

FACEBOOK, ACADEMIC PERFORMANCE, MULTITASKING AND SELF-ESTEEM

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ABSTRACT

Objectives of this study were to compare *Facebook* users and non-users on self-esteem and academic achievement variables and to investigate the factors related to perceived positive and/or negative impact of *Facebook* on academic performance. A total of 277 Croatian undergraduates participated in the study, 99 (35.7%) of which were male and 178 (64.3%) female.

Facebook users were younger in comparison to non-users, but did not differ in any variable of academic achievement (GPA, hours per week spent studying, academic performance proficiency) or in self-esteem. Self-esteem was correlated positively with frequency of using *Facebook* for communication with friends. There was no significant positive relation between self-esteem and GPA, but self-esteem was positively correlated with academic performance proficiency.

As predicted, students' perceived positive impact of *Facebook* on their academic performance was found to be positively related to their *Facebook* intensity and to frequency of *Facebook*-based communication for academic purposes, even after controlling for *Facebook* intensity. As predicted, students' perceived negative impact of *Facebook* on their academic performance was positively related to *Facebook* intensity. Active multitasking, i.e. interrupting studying or homework with *Facebook* activities, was predictive even after intensity of using *Facebook* and recreational purpose were controlled for. The study demonstrated the important role of multitasking in the relationship between *Facebook* and impaired academic performance.

Keywords: Facebook, academic performance, GPA, multitasking, self-esteem

Introduction

Facebook: prevalence of use, means of access, intensity of use

These days information technologies are increasingly becoming an integral part of everyday life and *Facebook* seems to be spearheading this new phenomenon. *Facebook* is the most used social networking website by worldwide monthly active users. As of July 21st 2010 it has over 500 million users (Zuckerberg, 2010), with 50% of its active users logging on to *Facebook* in any given day (*Facebook*, 2010). Entertainment Weekly put it on its end-of-the-decade best-of list, saying, “How on earth did we stalk our exes, remember our co-workers’ birthdays, bug our friends, and play a rousing game of *Scrabulous* before *Facebook*?” (Wikipedia, 2010).

The initial purpose of *Facebook* was to allow university students to create and maintain social ties between college and university students in different residence halls (Wikipedia, 2010). Even though *Facebook* is by now used by a much wider variety of users, university students are still its “biggest fans”. Results from a recent paper (Ellison et al, 2007) reported that 94% of undergraduate students are active *Facebook* users, spending 10–30 minutes online each day communicating with their *Friends List* of 150–200 people. Similarly, Wiley and Sisson (2006; as cited in Pempek et al, 2009) conducted a large survey on college students from universities in the Midwest United States, which indicated that 91% of students use the *Facebook*.

However, research on this topic in Croatia is scarce and therefore the two primary objectives of this study were to describe the prevalence of *Facebook* users among Croatian college students and find out how much time do college students devote to using *Facebook*.

Based on previous research in college populations (Ellison et al, 2007; Pempek et al, 2009) the following hypotheses were made:

- *Hypothesis 1*. The majority of students use *Facebook*.
- *Hypothesis 2*. The majority of students use *Facebook* daily.

Because of the lack of research and theoretical underpinning, present study posed no hypotheses regarding the characteristics of students’ *Facebook* use or the possible differences in *Facebook* use among students based on their gender. Instead, the following research questions were raised:

- *Research Question 1a*. How many students use *Facebook Mobile* application (use *Facebook* with their mobile phone)?
- *Research Question 1b*. How many students receive e-mail/sms notifications to alert them about *Facebook* activities?
- *Research Question 2*. Are there any gender-based differences in students’ *Facebook* use?
- *Research Question 3*. Is there any difference in students’ *Facebook* use based on their studying major?

Social networking on Facebook, self-esteem and academic performance

Because of its popularity among college students, questions about the impact of *Facebook* use on academic performance need to be raised. Several studies have suggested that engagement in *Facebook* is related to students’ involvement (Heiberger and Harper, 2008), academic

success and performance proficiency (Steinfeld et al, 2008; Hwang et al, 2004; Yu et al, 2010). It has been suggested that college students' social networking with peers and professors can be a way for obtaining information, knowledge, social acceptance and support, which can then lead to higher levels of their self-esteem, satisfaction with university life and consequently performance proficiency (Yu et al, 2010). Valkenburg et al. (2006) found that the more people used social networking sites, the greater the frequency of their interaction with friends was, which in turn had a positive impact on participants' self-esteem and their satisfaction with life.

