



## Effect of online social networking on student academic performance

Jomon Aliyas Paul<sup>\*</sup>, Hope M. Baker<sup>1</sup>, Justin Daniel Cochran<sup>2</sup>

Kennesaw State University, Kennesaw, GA 30144, United States

### ARTICLE INFO

#### Article history:

Available online 11 July 2012

#### Keywords:

Online social networking  
Theory of planned behavior  
Twitter  
Facebook  
Structural equation modeling

### ABSTRACT

Online social networks (OSNs) have permeated all generations of Internet users, becoming a prominent communications tool, particularly in the student community. Thus, academic institutions and faculty are increasingly using social networking sites, such as Facebook and LinkedIn, to connect with current and potential students and to deliver instructional content. This has led to a rise in questions about the impact of OSN on academic performance and the possibility of using it as an effective teaching tool. To learn more about the impact on academic performance, we conducted a survey of business students at a large state university. Survey results were analyzed using structural equation modeling (SEM). The results revealed a statistically significant negative relationship between time spent by students on OSN and their academic performance. The time spent on OSN was found to be heavily influenced by the attention span of the students. Specifically, we determined that the higher the attention span, the lower is the time spent on OSN. Further, attention span was found to be highly correlated with characteristics that predict or influence student behavior, such as their perceptions about society's view of social networking, their likes and dislikes of OSN, ease of use of OSN, etc.

© 2012 Elsevier Ltd. All rights reserved.

### 1. Introduction

Online social networking (OSN) sites, such as Facebook, Twitter and MySpace, are used on a regular basis by many millions of people. A major proportion of this online networking community is made up of college students. In fact, a recent survey of 3000 students from across the US revealed that 90% of college students use Facebook and 37% use Twitter (Dahlstrom, de Boor, Grunwald, & Vockley, 2011). Given the popularity of OSN, a number of universities are using it to market programs and communicate with current and perspective students and alumni. Some professors are beginning to use OSN in hopes of positively influencing the outcomes of class discussions and teamwork on projects and improving learning outcomes via better communication with and among students in their classes. However, recent studies reveal that over-involvement or obsession with social networking by students can have negative impacts on academic performance (Kirschner & Karpinski, 2010). This has spurred discussion among faculty across disciplines and from different universities about the effectiveness and viability of OSN as a teaching tool.

Picture the typical undergraduate classroom in which the instructor's goal is to create an engaging environment that stimulates deep learning. At least half of the students have a laptop

or tablet before them and almost all have a smartphone either sitting on their desk or very close at hand. Faculty opinions on the use of laptops, in classes for which they are not required, range from "no problem" to "absolutely not allowed." When challenged, students claim they are "taking notes" on these devices, even in highly quantitative classes where many formulae and symbols are used. However, a random walk about the room would reveal that most are browsing the Internet and are, most likely, on Facebook. Even, during class sessions when all students are using computers for class-related tasks, many tend to be on Facebook instead of following along with the demonstration. It is also very common to see students sending text and email messages on their phones during class. Some are even bold enough to answer a phone call in class although most professors do draw the line at that. This behavior not only prevents the offenders from fully engaging in the class, more conscientious students have complained that it is distracting to observe fellow students browsing on sites unrelated to the class.

Our personal experiences in the classroom lead us to believe there is a negative correlation between grades and time spent on laptops, tablets and cell phones during class. Students using these devices typically ask more questions about things covered earlier in the class period and more frequently claim that instructions about assignments were not made clear. This leads to interesting pedagogical questions. Should instructors ban all use of such technology during classes if it is not an integral part of the lesson plan? Should it be assumed that students are adults and are responsible for their own learning and, thus, let them do what they want while in class? Should faculty take the "if you can't beat them, join them" tact and incorporate OSN into the classroom experience?

<sup>\*</sup> Corresponding author. Tel.: +1 770 423 6086.

E-mail addresses: [jpaul17@kennesaw.edu](mailto:jpaul17@kennesaw.edu) (J.A. Paul), [hbaker@kennesaw.edu](mailto:hbaker@kennesaw.edu) (H.M. Baker), [jcochr48@kennesaw.edu](mailto:jcochr48@kennesaw.edu) (J.D. Cochran).

<sup>1</sup> Tel.: +1 770 423 6307.

<sup>2</sup> Tel.: +1 678 797 2677.

Outside of the classroom, there is anecdotal evidence of students' lessening ability to manage their time effectively. More and more procrastinate in getting started on assignments resulting in requests for extensions and in late submissions. A very common complaint among faculty is that students are not taking the time to read the assigned material. Students have a greater tendency to expect to learn all they need to know either solely within class or with very little out-of-class study time. The average attention span seems to be lessening as students quickly get frustrated and ask for help before attempting to thoroughly read the supporting text and work through practice sets provided by the instructor. As the percentage of the population enrolled in college has risen over the past 20 or so years, the average college student (1) spends more hours working to pay for school and living expenses, (2) is older and (3) is more likely to have a family to support. So, it is possible that students simply have fewer hours to devote to school-related activities rather than having shortened attention spans or less effective time management skills. It is also possible that the increased amount of time students are spending on OSN sites is having a negative impact on their out-of-class study time.

In conversations with faculty at our institution and from similar universities across the country, we realized the experiences described above are universal. Faculty are concerned about students' seemingly increasing lack of interest in and focus on their educational experience. Instructors increasingly feel as if they must be "entertainers" to fully engage students and convince them of the relevance of their course content. The larger issue to be addressed is how, and if, faculty and institutions can effectively change students' behavior, and whether they should. Assuming satisfactory academic performance is the ultimate measurable objective, the first step to be taken is to define the underlying factors, behavioral and circumstantial, that lead to academic achievement on an individual level.

The purpose of this study is to develop a general framework or model that defines the key drivers, direct and indirect, of academic performance. Of particular interest is the impact time spent on OSN has on academic performance. Observations of students and a search of current literature indicate that academic performance is a function of attention span, time management skills, student characteristics, academic competence and time spent on OSN. Student characteristics include age, gender, marital and family status, work requirements, major and type of student (traditional, hybrid or online). Academic competence is defined as a student's ability to manage the required course load and course materials for his/her chosen field of study. To fully develop the model, a behavioral component was added that includes the three variables, attitude toward use of OSN, perceived behavioral control (over the use of OSN) and subjective norms related to the use of OSN, such as peer pressure, societal expectations, etc. Due to the degree of inter-relatedness of the variables listed above, a structural equation modeling approach is taken in which the model constructs are the relationships between pairs of variables.

