions and make recommendations and suggestions for future research.

The Flow Theory (FT)

Borrowed from psychology, the flow theory has been used to assess human computer interaction and, more recently, to address people's use of the Internet. Flow is defined by Csikszentmihalyi (1977), founder of the theory, as the "holistic sensation that people feel when they act with total involvement." It concerns the absorption on a task, where the person is completely attracted by the artifact and the task being performed related to this subject. Whereas websites, emailing tools, and the computer itself can be considered artifacts, the

tasks concern the assignment performed using these tools (Finneran & Zhang, 2003). For instance, Facebook is the artifact while the people or students using this network are the tasks that prompt the flow on these platforms.

Novak et al. (1998) provided an extensive review of the definition of flow as experienced by people immersed in performing a task. Described as total concentration and deep involvement in the tasks carried out, these activities would result in an intrinsic enjoyment combined with a keen curiosity and a pleasure that encourages repetition of the activity on one hand, but the loss of time and inability to control oneself to quit this attraction on the other.

Flow has been addressed in several contexts, such as students' engagement in the classroom (Shernoff et al., 2003), learning of a foreign language (Egbert, 2004), management of sports and music leisure activities (Custodero, 2002; Jackson, 1977; O'Neill, 1999a, O'Neill, 1999b), customers' online shopping behavior (Koufaris, 2002; Pace, 2004; Smith & Sivakumar, 2004), people's behavior and acceptance of messages and content exchange online (Lu et al., 2009), and motivation and creativity (Csikszentmihalyi, 1988) for both adolescents and students in their classes or for employees at work. Although we think that the current stream of interactions and content generated on Facebook are tremendously similar to other online and offline activities at their core, the number of hours users spend is continuously increasing, and many people state that they are now organizing their lives on Facebook. Professionals are increasingly creating profiles, updating messages, and uploading videos to provide their fans with information while fans follow the news on their profile pages.

People are, by their nature, curious (Hofstede, 2010). Facebook allows for far-reaching information on one interface—namely, individuals' "walls." The flow of information shared on "walls" increases tremendously, varying according to the size of the individual's network (i.e., the number of "friends" and groups). Consequently, the user's attraction and involvement in activities on this social platform attracts greater concentration and time following the updates and news. Information shared also concerns all areas of daily life, which makes websites like Facebook a mine that anyone can explore and enlarge.

Nevertheless, although users experiences delight and enjoyment interacting with others on these networks and appear to be in total command of this activity, they lose control over other tasks that they are expected to perform instead. Time flies while they are absorbed in the effect of joy and curiosity from these websites, and no time or effort is left to carry on with other chief tasks.

The Distraction Effect

Although adhering to the social networking platforms is subject to the persuasive attitude of the social website and the attitude of the users toward the social networking activity (Fogg and Iizawa, 2008), individuals' online behavior is also subject to their personality traits, values, and cultures (Hofstede, 1984). Indeed, the way in which people use online social networks—especially in terms of behavioral patterns and attitudes toward information sharing and privacy—is a direct result of and reflection on their cultural backgrounds (Kiesler, 1997).

Yet individuals' intellectual capabilities to manage time and process the information would delimit their capacity to benefit from their online activities and restrict their efficiency on any tasks performed in parallel. Facebook users usually interrupt their work at their jobs or course preparation to visit their Facebook profiles because of the short-term capacity needed for the working memory process. Even unemployed people go online to look for job opportunities and end up interacting on these platforms, ultimately spending much longer time on them than expected. Ultimately, the split attention paid to multiple tasks causes individuals to become distracted.

Kiesler's earlier advance presumes that the use of online social networks or networking on the Internet (e.g., Facebook usage) varies across countries as cultures vary and might induce diverse impacts on the individuals. Their absorption in the social networking activity combines their extended immersion in these websites, their enjoyment while interacting, and their curiosity, but they are also temporally disassociated from their main tasks—whether online or offline—and lose control over their main activity in favor of chatting or checking new updates. In order to observe the effect of Facebook usage on students' academic performance and understand the preliminary effect of extensive presence on these networks, we measure Facebook usage and its impact for students in Sweden, a

particular European context with dissimilar studying environment and life settings compared to the US and Tunisian contexts.

Research Model

Based on the pre-developed theoretical background, the proposed research model posits that people's self-regulation, personality traits, and trust determine individuals' use of Facebook. Cultural characteristics explain students' trust online (Doney et al., 1998; Jarvenpaa et al., 1999, Jarvenpaa et al., 2000; Teo & Liu, 2007; Yoon, 2002), self-regulation attitude (Barkley, 2001; Posner & Rothbart, 1998; 2000) and personality traits (Hofstede & Hofstede, 2005; Nazir et al., 2009), which would explain the variability of Facebook usage among people from different cultural backgrounds and, ultimately, the variability in the outcomes of such usage. In addition, the model suggests that Facebook usage has a negative impact on students' class achievements as the cognitive absorption increases because of the split attention effect. Indeed, as cognitive absorption on networking increases, absorption in the internet results in distractions from the main task of studying (homework preparation) and impedes students' concentration for effectively preparing assignments.