On the other hand, some researchers found no correlation between *Facebook* use and GPA (Kolek and Saunders, 2008; Pasek et al, 2009) or found negative correlation between *Facebook* use and academic achievement measured by self-reported GPA and hours spent studying per week (Karpinski and Duberstein, 2009; as cited in Kirschner and Karpinski, 2010). A recent study found that *Facebook* users reported lower GPA's and spent fewer hours per week studying than non-users (Kirschner and Karpinski, 2010).

However, it's possible that the quality of *Facebook* use (that is, the purpose *Facebook* is used for, rather than just the quantity of it), is what's relevant to the impact *Facebook* use has on academic performance. If *Facebook* is used intensively for academic purposes and/or essential or supportive communication with others, positive impact on academic achievement could be expected. On the other hand, if intensively used for recreational purposes only (*e.g.*, *playing games, tagging photos, looking at video links*), negative impact on one's academic performance may be expected since in this scenario, students possibly devote too much time to *Facebook* on expense of studying.

What may be especially relevant to the negative impact of *Facebook* use on academic performance is whether *Facebook* use interferes with the performance of the academic tasks (for example through multitasking). Increasing number of studies show that today's college students watch television, type out instant messages or engage in *Facebook* activities while simultaneously performing their academic tasks, like studying, doing schoolwork or homework (Junco and Cotten, 2010; Huang and Leung, 2009). However, evidence suggests that no matter how good one is at multitasking, he/she can never be as effective and efficient as when doing one thing at a time, because the switching back and forth between activities increases the mental work (Jackson, 2008).

Mayer and Moreno's cognitive theory of learning and information (Chandler and Sweller, 1991) explains why multitasking may also have a negative impact on learning. They took the idea from the cognitive load theory that the processing capacities of visual and verbal working memories are limited and further explained that presenting too many elements for processing can lead to overload, which then results in some of the elements not being processed. Once cognitive processes are overloaded, deeper processing and learning is impossible (Mayer and Moreno, 2003). Cognitive load theory can explain the negative effect of multitasking in terms of the split-attention effect. Information from two independent sources compete for visual attention and cognitive processes of the learner, causing a split-attention effect. Multitasking can impact the learning process through a form of information overload (Mayer and Moreno, 2003) and split-attention effect. Supporting this theory, research has shown that students who multitask report on detrimental effect on their schoolwork (Mayer and Moreno, 2003; Junco and Cotten, 2010). According to Mayers and Moreno (2003, page 45), *essential processing* refers to the focus of cognitive processes on making sense of the presented material, which includes selecting, organizing and integrating words and images; *incidental processing* are

cognitive processes that are required to process extraneous variables in learning and non-essential aspects of the presented material, and *representational holding* refers to processes aimed at holding verbal or visual representations in working memory. So, if a student frequently interrupts his/her academic activities with *Facebook* activities, it may be expected that their academic performance will suffer, because splitting their attention between *Facebook* activity and academic task at hand reduces the capacity for essential processing and for representational holding, while it increases the incidental processing. Based on this theory, this study hypothesizes that using *Facebook* simultaneously with attempting to study or perform some other academic tasks (like writing essays for example), will result in impaired academic achievement, or at least in academic achievement not being as good as it could be.

From the methodological standpoint it is also important to differentiate the research which compares *Facebook* users and non-users on personality variables and academic achievement and the type of research investigating the relationship between *Facebook* use and academic achievement in *Facebook* users. Therefore, this study will compare *Facebook* users and non-users based on age, academic achievement and self-esteem. Since it is expected that the majority of students are using *Facebook* nowadays, *Facebook* users may not differ from *Facebook* non-users in academic achievement. Also, it is possible that non-users are older, since younger people are more inclined to use the newer technologies. However, since research in Croatia is yet to support any comparison between *Facebook* users and non-users, this study formed research questions on these matters as well.

This study will also investigate the nature of a relationship (if any) between the intensity and purposes of *Facebook* use, multitasking (simultaneous *Facebook* use and performance of academic tasks) and perceived impact of *Facebook* use on academic performance.