In summary, the objectives of this study, and hence the motivation behind designing the proposed model, is to (1) test the if time spent on OSN negatively impacts academic performance, (2) identify the variables that directly and indirectly impact time spent on OSN and academic performance and (3) indicate relationships between the exogenous variables. Specifically, the main research questions which form the hypothesis of the SEM models are as follows:

RQ1: Does time spent on OSN have a significant impact on academic performance?

RQ2: Does attention span have a significant impact on academic performance?

RQ3: Do student characteristics have a significant impact on academic performance?

RQ4: Does academic competence have a significant impact on academic performance?

RQ5: Do predictors of student behavior have a significant impact on academic performance?

RQ6: Do time management skills have a significant impact on academic performance?

RQ7: Do student characteristics, time management skills, attention span, etc. have an impact on time spent on OSN?

These research questions are based on our personal experiences and evidence from extant literature and are the primary focus of this study. The ultimate goal is to use the results, and answers to the questions, to (1) whether students should make appropriate behavioral changes to their online social networking outside of class and (2) provide decision support information for faculty who plan to incorporate OSN into their curriculum.

## 2. Literature review

The study of factors affecting academic performance has been widely researched over the years. These studies have focused on the effect of factors such as academic competency, time management skills, study strategies, student characteristics, etc. (Margrain, 1978; Mizerski & Pettigrew, 2003; Sangsiry, Kawatkar, Dutta, & Bhosle, 2004; Trueman & Hartley, 1996, to name a few) on academic performance. Trueman and Hartley (1996) found that women and older students have better time management skills. Similarly, Mizerski and Pettigrew (2003) show that women and older students perform better academically. Sangsiry et al. (2004) identifies academic competency, time management and study strategies as significant drivers of academic performance. In Kleijn, Ploeg, and Topman (1994), the authors state that higher levels of academic competency lead to better academic performance. Lay and Schouwenburg (1993) found that good time management skills are key to academic performance. On another level, neuroscientist Susan Greenfield (Wintour, 2009) warned of the negative effect of OSN on the attention span of kids. Although attention span has not been directly linked to academic achievement of students, an indirect association seems to exist, as demonstrated in the following studies: Barkley (2006) and DuPaul and Volpe (2009) focus on the effect of attention deficit disorder on student achievement; Johnstone and Percival (1976) and Wilson and Korn (2007) study the effect of class duration on the attention span of students.

In the wake of the recent popularity of online social networking and its increasing usage among the student community, research on the effect of OSN has also gained considerable traction. For example, a recent article by Kirschner and Karpinski (2010) concluded that use of Facebook negatively affects GPA and study time spent per week. In another related study, Zhong, Hardin, and Sun (2011) studied the effect of personality traits on the use of Facebook. They found that users with high need for cognition use Facebook less while those with high information and technology innovativeness were highly likely to spend more time on Facebook. While extant research has studied the effect of OSN on academic performance, a detailed analysis focusing on the key research questions discussed in the introduction section is missing. This study aims to bridge this gap in the extant literature.

In order to affect changes in student behaviors that might improve academic performance, it is important to know what drives their sometimes obsessive use of OSN. There is not a great deal of published research related to such factors. Baker and White (2010) applied Ajzen's theory of planned behavior (TPB) model to predict the use of OSN among adolescents. Ajzen's TPB model was devel-

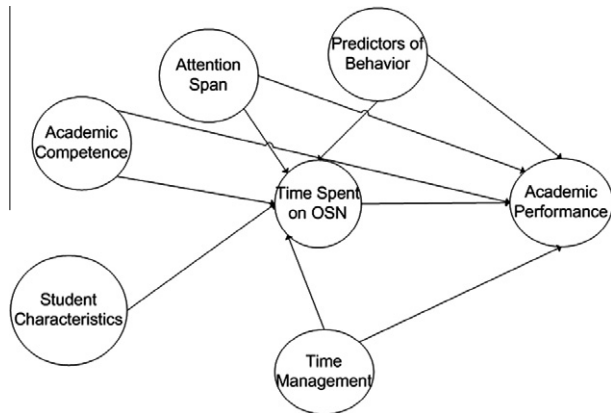


Fig. 1. Basic model.

oped to predict intentions to engage in certain behaviors and, subsequently, to predict actual engagement in the behaviors (Ajzen, 1991). The three variables used to predict intention are attitude toward the behavior in question, perceived behavioral control (PBC) over the behavior and subjective norms surrounding the behavior. Baker and White (2010) found the variables attitude and planned behavioral control to be significant in predicting the intent to use OSN. They discovered the variable subjective norms (a person's perception that others believe he or she should engage in the behavior) was not significant but the variable group norms (the expected behavior of his or her social group) was significant. As they point out, adolescents and college students adhere more to group norms. Interestingly, Baker and White (2010) also found that age and gender are not significant factors in predicting OSN usage. In contrast, a later study by Cameron (2010) found that TPB was not useful in determining the intentions of college students to use OSN. It is not the intention of this study to test the usefulness of TPB to predict the intention to use OSN. However, given the demonstrated link between the variables that predict behavior on time spent on OSN, we include them as a "Predictors of Behavior" construct in the proposed model.

As mentioned earlier, the factors in the proposed model have the potential to be interactive and overlapping, making it more difficult to discern the strength and direction of relationships between them. Thus, a structural equation modeling (SEM) approach was chosen for analysis purposes. SEM is a powerful alternative to multiple regression in that it simultaneously considers numerous multiple regression models for which variables can be independent in some models and dependent in others. Multicollinearity and interdependency between all variables included in the overall model are taken into account. This method is explained in detail in Hair, Anderson, Tatham, Babin, and Black (2005). SEM has been applied successfully for similar problem settings in a wide variety of fields including psychological research (MacCallum & Austin, 2000), behavioral finance (Lu, Song, & Li, 2010), economics (Buehn & Schneider, 2009), etc.

Based on the research questions (RQ1–RQ7) that we highlight in the introduction section, Fig. 1 presents the basic model we investigate in the next section using SEM technique.