However, we presume that life satisfaction and high performance goal orientation would limit the crucial effect of SM usage on students' academic performance. Similarly, we hypothesize that students skilled in multitasking would experience lower cognitive absorption than monochromic students, which would then be less likely to have harmful effects on their grades.

Figure 1 depicts the research model, which is followed by a discussion of the underpinnings of each of these assumptions.
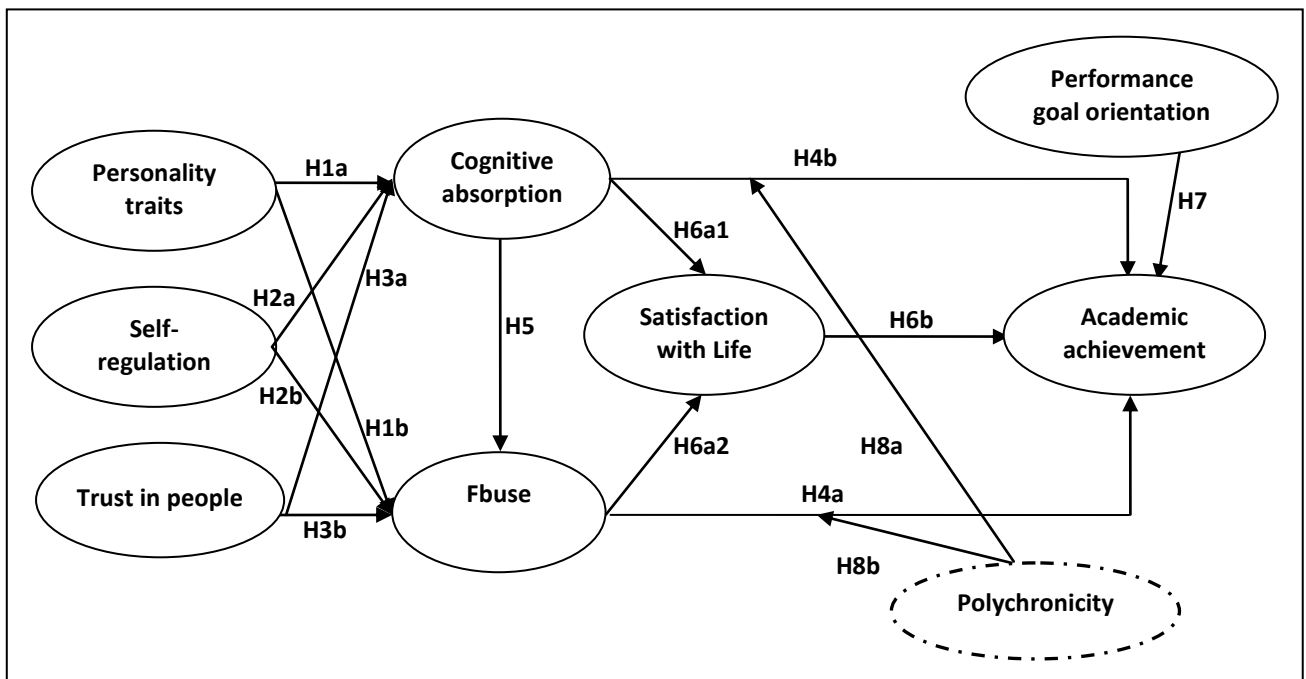
Figure 1: Research Model

Who is using Facebook?

Personality traits

Previous literature has demonstrated that personality traits reflect our attitudes and represent individuals' predispositions to perform specific activities and show particular behaviors (Ajzen & Fishbein, 1977; Davaraj et al., 2008). Individuals' personality traits are the personality characteristics that, along with values, shape our identities and form our attitudes (Olver & Mooradian, 2003; Roccas et al., 2002). Such traits originate from the psychological state and show the moral status, preferences, and goals of each individual. They also deliberate the level of individuals' need to interact with others and inner motives and goals, such as increasing self-esteem and answering an emotional need (Hardie & Tee, 2007).

Personality traits have been extensively discussed in order to explain people's behavior on the internet, students' attitude in education, and the impact on their academic performance (Blickle, 1996; De Raad & Schouwenburfg, 1996; Furnham et al., 2003; Hardie & Tee, 2007; Poropat, 2009). Furnham et al. (2003) and Lounsbury et al. (2005) argued that

personality also has to do with cognitive abilities. Conscientious students tend to be more intelligent whereas neurotic students seem to be less intelligent, although this might be just an illusion as conscientious students—aware of the importance to excel in their studies—are likely to be more studious and diligent. Meanwhile, neurotic students are emotionally more sensitive, which makes them less inclined to study when they are not emotionally satisfied. They need satisfactory interpersonal interactions and entertainment with their contacts. Thus, they communicate by extensively hiding behind a technology interaction tool, but they are also selective of the content they would like to check. They constantly try to find more opportunities to interact with and share interests with others.

Extraverted students are also outgoing, with their sociable character affecting their attitudes. Judge et al. (1999) stated that "extraversion is thought to consist of sociability." Students with this personality trait are very active in social networks in which they are members and are highly proficient at initiating and managing groups of people on these platforms. They are talented in running debates about the new and most popular topics. People with such characteristics are also adventurous, dominant, and ambitious, which gives them skills to lead group discussions with people that they may have never met offline. Considering the nature of the activity in which they engage on Facebook, they are likely to spend long hours managing groups and discussions, updating groups profiles, and uploading news, videos, and pictures to enliven the debates. Agreeable Facebook users like to help others and often spend time assisting them (Kamdar & Van Dyne, 2007; Tabak et al., 2009). They are kind to others and honest so that others like to talk to them and involve them in their discussions (Clark & Schroth, 2010). Because of their courtesy, they cannot decline invitations to become friends, have a look at their profiles, or join a discussion.

Finally, open students are open minded (Roccas et al., 2008), intellectual, and open to new experiences (Judge et al., 1999). Students with this profile are curious, but they reflect their interactions online in terms of new opportunities and intellectual utility. Broad minded and sensitive to art (Propat, 2009), they are imaginative and constantly look for creativity (Judge et al., 1999; Propat, 2009; Robbins & Judge, 2011).

As personality traits shape individuals' attitudes and behaviors, we hypothesize that personality traits significantly determine Facebook usage. Thus, we test the following hypotheses:

H1a: Extraverted, neurotic, and agreeable students and students open to new experiences will have a high presence on Facebook; conscientious students will have limited presence on this website.

H1b: Extraverted, neurotic, and agreeable students and students open to new experiences will be highly cognitively immersed in Facebook. Conscientious students will be less absorbed in this platform.

Self-regulation

Self-regulation, as an associated attribute to conscientiousness (Posner & Rothbart, 1998), is considered to have a restrictive effect on Facebook usage. Students with high self-regulation are expected to allocate less time to social networks and to maintain a more organized attitude toward and on these platforms. Their reflection on the interactions made on Facebook for example and the content generated by the online communities into which they integrate are more effective. They think in terms of the "utility" of the interaction they would have with people rather than of an affective basis. Although relationships are determined by cognitive and emotional motives, self-regulated individuals evaluate their attitudes by managing their emotional reaction to what they achieve through the social activity (Bagozzi, 1992). Yet self-regulated students are also goal oriented as they set their goals and strive to achieve them (Latham & Locke, 1991). Thus, we hypothesize that self-regulation will slow the frequency of usage and reduce the number of hours spent on online networking sites.

H2a: Highly self-regulated students will demonstrate less use of Facebook.
H2b: Highly self-regulated students will demonstrate less cognitive absorption in Facebook.

Trust in people

Trustworthiness in online transactions and in internet-based applications has been widely discussed (Grabner-Kräuter & Kaluscha, 2003; Grandison & Sloman, 2000; Kangas et al., 2007; Wang & Emurian, 2005). In interactions on social websites, trust relates more to trust in people than in the applications themselves. Initially, people on different social networking activities give the impression that they trust almost every message, video, or picture posted on the walls on Facebook or shared on YouTube or via Twitter. Information

has a large number of sources, and if individuals trust the information provided, this assumes that they trust the source: They will "like" the source page on Facebook, add a friend (to follow the news if it comes from an individual's profile instead of a group page), or add people to their networks with whom they share some common interests based on comments, pictures, and videos shared. However, many people have passive profiles on these sites, with a very limited number of contacts and share little or no content. Individuals' online social behavior depends on their trust in people (Golbeck, 2009), although Uslaner (2000) argues that trust sometimes matters and sometimes does not in online social interactions.

We hypothesize that trust matters in increasing participation, activity, and absorption on social networking websites as it reflects a self-conviction of the need to share this content. Thus, we test the following hypotheses:

H3a: A high level of trust in people will increase Facebook use.
H3b: A high level of trust in people will increase Facebook absorption.

Facebook use

Facebook usage is based on 1) the use of the platform and 2) the extent of cognitive immersion into this networking websites. Its use refers to the presence of the individuals on this social website, the time spent on this platform, the frequency of visits, and the nature of the activities performed. People from different age ranges interact and exchange content on Facebook; they share videos and pictures, discuss subjects, chat, publish advertisements for group events, or play on available applications. Younger generations (e.g., students) spend many hours—up to 8 hours a day—surfing this socializing website.