### 3. Methodology

Survey questions measuring each of the constructs (Time Spent on OSN (TS), Predictors of Behavior (PB), Time Management Skills (TM), Academic Competency (AC), Attention Span (AS), Student Characteristics (SCs) and Academic Performance (AP)) were developed building on extant literature and discussions with fellow

faculty within a business school. For instance, questions that best capture the factors which explain students' online networking behavior were found in Cameron (2010). Similarly, (Margrain, 1978; Mizerski and Pettigrew, 2003; Sansgiry et al., 2004; Trueman and Hartley, 1996) helped us with questions related to factors such as academic competency, time management skills, study strategies, student characteristics, etc. The study by Trueman and Hartley (1996) suggested the inclusion of gender as an important variable explaining time management skills. The literature discussed above and our personal experiences serve as the basis for the survey questionnaire. The complete questionnaire is provided in Appendix A.

The sample includes undergraduate students enrolled in business school courses. In order to get a good representation of the student population, an equal number of lower, middle and upper level classes were included. Data was collected from fifteen total sections of six different classes using an anonymous survey instrument that was made available to the students via the Qualtrics survey software. Table 1 contains a summary of the characteristics of the 340 valid survey responses. This sample is a good representation of students in this college of business, in which the gender divide is about 50–50 and consists of slightly older students (average age of 26.7 years versus 24 for the university) than the general university student body.

#### 3.1. Model analysis

We first performed a confirmatory factor analysis to validate and confirm our theoretical model built using IBM, SPSS AMOS (version 19) software. The initial model is presented in Fig. 2. The analysis indicated a poor fit and several of the factor loadings were below the minimum limit of 0.5, as shown in 2. For example, the factor loading for AC1 (Variable 1 for the Academic Competence construct) was 0.486. Additionally, several regression weights were statistically insignificant ( $p$ -value >0.05) and RMSEA and chi-square ( $C_{min}/df$ ) statistics were greater than 0.08 and 3 respectively. The fit indices for the initial model are presented in Table 3.

After deleting variables with low factor loadings one at a time, we obtained the reduced measurement model. We retained a few variables in spite of their low factor loadings mainly to avoid under-dependency of the construct on its measurement variables (Hair et al., 2005). Under-dependency occurs when there are not enough variables to effectively define a construct. This improvement can be noted by comparing Tables 2 (Initial Model) and 4 (Reduced Model). The convergent validity (variance extracted) and construct reliability results are presented in Table 5. As can be noted, these results are acceptable as they surpass the minimum limits of 0.5 and 0.7 respectively. The only exceptions to this were: TS, TM and AP, which were just out of range, but retained. This was mainly because of retaining variables with lower factor loadings, as doing otherwise would have resulted in under-dependency of the construct on its measurement variables. In addition, the fit indices

Table 1  
Characteristics of sample data.

Variable	Sample results
Gender	48% males/52% females
Average age	26.73 years
Range of ages	18–67 years
Marital status	69% single/30% married/1% other
Average # of children	0.42
Percentage with children	24%
Average GPA	3.19 (4.0 scale)
Average time as Facebook user	4.87 years

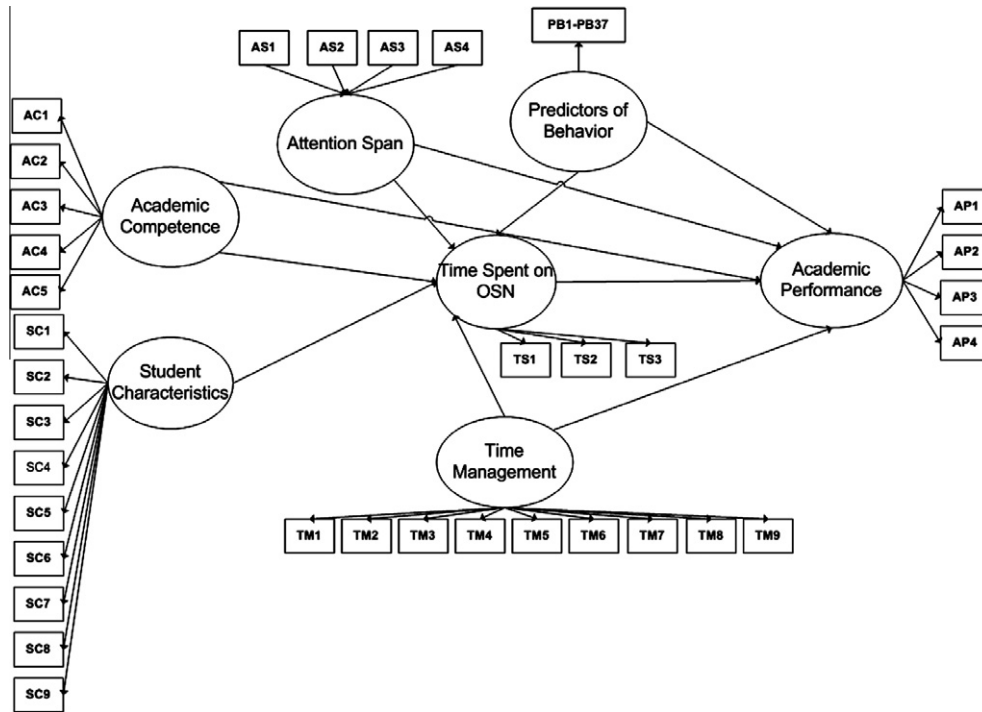


Fig. 2. Initial model.

Table 2  
Factor Loadings (Initial Model).