We presume that an extensive presence on Facebook and increased levels of information flow management engage students in this task more than in their homework, which would deflect their attention from their main task (academic tasks) to engage them in non-stop interactions and socialization, thereby prohibiting them from focusing appropriately on their academic tasks. Then, we hypothesize that:

H4a: A significant use of Facebook will decrease students' academic achievement.
   Cognitive Absorption

Cognitive absorption refers to the appeal of the platform that the user surfs and the task performed on this platform. It can be used to examine the extent to which the individual is enjoying him- or herself (Agarwal & Krahannal, 2000) during computer interactions— namely, networking—while interacting on Facebook. The user is mentally absorbed in the online social networks of interest. The individual then interacts and builds relationships through these platforms. Mentally absorbed, the users become immersed and captivated by tasks that engage most of their mental efforts. Thus, the cognitive load generated while performing a particular task, which refers to the working memory resources deployed, is at its highest level when users are fully engaging in the task. This presumes that high immersion in one task will take concentration away from other tasks performed in parallel. Thus, we assume that a high level of engagement in the social networking activity will cause students to lose focus on academic tasks, thereby affecting academic results. We then test the following hypothesis:

H4b: A high level of cognitive immersion on Facebook will decrease students' academic achievement.

Furthermore, being absorbed in this task, users will spend more time interacting with peers. Thus, we test the following hypothesis:

H5: A high level of cognitive absorption in Facebook will increase students' times spent on this website.

Role of satisfaction with life and performance-goal orientation

Satisfaction with life

Satisfaction with life has been largely discussed as a feature of individuals' positive psychology. It has also been largely discussed as an enhancer of students' academic achievement (Chow, 2010; Danielsen et al., 2009; Huang & Carleton, 2003; Huebner, 2004; Suldo et al., 2006; Suldo et al., 2008); although other authors have argued this assumption, some empirical studies could not confirm this interdependence (Bastian et al., 2005; Leung & Leung 1992). Previous literature showed that satisfaction with life is highly determined by

one's relationship with parents (Danielsen et al., 2009; González, Saura, Rodríguez & Linares, 2010; Huebner, 2004), friends (González et al., 2010; Huebner, Laughlin, Ash & Gilman, 1998) as well as by leisure activities in which one participates (Chen et al., 2010). Life satisfaction offers assistance to the psychological environment, enabling students to prioritize concerns related to academic achievement and focus on efforts to perform well in their studies.

We assume that high usage of Facebook will increase users' satisfaction with life as nowadays it is considered one of the primary leisure activities. It represents the communication tool that students use the most with their friends and family members after mobile phones. Thus, we hypothesize that:

H6a1: The high use of Facebook will increase students' satisfaction with life.

H6a1: A high level of cognitive absorption in Facebook will increase students' satisfaction with life.

H6b: Students' high satisfaction with life will increase their academic achievements.

Performance-goal orientation

Achievement-goal orientation or mastery orientation describes the student inner wish to perform well in his academic tasks. It supports a favorable studious attitude and inner motivation, which enhance the probability of developing better academic performance (Button et al., 1996; Chen & Mathieu, 2008; Roebken, 2007) and realize better achievement in their results. Students who are stirred by goal orientation are more organized and focused on their tasks and on achieving their learning aims and good final results. It inspires them to deploy more energy and mental efforts on their studying tasks. Thus, we hypothesize that:

H7: A high level of performance-goal orientation will increase students' academic achievement.

Academic Achievement

Academic performance has been largely discussed in earlier researches in education and educational psychology. Two main approaches offered different visions to perceive academic performance. While approaching a specific goal is the most common method to assess academic performance, avoiding adverse outcome can also be considered as alternative (Valle et al., 2009; Was, 2006). Yet, goal achievement might be task focused or end results focused (Valle et al., 2009; Was, 2006). Considering Facebook usage as leisure activity that will interfere with the students' performance on their academic work, our hypotheses presume the effect on their overall academic results. Thus, academic achievement is here results focus and looks only at final results/grades of the students.

Role of Polychronicity

Polychronicity has been largely discussed across cultures, demonstrating that people from different cultures have different multitasking skills. Although people from Arabian and Middle Eastern countries (group 1) have been described as having the capability to work comfortably on two tasks or more and being able to get organized on the different tasks they are performing, people from European countries (group 2) would rather perform and work more efficiently on only one task at a time. This can be explained by the cultural background of each individual (Usunier & Valette-Florence, 2007). Although they can have different load-processing approaches, people are subject to the same working memory load. The priority the former group gives to the performed task does not stand as the only determinant for this group, interaction itself is more important. Meanwhile, for the latter group, the priority is given to the tasks and time management (Usunier & Valette-Florence, 2007).

Individuals with polychronicity skills have the capability to easily run two or more tasks simultaneously, thereby inducing their ability to balance the allocated mental effort to the different tasks. Thus, their cognitive load and their working memory processing will be balanced and would not increase excessively. This guarantees that talented multitasking students are more effective on the different tasks they run. Thus, we test the following hypothesis:

H8a: Students with a high level of multitasking capabilities will not experience the presumed negative effect of Facebook use on their achievement.

H8b: Students with a high level of multitasking capabilities will not experience the presumed negative effect of cognitive absorption on their achievement.

Methodology

In order to test the proposed research model, an empirical study was conducted with undergraduate students from Luleå University of Technology (LTU) in Sweden. The scope of this study considers the use of Facebook. It analyzes this usage and its impact on the students in the Swedish context. A questionnaire was designed to consider this particular focus and mapped to apply specifically to the Swedish educational context. Examples from the measures used appear in Table 1.

Table 1. Examples of Measures

Constructs	Designation	Sample Measures	References
Social Networking Sites usage	**Facebook usage**	How frequently do you use Facebook? How much time do you spend on Facebook?	**Teo et al. (1999)**
Satisfaction With Life	**SWL**	In most ways, my life is close to my ideal.	**Diener et al. (1985)**
Cognitive Absorption	**CogAb**	**Temporal Dissociation** Time appears to go by very quickly when I am using the Web. **Focused Immersion** While using the Web, I am absorbed in what I am doing.	**Agarwal & Karahanna (1990)**
Student Achievement	**St Ach**	Grade point average (GPA)	**Appleton et al. (2006); Karpinski & Duberstein (2009)**
Personality traits	**Personality**	**Extraversion** I see my self as extraverted, enthusiastic **Conscientiousness** I see my self as dependable, self-disciplined **Neurotic** I see my self as anxious, easily upset **Openess to change** I see myself as open to new experience, complex **Agreeableness** I see myself as sympathetic, warm	**Gosling, Rentfrow & Swann (2003)**
Self-regulation	**Selfreg**	Most of the time I pay attention to what I am doing. I think a lot about how I'm doing.	**Brown, Miller & Lawendowski (1999)**

Constructs	Designation	Sample Measures	References
Trust	**Trust**	Most people answer personal questions honestly. Most people are honest in describing their experiences and abilities.	**Kanawattanachai & Yoo (2002)**
Performance-goal Orientation	**PoG**	I prefer to do things that I can do well rather than things that I do poorly. I'm happiest when I perform tasks on which I know that I won't make any errors.	**Button et al. (1996)**

Data collection

We used a paper-based survey in order to collect data from LUT undergraduate students. Students received the surveys during one of their lecture sessions and were asked to return them back to the same lecturer during the next session. This gave the students an interval ranging from three days to one week to answer the survey. Participation was voluntary for all students. Motivation was offered to the students (drawing for three smart phones). Students from three majors participated in this empirical study: business administration, social sciences, and engineering. Ultimately, 239 completed surveys were collected, representing an approximately 30% response rate.

Results and Discussions

We conducted a structural equation modeling analysis. We used SmartPLS Software, which allowed us to run the whole model and test the independencies at once. It also permitted us to test the moderating effect simultaneously as well. This section presents the measurement model, then the structural model results and analysis.

The measurement model

The constructs in the model have different psychometric characteristics and are all measured by reflective measures. They are represented either by a full scale or by a set of dimensions that have been measured through corresponding scales with reflective measures as well.

Convergent validity

First, an exploratory factor analysis (EFA) was performed for reflective scales in order to ensure the internal validity of constructs and dimensions (i.e., convergent validity). The EFA was run first with SPSS 18; results were confirmed through the corresponding factors loadings on SmartPLS where each items loaded significantly higher than 0.5 and thus correlated strongly with its corresponding construct. Table 2 summarizes the psychometric characteristics of the constructs.