Variable	Construct	Factor loading	Variable	Construct	Factor loading
AC5	← Academic_competence	0.536	PB2	← Predictors_behavior	0.61
AC4	← Academic_competence	0.645	PB3	← Predictors_behavior	0.582
AC3	← Academic_competence	0.608	PB4	← Predictors_behavior	0.628
AC2	← Academic_competence	0.532	PB5	← Predictors_behavior	0.63
AC1	← Academic_competence	0.486 <sup>a</sup>	PB6	← Predictors_behavior	0.558
SC7	← Student_characteristics	0.152 <sup>a</sup>	PB8	← Predictors_behavior	0.127 <sup>a</sup>
SC6	← Student_characteristics	0.836	PB9	← Predictors_behavior	0.56
SC5	← Student_characteristics	0.368 <sup>a</sup>	PB10	← Predictors_behavior	0.664
SC4	← Student_characteristics	0.701	PB11	← Predictors_behavior	0.068 <sup>a</sup>
SC3	← Student_characteristics	0.774	PB12	← Predictors_behavior	0.643
SC2	← Student_characteristics	0.031 <sup>a</sup>	PB13	← Predictors_behavior	0.669
SC1	← Student_characteristics	0.313 <sup>a</sup>	PB14	← Predictors_behavior	0.634
TS1	← Time_OSN	0.677	PB15	← Predictors_behavior	0.498 <sup>a</sup>
TS2	← Time_OSN	0.644	PB16	← Predictors_behavior	0.442 <sup>a</sup>
TS3	← Time_OSN	0.684	PB17	← Predictors_behavior	0.579
TM9	← Time_management	0.721	PB18	← Predictors_behavior	0.062 <sup>a</sup>
TM8	← Time_management	0.439 <sup>a</sup>	PB19	← Predictors_behavior	0.436 <sup>a</sup>
TM7	← Time_management	0.65	PB20	← Predictors_behavior	0.571
TM6	← Time_management	0.488 <sup>a</sup>	PB21	← Predictors_behavior	0.594
TM5	← Time_management	0.571	PB22	← Predictors_behavior	0.302 <sup>a</sup>
TM4	← Time_management	0.362 <sup>a</sup>	PB23	← Predictors_behavior	0.387 <sup>a</sup>
TM3	← Time_management	0.053 <sup>a</sup>	PB24	← Predictors_behavior	0.197 <sup>a</sup>
TM2	← Time_management	0.255 <sup>a</sup>	PB25	← Predictors_behavior	0.303 <sup>a</sup>
TM1	← Time_management	0.035 <sup>a</sup>	PB26	← Predictors_behavior	0.456 <sup>a</sup>
AS4	← Attention_span	0.153 <sup>a</sup>	PB27	← Predictors_behavior	0.185 <sup>a</sup>
AS3	← Attention_span	0.673	PB28	← Predictors_behavior	0.646
AS2	← Attention_span	0.617	PB29	← Predictors_behavior	0.55
AS1	← Attention_span	0.718	PB30	← Predictors_behavior	0.402 <sup>a</sup>
AP1	← Academic_performance	0.802	PB31	← Predictors_behavior	0.472 <sup>a</sup>
AP2	← Academic_performance	0.66	PB32	← Predictors_behavior	0.639
AP3	← Academic_performance	0.193 <sup>a</sup>	PB33	← Predictors_behavior	0.637
AP4	← Academic_performance	0.356 <sup>a</sup>	PB34	← Predictors_behavior	0.612
SC8	← Student_characteristics	0.46 <sup>a</sup>	PB35	← Predictors_behavior	0.572
SC9	← Student_characteristics	0.189 <sup>a</sup>	PB36	← Predictors_behavior	0.697
PB1	← Predictors_behavior	0.557	PB37	← Predictors_behavior	0.732
			PB7	← Predictors_behavior	0.005 <sup>a</sup>

<sup>a</sup> Indicates the variables with factor loading below 0.5.



**Table 3**  
Fit Metrics (Initial Model).

Goodness of fit index	Estimated value
$\chi^2/df$	3.068
RMSEA	0.085
CFI	0.508
GFI	0.473
NFI	0.414

were within acceptable limits. For example, RMSEA was 0.078 and chi-square statistic ( $C_{min}/df$ ) was equal to 2.98.

Since the reduced model showed acceptable results, we then focused on verifying and estimating the theoretical model of significant relationships. This measurement model was arrived at as per guidelines provided in Hair et al. (2005). Specifically, we developed this model after eliminating insignificant relationships between constructs and adding paths acting on recommendations due to modification indices. In other words, while the initial model indi-

cated additional paths between constructs, some of these were dropped because they were insignificant. The SEM model that includes the significant relationships between the constructs studied and corresponding results is provided in Fig. 3.

In the reduced model shown in Fig. 3 there are nine variables within the predictors of planned behavior construct that measure attitude toward OSN, perceived behavioral control over the use of OSN and subjective norms surrounding OSN as well as intention to use OSN. Academic performance is measured by recent grades and cumulative GPA. The relevant student characteristics are age, marital status and number of children. The student characteristics removed from the initial model due to low factor loadings were working hours, gender, type of learner, history and level of use of Facebook and academic major.

3.2. Results of SEM model

The results presented in Table 6 are the confirmed relationships as all the *p*-values are less than or equal to 0.05. The survey ques-