Table 2. Psychometric properties: Factor loadings, AVE, and Cronbach's Alpha

Constructs	Measures	Loadings	T Statistics
Personality trait Orientation AVE: 0.74 α=0.65	Extrav	0.85	8.16
	Openne	0.87	12.75
Performance-Goal Orientation AVE: 0.54 α=0.88	PGO1	0.72	4.44
	PGO2	0.78	4.34
	PGO3	0.76	4.40
	PGO4	0.77	4.10
	PGO5	0.79	4.42
	PGO6	0.61	3.42
	PGO7	0.74	4.35
	PGO8	0.68	3.91
Polychronicity AVE: 0.61 α=0.70	Pol1	0.80	3.63
	Pol2	0.94	4.13
	Pol3	0.56	2.32
Self-Regulation AVE: 0.62 α=0.85	Eva	0.80	10.33
	Rec	0.84	10.55
	Ass	0.81	12.71
	Pla	0.77	8.47
	Tri	0.72	8.40
Satisfaction with Life AVE: 0.50 α=0.82	LS1	0.65	3.15
	LS2	0.66	3.61
	LS3	0.79	4.31
	LS4	0.63	4.02
	LS5	0.85	5.24
Trust AVE: 0.53 α=0.82	Tr1	0.67	3.87
	Tr2	0.68	3.89
	Tr4	0.81	6.33
	Tr5	0.73	5.92
	Tr6	0.83	5.68

Purified scales in Table 2 show that the constructs are well represented through their corresponding items. All loadings are higher than 0.5. The Cronbach's alpha is higher than or approaching 0.7 for all constructs. Table 2 also displays a confirmation of the convergent

validity through the average variance explained (AVE); all AVE values are equal to or greater than 0.5 (Fornel and Larcker, 1981). Thus, the purified items measure their corresponding dimensions and constructs well.

The explained percentages (R^2) of the dependent variables (Facebook use, cognitive absorption, satisfaction with life, and student's academic achievement) show that Facebook use is highly explained by the cognitive absorption ($R^2 = 22\%$) in addition to personality traits, self–regulation, and trust in people. This percentage in turn explains students' long hours on these networking websites and their engagement in this online social activity.

By focusing on Facebook usage (Facebook use and cognitive absorption on Facebook), satisfaction with life, and performance-goal orientation of the student, the proposed model explained 15% of the impact on students' academic achievement. Although not high, this percentage is still important to consider. Facebook use and cognitive absorption are only explained at a low level (5% and 4%, respectively) which shows that the presence on the social networking sites cannot be explained by personality traits, self-regulation, or trust exclusively. The cultural background, need for interaction, and platform interface features might also explain students' immersion in this social network.

Discriminant validity

Cross-loadings on PLS (see Table 3) indicate that each item measures its corresponding construct well rather than measuring the other constructs. Items are more correlated to their respective constructs rather than to other constructs in the model. This is further verified by comparing the square root of the AVE values to the correlation of the constructs with the rest of the constructs. Table 4 displays these values; the discriminant validity of these constructs is confirmed as the values of the square root of the AVEs are higher than the correlations.

Table 3. Cross-loadings

	Personality	SWL	PgO	Pol	Selfreg	Trust
Extrav	**0.85**	0.21	0.21	-0.10	0.28	-0.02
Openne	**0.87**	0.13	0.14	-0.14	0.32	0.02
LS1	0.28	**0.57**	0.14	0.03	0.20	0.15
LS2	0.21	**0.61**	0.13	0.02	0.23	0.25
LS3	0.28	**0.74**	0.21	-0.04	0.22	0.20
LS4	0.18	**0.67**	0.18	-0.09	0.20	0.12
LS5	0.07	**0.89**	0.15	-0.02	0.15	0.14
PGO1	0.20	0.24	**0.72**	0.10	0.41	0.17
PGO2	0.07	0.14	**0.78**	0.07	0.23	0.16
PGO3	0.23	0.27	**0.76**	0.01	0.36	0.20
PGO4	0.11	0.13	**0.77**	0.00	0.32	0.14
PGO5	0.20	0.11	**0.79**	0.06	0.28	0.11
PGO6	0.07	0.13	**0.61**	0.11	0.34	0.16
PGO7	0.11	0.15	**0.74**	0.01	0.36	0.11
PGO8	0.15	0.08	**0.68**	0.05	0.23	0.02
Pol1	-0.20	-0.06	0.00	**0.80**	-0.08	-0.02
Pol2	-0.08	-0.01	0.05	**0.94**	-0.06	0.04
Pol3	-0.10	-0.02	0.08	**0.56**	0.09	0.04
Ass	0.24	0.20	0.37	-0.03	**0.81**	0.02
Eva	0.27	0.19	0.44	0.00	**0.80**	0.07
Rec	0.28	0.18	0.26	-0.08	**0.84**	0.13
Pla	0.35	0.31	0.27	-0.07	**0.77**	0.05
Tri	0.25	0.04	0.34	-0.01	**0.72**	0.00
Tr1	0.00	0.22	0.16	0.03	0.07	**0.67**
Tr2	-0.02	0.20	0.03	-0.06	-0.01	**0.68**
Tr4	-0.01	0.15	0.12	0.05	0.03	**0.81**
Tr5	-0.04	0.13	0.05	0.01	0.02	**0.73**
Tr6	0.03	0.12	0.18	0.01	0.12	**0.83**

Table 4. Discriminant validity

	Personality	PgO	Pol	SWL	Selfreg	Trust
Personality	**0.86**	0	0	0	0	0
PgO	0.20	**0.73**	0	0	0	0
Pol	-0.14	0.05	**0.78**	0	0	0
SWL	0.20	0.21	-0.03	**0.71**	0	0
Selfreg	0.35	0.42	-0.05	0.23	**0.79**	0
Trust	0.00	0.18	0.03	0.20	0.08	**0.75**

All reflective constructs (personality traits, self-regulation, trust, Facebook use, cognitive absorption, life satisfaction, polychronicity, and performance-goal orientation) have shown convergent and discriminant validities.

Structural Model

The inner validity of the constructs was confirmed through the convergent-content validity of the scales. Their outer validity was also established through discriminant validity as each item was shown to measure its corresponding construct consistently rather than measuring other constructs in the model. Therefore, we analyzed the interdependencies tested in the model by examining the path and total effects results.

Path analysis

The path analysis (see Table 5) indicates that personality traits (extraversion and openness to change) significantly affect the time spent on the networking site (pc= 0.23, T= 3.82), but not the immersion status (pc= 0.03, T=0.58) of the student while surfing and interacting on this platform. Extraverted and open personality traits significantly represented the characteristics of the students using Facebook the most (AVE= 0.74, α=0.65). Agreeable, conscientious, and neurotic students were not sufficiently represented in our sample, which means the nature of their presence and activities on Facebook could not be studied. The results based on perceived impact partially confirmed the results presented in earlier exploratory studies by Kaspernski and Duberstein (2009) and Canales et al. (2009). Indeed, self-regulated students, in accordance with the expected attitude of conscientious students, limit their presence on and usage of these sites.

Table 5. Path coefficients—Direct effects

Path coefficients (pc)	Original Sample	T Statistics	Hypotheses
Personality -> CogAbs	0.03	0.58	H1a: Rejected
Personality -> Fuse	**0.23****	**3.82**	**H1b: Accepted**
Selfreg -> CogAbs	**0.14***	**1.92**	**H2a: Accepted**
Selfreg -> Fuse	**-0.17****	**2.49**	**H2b: Accepted**
Trust -> CogAbs	0.11	1.51	H3a: Rejected
Trust -> Fuse	**-0.10***	**1.76**	**H3b: Accepted**
Fuse -> St Achi	**-0.14****	**2.14**	**H4a: Accepted**
CogAbs -> St Achi	**-0.22****	**3.43**	**H4b: Accepted**
CogAbs -> Fuse	**0.41****	**6.51**	**H5: Accepted**
CogAbs -> SWL	**-0.16****	**2.04**	**H6a1: Accepted**
Fuse -> SWL	0.04	0.70	H6a2: Rejected
SWL -> St Achi	0.09	1.55	H6b: Rejected
PgO -> St Achi	**0.10***	**1.92**	**H7: Accepted**
CogAbs * Pol -> St Achi	**0.12****	**2.13**	**H8a: Accepted**
Fuse * Pol -> St Achi	-0.07	1.22	H8b: Rejected

Self-regulation significantly affects both students' presence on Facebook (pc= -0.17, T= 2.49) and their immersion on this leisure activity (pc= 0.14, T= 1.92). However, trust in people does not significantly determine students' absorption in the online social networking activity, although it significantly affects the time spent on Facebook. Students who trust other people may spend long hours interacting on Facebook, but they would not be cognitively immersed in this activity. They are not highly cognitively involved in the different tasks they perform.

Students' presence on the online networking and their cognitive absorption negatively impact their academic achievement (respectively, pc= -0.14, T= 2.14 and pc= -0.22, T= 3.43) as perceived by the undergraduate students. Furthermore, the inability of some students to manage multitasks simultaneously increases their cognitive immersion on the task that attracts the most of their attention on the platform (e.g., surfing and Facebook interactions), but not the number of hours spent. In addition, satisfaction with life does not have a considerable effect on students' academic performance. The results indicate that their Facebook use and interest enhance their satisfaction with life as they can catch up with friends, find older ones, and keep updated about both friends and family members.

Meanwhile, performance-goal orientation has a significant positive effect on students' achievements. Enhanced goal orientation is defined by the desire and the motives to learn, complete academic tasks, and acquire skills in problems solving and continuous academic development (Erez, 2005; McGrew, 2008), which incite students to perform well in class and pursue academic achievement.

Finally, we conclude the total effects of social networking site usage and cognitive absorption on students' achievement (see Table 6), which demonstrates whether the argued factors (self-regulation, performance-goal orientation, polychronicity, and satisfaction with life) reduce the presumed negative effect of the presence on the networking platforms on academic achievement.