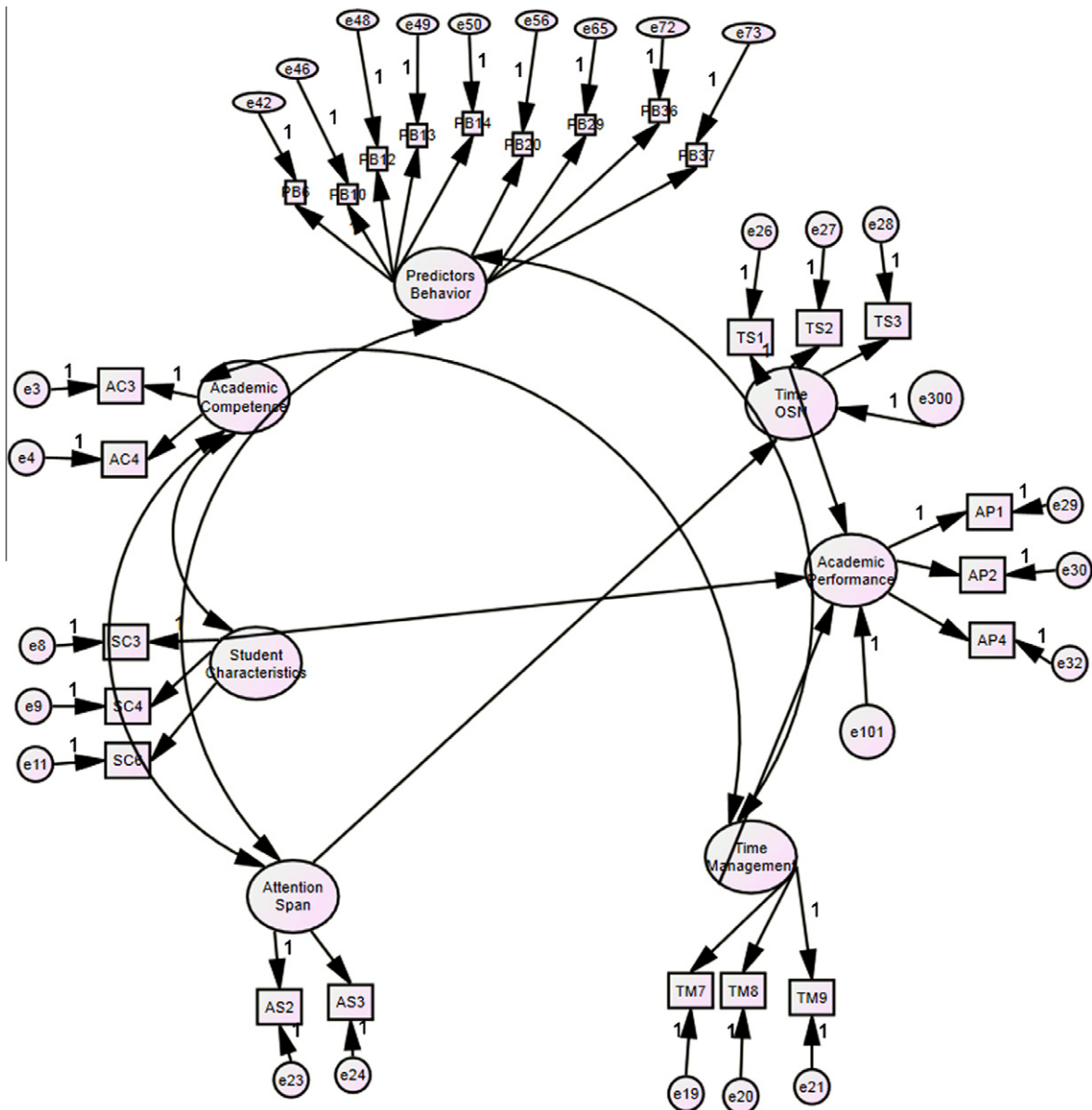


Fig. 3. SEM model.

**Table 4**  
Factor Loadings (Reduced Model).

Variable	Construct	Factor loading
PB6: OSNS helps me be productive in my study time	← Predictors_behavior	0.657
PB10: I consider OSNS to be a good study tool	← Predictors_behavior	0.757
PB12: OSNS provide an effective mechanism for communicating about course topics with my professors.	← Predictors_behavior	0.707
PB13: I feel that I will miss out on useful course information if I do not engage in OSNS communication with classmates and/or my professors	← Predictors_behavior	0.79
PB14: I find it frustrating when my classmates do not use OSNS to communicate information about course topics	← Predictors_behavior	0.691
PB20: My professors expect me to use OSNS to communicate with them about course topics	← Predictors_behavior	0.745
PB29: I know how to use OSNS as an effective study tool	← Predictors_behavior	0.651
PB36: I plan to use OSNS to more effectively manage my study time	← Predictors_behavior	0.77
PB37: I intend to improve my academic performance over the next year by effectively using OSNS as a study tool	← Predictors_behavior	0.846
AP1: My overall GPA is ____	← Academic_performance	0.925
AP2: My average grade from last semester was	← Academic_performance	0.572
AP4: My average grade in the last three face-to-face classes I took was	← Academic_performance	0.301
AS3: I often check OSNS in the middle of working on a school or work assignment.	← Attention_span	0.463
AS2: While at work I check OSNS ____ times.	← Attention_span	0.599
TM9: I have good time management skills	← Time_management	0.454
TM8: I have enough time to complete my school assignments as thoroughly as I would like	← Time_management	0.546
TM7: I find it easy to organize study and leisure time	← Time_management	0.967
SC6: My age is ____	← Student_characteristics	0.783
SC4: My marital status is	← Student_characteristics	0.694
SC3: I have ____ children	← Student_characteristics	0.852
AC4: I am enjoying all of the classes offered in the BBA curriculum	← Academic_competence	0.837
AC3: I find the courses taught in the business school interesting	← Academic_competence	0.678
TS1: The amount of time (in hours) I spend on OSNS on a daily basis is ____	← Time_OSN	0.592
TS2: The average amount of time (in minutes) I spend, per class, on OSNS while attending class is ____	← Time_OSN	0.665
TS3: For every 8 h I spend at work, I spend ____ in hours on OSNS	← Time_OSN	0.764

**Table 5**  
Reliability (reduced model).

	AC	SC	TS	TM	AS	AP	PB
Variance extracted	0.58	0.61	0.46	0.48	0.54	0.42	0.54
Construct reliability	0.73	0.82	0.72	0.72	0.77	0.73	0.85

tions related to the attention span construct that remain in the final confirmed model, as shown in Table 4, are scored such that higher scores indicate attention deficit rather than increased attention span. Thus, the attention span construct is renamed as attention deficit from here onto avoid confusion. The fit metrics presented in Table 7 indicate a good fit for the final model.

**4. Discussion**

Using the results presented in Table 6, we address the research questions posed earlier in the paper. In some cases, there is evidence of direct relationships between variables while in others the relationships are indirect.

**Table 6**  
Relationships confirmed (final model).

			Estimate	SE	P-value
Time_OSN	←	Attention_deficit	0.445	0.065	<sup>a</sup>
Academic_performance	←	Time_OSN	-0.119	0.06	0.048
Academic_performance	←	Time_management	0.144	0.061	0.019
Academic_performance	←	Student_characteristics	0.125	0.032	<sup>a</sup>
Attention_deficit	↔	Academic_competence	-0.083	0.037	0.026
Predictors_behavior	↔	Attention_deficit	-0.352	0.063	<sup>a</sup>
Time_management	↔	Academic_competence	0.033	0.016	0.039
Student_characteristics	↔	Academic_competence	0.061	0.031	0.05
Predictors_behavior	↔	Time_management	-0.038	0.016	0.02

Two headed (↔) connections indicate covariance between constructs. One headed (←) connectors indicate a causal path from a construct to an indicator (measured) variable. <sup>a</sup> Indicates p-value less than 0.001.

**Table 7**  
Fit metrics (final model).

Goodness of fit index	Estimated value
$\chi^2/df$	2.171
RMSEA	0.059
CFI	0.903
GFI	0.880
NFI	0.835

*RQ1: Does time spent on OSN have a significant impact on academic performance?*

Time spent on OSN is shown to negatively impact academic performance. As time spent on social networking sites increases, the academic performance of the students is seen to deteriorate. This ties in well with findings presented in Kirschner and Karpinski (2010).

*RQ2: Does attention span have a significant impact on academic performance?*

As mentioned earlier, we renamed the attention span variable as attention deficit to avoid confusion. The results indicate a statistically significant relationship between time spent on OSN and attention deficit. Increased levels of attention deficit resulted in increased time spent on OSN. As we also found that time spent on OSN negatively impacts academic performance, there is an indirect relationship between attention deficit and academic performance, implying that increased levels of attention deficit have a negative, although indirect, impact on academic performance.

*RQ3: Do student characteristics have a significant impact on academic performance?*

There is a positive and statistically significant relationship between academic performance and the student characteristics construct. In other words, age, marital status, and # of children are related to academic performance. It is not possible to separate out the marginal impact of each student characteristic with these model results, so the precise nature of the relationships between such variables and academic performance will be the focus of future extensions of this research effort. The significant relationship between student characteristics and academic performance reprises findings reported in extant literature (Margrain, 1978).

*RQ4: Does academic competence have a significant impact on academic performance?*

There is a positive, but indirect, relationship between academic competence and academic performance. We see that academic competence is positively correlated with the time management and student characteristics constructs, which are both shown to have a positive impact on academic performance. While we initially expected a direct relationship between academic competence and academic performance, the indirect relationship is also interesting. More specifically, academic competence is negatively correlated with attention deficit, which has a negative impact on academic performance. As in the extant literature (Kleijn et al., 1994), our findings support a positive although indirect relationship between academic competence and academic performance.

*RQ5: Do predictors of student behavior have a significant impact on academic performance?*

The relationship between the predictors of (OSN) behavior and academic performance is not as clear. The predictors of behavior construct is negatively correlated with both attention deficit and time management which in turn have opposite impacts on academic performance. Therefore, we cannot conclude that predictors of student behavior significantly impact academic performance.

*RQ6: Do time management skills have a significant impact on academic performance?*

The results indicate that academic performance improves as the time management score increases, indicating that good time management leads to improved academic performance. This finding ties in well with relationship between time management and academic performance as reported in Trueman and Hartley (1996)

*RQ7: Do student characteristics, time management skills, attention span, etc. have an impact on time spent on OSN?*

The results indicate that a higher attention deficit is related to an increased amount of time spent on OSN. The direction of this relationship although opposite to that reported in Greenfield

(Wintour, 2009), provides further evidence to the existence of a significant relationship between these two factors. There were no significant relationships found between time spent on OSN and other student characteristic variables.

Other interesting observations from the survey results are presented in Table 8. These questions relate to the constructs Predictors of Behavior, Time Management and Academic Competence. Although students are evenly divided in their assessment of their capability to use OSN effectively as a study tool (PB29), they tend to not agree that OSN is currently a good study tool (PB6 & PB10) and are not likely to increase their use OSN as a study tool in the future (PB36). Students do not feel pressured by the faculty to use OSN for communication purposes (PB20) and they do not expect their classmates to do so either (PB14). It is interesting to note that students are not inclined to believe that OSN will improve their academic performance in the future (PB37). In terms of Time Management, students are very confident in their ability to effectively manage their time (TM9) and only one-third of them find it difficult to organize study and leisure time (TM7).

In summary, we discovered several direct relationships between constructs within the SEM model. As shown in Fig. 4, time management skills, student characteristics and time spent on OSN have direct impacts on academic performance. Student characteristics, including age, marital status (being single) and number of children all positively influence a student's academic performance while time spent on OSN has a negative effect. The only direct relationship with time spent on OSN found was with the attention deficit construct. As the level of attention deficit increases, the amount of time spent on OSN increases. Other non-directional relationships between the constructs lead to implied or indirect connections between certain constructs and academic performance and time spent on OSN. For example, academic competence is positively related to student characteristics and time management, which implies an indirect relationship between academic competence and academic performance. Attention deficit has a significant positive impact on time spent on OSN, which negatively impacts academic performance, thus implying an indirect relationship between attention deficit and academic performance. As mentioned earlier, planned behavior is significantly related to time management and attention deficit but not to the main constructs of interest, academic performance and time spent on OSN. The Theory of Planned Behavior was not the central focus of this paper, but was included because of its associations with prior research. Given the relationships that were discovered for the planned behavior construct in this study, it would be worthwhile to investigate this further in a future study.

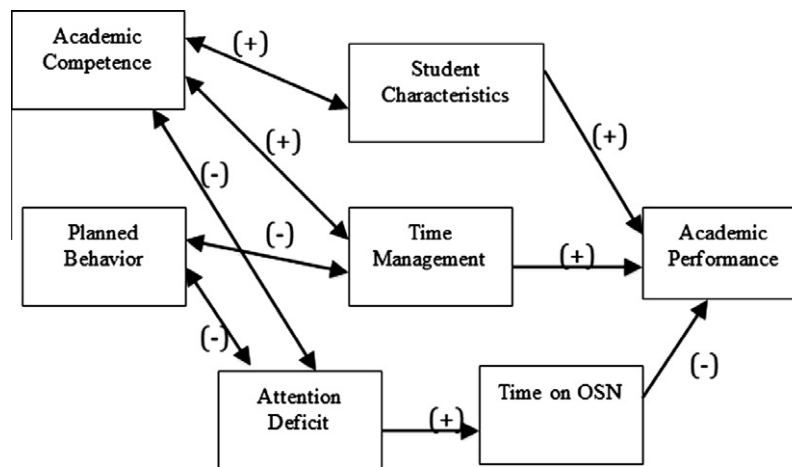
## 5. Conclusions and future research

The primary motivation of this paper was to determine (1) the nature of the relationship between student academic performance and time spent on OSN and (2) how time spent on OSN relates to other key factors, such as attention span and time management skills, that also seem to influence student learning. Our ultimate goal is to motivate appropriate behavioral changes in students in regards to social networking use outside of class in hopes of improving academic performance. In addition, we want to provide information for faculty who wish to incorporate OSN in their curricula, given its widespread popularity among students.