Table 6. Total effects

Total effects	Path coefficients	T Statistics
CogAbs -> Fuse	0.41**	6.51
CogAbs -> St Achi	-0.29**	5.08
Fuse -> St Achi	-0.14**	2.04
Personality -> Fuse	0.25**	4.04
Selfreg -> Fuse	-0.12*	1.65

Personality traits, as represented in this study (extraverted and open students), and self-regulation significantly determine the use of Facebook. In turn, Facebook use negatively affects students' academic performance (pc= -0.29, p<0.05). Moreover, high cognitive immersion induces similar effects (pc=-0.14, p<0.05). In addition, cognitive absorption itself increases Facebook use (pc= 0.41, p<0.05), which means that the more students are immersed and engaged in this platform, the more time they will spend on it at greater frequencies.

Conclusion: Contributions, limitations, and further research

This study attempted to measure the perceived impact of the presence and use of the social networking site Facebook by undergraduate students at Luleå University of Technology on their academic achievement. The expected results demonstrated the perception of the use of this online platform in a particular cultural and academic context and its preliminary impact. We analyzed the role of trust in people, self–regulation, and personality traits in enhancing one's presence on Facebook. We then analyzed whether extensive cognitive load would increase the presence on this site and if both would negatively impact students' academic results. The role of polychronicity, satisfaction with life, and performance-goal orientation in reducing the presumed negative effect of online social networking and enhancing the students' academic achievement was tested as well.

The results confirm the assumption that immersion and engagement in this social activity increases time spent on the website and that even spending 5 to 10 hours a week on Facebook could decrease students' focus and effort on assignment preparation. This effect can be explained by the split attention effect on two tasks that students try to perform simultaneously. Extraverted and open students appear to be more concerned by such effects. Students who are self-regulated are in control of their presence on these websites, which limits the ultimate negative effect. Indeed, as self-regulation characterizes the conscientious personality trait, it delineates the behavior and attitude that people with such a personality

reflect, thereby offering insights into the probable attitude of conscientious students on these platforms, although this was not tested in the present study.

Furthermore, although Swedish students naturally trust people (Lolle & Torpe, 2010, 2011; Uslaner & Badescu, 2002), this trait seems to not encourage their presence on social networking sites. According to the results presented by Uslaner (2000), trust does not always matter in technology-mediated relationships, which implies that building online relationships is basically not determined by trust in people. Students' active presence on Facebook can be explained by a need for interaction and socialization that individuals do not experience in their daily lives.

Multitasking-skilled students do not experience the impact of extended presence on Facebook on their cognitive absorption as polychronicity significantly moderates this interdependence. Yet satisfaction with life significantly increases one's presence on and attraction to social networking platforms, although it does not represent a significant enhancer of students' academic achievement—although the latter is improved with students' high performance-goal orientation.

Contributions

The present study applied flow theory to immersion into a new social networking site (i.e., Facebook) as an online social activity that has recently attracted the attention of the mostly young generation (more than 60% of the individuals that form the Facebook community, for example, are younger than 34 years old). Engaged in such an online platform, users seem to perform better in online social activities than on any other task, including assignments. As a result, students appear to experience degraded academic achievement.

The current study offered a conceptual and analytical analysis of students' usage of social networking sites, presence and interaction on these platforms as a leisure activity, and absorption and eventual impact on their academic achievements based on the flow theory. Considering the initial academic level of each student, we considered the perceived variation in their results as observed before and after they started to network on Facebook. The empirical tests of the hypotheses provided considerable results from the Swedish context, which is considered one of the more highly connected countries as internet access is available

to 92.5% of the population (Internet World Stats, 2010). These results help students understand the preliminary effect of these new technologies, including the extent and conditions to which this applies.

Limitations

The primary limitations are the small size of the sample (239 students) and the context of the study—namely, a specific university in Sweden, where both the region and the students have very specific environmental and personality characteristics, respectively. The university admits predominantly northern resident and exchange students who select Luleå University of Technology to experience life in the cold weather and winter sports. The Norrbotten region in which the university is located is characterized by snow and cold weather for about eight months a year and very hushed atmosphere that provokes a retort from students who need to interact and socialize. This explains why the sample included more students who are open to new experiences and extraverted students and, thus, could not be representative of the five individual personality traits.

Further research

It would be appropriate to observe whether students in other Swedish universities experience the same effect on their studies. Another Swedish university in southern Sweden has a social environment thoroughly different from the north. Furthermore, it would be of interest to examine whether students living in another cultural context would experience the same effect; thus, we recommend that other similar study with undergraduate students be conducted in another cultural context, in a country that presents a dissimilarity in the personalities traits of its individuals and in the social background. Such a study would discern whether a disparity exists in behaviors on online social networking sites. It will also enable the observation of whether individuals experience dissimilar effects due to cultural and environmental differences.

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