As explained in the paper, our results point to a negative impact of OSN usage on academic performance. Also, our analysis and anecdotal data presented in Dahlstrom et al. (2011) reveal that, although students feel competent in their ability to use OSN for academic purposes, they do not have the desire or willingness to do so. As indicated in the findings of Dahlstrom et al. (2011), stu-

**Table 8**  
Student perceptions: results of survey.

Survey questions	Agree/strongly agree (%)	Disagree/strongly disagree (%)
PB6: OSNS helps me be productive in my study time	22	48
PB10: I consider OSNS to be a good study tool	29	41
PB14: I find it frustrating when my classmates do not use OSNS to communicate information about course topics	18	49
PB20: My professors expect me to use OSNS to communicate with them about course topics	22	53
PB29: I know how to use OSNS as an effective study tool	33	33
PB36: I plan to use OSNS to more effectively manage my study time	24	42
PB37: I intend to improve my academic performance over the next year by effectively using OSNS as a study tool	27	41
TM9: I have good time management skills	71	12
TM7: I find it easy to organize study and leisure time	49	33



**Fig. 4.** Summary of final model.

dents place a higher value on the technologies their instructors use effectively in the classroom. Perhaps if more faculty really knew how to incorporate OSN into their curricula, seamlessly and effectively, OSN could be viewed as a valuable pedagogical technology. Given the lack of credible evidence that students are willing to use OSN for academic purposes and the existence of credible evidence that increasing amounts of time spent on OSN negatively effects academic performance, faculty attempts to include OSN are rationally unfounded. Therefore, there is a need for further investigation into the types of OSN exercises and applications that enhance learning as well as the types of courses for which such exercises and applications would be most appropriate.

Students should be made aware of the detrimental impact of online social networking on their potential academic performance. In addition to recommending changes in social networking related behavior based on our study results, findings with regard to relationships between academic performance and factors such as academic competence, time management skills, attention span, etc., suggest the need for academic institutions and faculty to put adequate emphasis on improving the student's ability to manage time efficiently and to develop better study strategies. This could be achieved via workshops and seminars that familiarize and train students to use new and intuitive tools such as online calendars, reminders, etc. For example, online calendars are accessible in many devices and can be setup to send a text message or email

reminder of events or due dates. There are also online applications that can help students organize assignments and task on a day-to-day basis. Further, such workshops could be a requirement of admission to academic programs. In the light of our results on relationship between attention span and academic performance, instructors could use mandatory policies disallowing use of phones and computers unless required for course purposes.

There are a number of other directions we plan to pursue as extensions of this research. We aim to study the impact of social networking on online versus traditional student academic performance. In addition, we plan to investigate whether online and traditional student characteristics/demographics have any disparate effects on social networking behavior outside of class. We plan to specifically focus on student characteristics and predictors of behavior and determine the exact nature of relationship between variables such as number of children, student age, marital status, etc., and the student performance. We plan to do the same via a separate study on the variables representing the predictors of behavior construct as both these factors have been found to significantly impact directly or indirectly the student academic performance and their OSN activity. We also plan to add more questions/constructs that would help improve some of the marginally acceptable indices. Investigation of all these research questions is of paramount importance as the popularity of online social networking among students is most likely going to increase in the near future.



## Appendix A. Survey Questionnaire

We measure each of these constructs using the following variables (TS1--- AP4) as discussed below.

**Instructions:** Select the answer for each question that best describes you. Online social networking sites (OSNS) include Facebook, LinkedIn, MySpace, Twitter, blogs, etc.

TS1: The amount of time (in hours) I spend on OSNS on a daily basis is  
0; up to 2; 2-4; 4-6; more than 6

TS2: The average amount of time (in minutes) I spend, per class, on OSNS *while attending class* is  
0; up to 15; 15-30; 30-45; more than 45=5

TS3: For every 8 hours I spend at work, I spend \_\_\_\_\_ in hours on OSNS  
0; up to 1; 1-2; 2-3; 3-4; more than 4

TM1: I spend \_\_\_\_\_ hours a day, on average, on OSNS communicating with a study group or fellow students in a class about class-related items?  
0; up to 1; 1-3; 3-4; more than 4)

TM2: The number of hours per week, on average, I spend studying *for each course* is  
0-3; 3-6; 6-9; 9-12; more than 12

TM3: On average, I take \_\_\_\_\_ courses each semester.  
1; 2; 3; 4; more than 4

TM4: I make a list of things I have to do each day.  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

TM5: I have a clear idea of what I want to accomplish during the upcoming week.  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

TM6: I rarely find myself still working on an assignment the day it is due.  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

TM7: I find it easy to organize study and leisure time?  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

TM8: I have enough time to complete my school assignments as thoroughly as I would like.  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

TM9: I have good time management skills.  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

AS1: On a daily basis, I check OSNS \_\_\_\_\_ times.  
0; 1; 2; 3; 4; more than 4

AS2: While at work I check OSNS \_\_\_\_\_ times.  
0; 1; 2; 3; 4; more than 4

AS3: I often check OSNS in the middle of working on a school or work assignment.  
Strongly Disagree =1, Disagree =2, Neutral =3, Agree =4, Strongly agree =5

AS4: The longest amount of time, in minutes, I can focus on a lecture, audio/video presentation without any distraction is  
0-5; 5-10; 10-15; 15-20; more than 20

SC1: The number of hours I work per week, on average, is \_\_\_\_\_. (fill in the blank)

SC2: My gender is  
Male; Female

SC3: I have \_\_\_\_\_ children. (fill in the blank)

SC4: My marital status is  
Married; Single

SC5: I am best described as a  
Traditional student (all face-to-face classes); Hybrid student (some online courses); WebLearner (all online classes)

SC6: My age is \_\_\_\_\_ (fill in the blank)

SC7: My major is \_\_\_\_\_ (fill in the blank)

SC8: I have had a Facebook account for \_\_\_\_\_ years. (fill in the blank)

SC9: My Facebook use is best described as  
I use Facebook to less than once a week to check in with friends and family;  
I use Facebook about once a week to check in with friends and family;  
I use Facebook as my primary means of communication with friends and family;  
I update my status and check that of my Facebook friends on a daily basis;  
I feel completely out of touch when the power is out and I cannot connect to Facebook.

**Evaluate how much you agree with the statements (AC1-PB37) below with  
Strongly agree =1, Agree =2, Neutral =3, Disagree=4, Strongly Disagree =5**

AC1: I am able to manage my course load without any difficulty during the semester.

AC2: I can easily understand the material taught in the business school.

AC3: I find the courses taught in the business school interesting.

AC4: I am enjoying all of the classes offered in the BBA curriculum.

AC5: I always do my best to understand the course material.

PB1: I think that OSNS provide me enjoyment.

PB2: I think that OSNS are useful.

PB3: I think it is important that I check my social networking site often.

PB4: I think OSNS usage will be of benefit to my social life.

PB5: I think OSNS usage will result in a positive opinion about me.

PB6: OSNS helps me be productive in my study time.

PB7: I find OSNS to be a distraction from my school work.

PB8: At times, I have “turned off” my Facebook account to allow me to focus on school work.

PB9: OSNS help me to manage my time more effectively.

PB10: I consider OSNS to be a good study tool.

PB11: OSNS provide an effective mechanism for communicating about course topics with my classmates.

PB12: OSNS provide an effective mechanism for communicating about course topics with my professors.

PB13: I feel that I will miss out on useful course information if I do not engage in OSNS communication with classmates and / or my professors.

PB14: I find it frustrating when my classmates do not use OSNS to communicate information about course topics.

PB15: People that are important to me recommend and/or encourage OSNS.

PB16: If I use an OSNS people that are important to me would approve.

PB17: Others feel that I am more accessible because I use an OSNS.

PB18: Most people I know use OSNS.

PB19: My classmates use OSNS as a study tool.

PB20: My professors expect me to use OSNS to communicate with them about course topics.

PB21: My classmates expect me to communicate with them about course topics via OSNS.

PB22: I think my use of OSNS is typical for people in my age group.

PB23: For me, participating in OSN is easy.

PB24: I feel that I am capable enough to use OSNS to do what I want to do.

PB25: I feel competent enough to use all the functions in an OSNS.

PB26: I rarely encounter problems that cannot be resolved when using an OSNS.

PB27: I know how to use OSNS.

PB28: I feel comfortable using OSNS to communicate with my classmates and professors.

PB29: I know how to use OSNS as an effective study tool.

PB30: In the future I intend to continue using OSNS as often as I do now.

PB31: I plan to log on to an OSNS sometime within the next week.

PB32: I believe I will be using OSNS as much or more this time next year.

PB33: I plan to communicate with other OSNS users in the next week.

PB34: I intend to post more content on an OSNS for others to view in the next week (e.g. upload photos, send messages, etc.).

PB35: In the future, I plan to use OSNS more to communicate with my classmates and professors.

PB36: I plan to use OSNS to more effectively manage my study time.

PB37: I intend to improve my academic performance over the next year by effectively using OSNS as a study tool.

AP1: My overall GPA is \_\_\_\_\_. (fill in the blank)

AP2: My average grade from last semester was

A; B; C; D; F

AP3: My average grade in the last three online classes I took was

A; B; C; D; F

AP4: My average grade in the last three face-to-face classes I took was

A; B; C; D; F

## References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Baker, R., & White, K. (2010). Predicting adolescents' use of social networking sites from an extended theory of planned behaviour perspective. *Computers in Human Behavior*, 26, 1591–1597.
- Barkley, R. A. (2006). *Attention deficit hyperactivity disorder: A handbook for diagnosis and treatment* (3rd ed.). New York: Guilford Press.
- Buehn, A., & Schneider, F. (2009). Corruption and the shadow economy: A structural equation model approach. *IZA Discussion papers* 4182.
- Cameron, R. (2010). *Ajzen's theory of planned behavior applied to the use of social networking by college students*. University Honors Program. Paper 149. <<http://ecommons.txstate.edu/honorprog/149>>.
- Dahlstrom, E., de Boer, T., Grunwald, P., & Vockley, M. (2011). ECAR: National study of undergraduate students and information technology. <<http://net.educause.edu/ir/library/pdf/ERS1103/ERS1103W.pdf>> Retrieved 03.11.11.
- DuPaul, G., & Volpe, R. (2009). ADHD and learning disabilities: Research findings and clinical implications. *Current Attention Disorders Reports*, 1, 152–155.
- Hair, J. F., Anderson, R. E., Tatham, R. L., Babin, B., & Black, W. C. (2005). *Multivariate data analysis* (5th ed.). New Jersey: Prentice Hall.
- Johnstone, H., & Percival, F. (1976). Attention breaks in lectures. *Education in Chemistry*, 13, 49–50.
- Kirschner, P. A., & Karpinski, A. C. (2010). Facebook and academic performance. *Computers in Human Behavior*, 26, 1237–1245.
- Kleijn, W., Ploeg, H., & Topman, R. (1994). Cognition, study habits, test anxiety, and academic performance. *Psychological Reports*, 75, 1219–1226.
- Lay, C., & Schouwenburg, H. (1993). Trait procrastination, time management and academic behavior. *Journal of Social Behavior and Personality*, 84, 647–662.
- Lu, B., Song, X.-Y., & Li, X.-D. (2010). Bayesian analysis of multi-group nonlinear structural equation models with application to behavioral finance. *Quantitative Finance*, 12, 477–488.
- MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, 51, 201–226.
- Margrain, S. A. (1978). Student characteristics and academic performance in higher education: A review. *Research in Higher Education*, 8, 111–123.
- Mizerski, K., & Pettigrew, S. (2003). Academic performance of marketing students by student characteristics. <[http://smib.vuw.ac.nz:8081/WWW/ANZMAC2003/papers/ED02\\_mizerskik.pdf](http://smib.vuw.ac.nz:8081/WWW/ANZMAC2003/papers/ED02_mizerskik.pdf)> Retrieved 13.04.11.
- Sansgiry, S. S., Kawatkar, A. A., Dutta, A. P., & Bhosle, M. J. (2004). Predictors of academic performance at two universities: The effects of academic progression. *American Journal of Pharmaceutical Education*, 68, 103.
- Trueman, M., & Hartley, J. (1996). A comparison between the time-management skills and academic performance of mature and traditional-entry university students. *Higher Education*, 32, 199–215.
- Wilson, K., & Korn, J. H. (2007). Attention during lectures: Beyond ten minutes. *Teaching of Psychology*, 34, 85–89.
- Wintour, P. (2009). Facebook and Bebo risk 'infantilising' the human mind. <<http://www.guardian.co.uk/uk/2009/feb/24/social-networking-site-changing-childrens-brains>> Retrieved 13.04.11.
- Zhong, B., Hardin, M., & Sun, T. (2011). Less effortful thinking leads to more social networking? The associations between the use of social network sites and personality traits. *Computers in Human Behavior*, 27, 1265–1271.