Based on the presented research and literature review, the following predictions and research questions were formed:

- *Research Question 4.* Do *Facebook* users differ from the non-users based on their age, academic achievement and/or self-esteem?
- *Research Question 5.* How many students consider their *Facebook* use a positive impact and how many consider it a negative impact on their academic performance?
- *Hypothesis 3.* Students' *Facebook*-based communication with friends and family will be positively correlated with their level of self-esteem.
- *Hypothesis 4.* Students' perceived positive impact of *Facebook* on their academic achievement will be positively related to their *Facebook* intensity of use and both use of *Facebook* for academic purposes (e.g., *communicating with their professors and/or teaching assistants, gathering info on coursework*) and social purposes (e.g., *communicating with friends and family, reconnecting with people*). Academic and social use of *Facebook* will be independently related to positive impact of *Facebook*.
- *Hypothesis 5.* Students' perceived negative impact of *Facebook* on their academic achievement will be positively related to their *Facebook* intensity of use and use of *Facebook* for recreational purposes (e.g., *playing games, looking at photos and videos*), and to multitasking (simultaneously engaging in *Facebook* activities and performing academic tasks). Recreational use of *Facebook* will be independently related to negative impact of *Facebook*.

Method

Sample and procedure

The convenient sample in this research consisted of a total of 277 Croatian undergraduates, 99 (35.7%) of which were male and 178 (64.3%) female. The age of participants ranged from 19 to 30 ($M = 20.25$, $SD = 1.625$), with the majority of the participants (92.4%) being in the 19-22 age range. 94 (33.9%) participants were university students with major in mathematics and 183 (66.1%) were students pursuing a professional degree in business administration and management.

Participants were recruited by researchers coming to their scheduled class and asking them to complete the questionnaire in September 2010. Permission from instructors was obtained prior to visiting the classes. Consent process was explained to participants and their participation in the study was voluntary and anonymous.

In addition to demographic measures noted above, present study used a questionnaire consisting of a several measures described in the following passages.

Measures

Self-esteem

Self-esteem was measured by using seven items from the Rosenberg Self-Esteem Scale (Rosenberg, 1989) on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with a higher total score indicating higher self-esteem.

Facebook use

Participants were first asked whether they have an active *Facebook* account, and if they answered yes, they were asked to provide the following information specific to their *Facebook* use:

- use of *Facebook Mobile* application (*yes/no*)
- use of email/sms notifications to receive alerts about *Facebook* activity (*yes/no*)
- number of friends on their *Facebook Friends list* (*open-ended; responses later grouped into seven categories: 100 or less, 101-200, 201-300, 301-400, 401-500, 501-600, more than 600*)
- *Facebook* login frequency (*several times a day, once a day, several times a week, once a week, several times a month; once a month, several times a year, once a year, less than once a year*)
- average *Facebook* login duration (*less than half an hour; half an hour to 1 hour; 1-3 hours; more than 3 hours*)
- *Facebook* engagement (attitudes towards *Facebook*) was measured by six-item five-point Likert scale taken from Ross et al. (2009) (*e.g., Facebook is part of my everyday activity, I am proud to tell people I'm on Facebook, I would be sad if Facebook shut down*). Response categories ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Total score was calculated by summing all items.

Much like Ellison et al. (2007) and Steinfeld et al. (2008) this study combined the above mentioned variables describing the characteristics of participants' *Facebook* use into a single measure of *Facebook* use named *Facebook* intensity, which provided a more robust measure of intensity of *Facebook* use than would simple items assessing number of friends, login frequency, login duration or attitudes towards *Facebook*. Ordinal data on variable measuring the average *Facebook* login duration were converted to the best approximation possible, replacing each ordinal value with the mid-point of the response category. For example, if a participant estimated that his/her average *Facebook* login lasts between 31 and 60 minutes, this was converted to 45 minutes. Because of the much greater range of the number of friends and duration of average *Facebook* login (in minutes) these items were before averaging first transformed by taking the logarithm of the values.

Purposive value of Facebook usage

Based on students' interests and affinities, *Facebook* can be used for a wide variety of different purposes ranging from purely passing time on one end, through maintaining social contacts, all the way to using *Facebook* to support one's coursework on the other end.

Present study used a newly constructed 16-item scale to examine the purposes students use the *Facebook* for. Students rated the frequency of using *Facebook* for certain purposes on a five-point Likert scale ranging from 1 (*never*) to 5 (*always*). They were asked about activities describing the three general types of purposes: social purposes (*e.g., communicating with friends and family, reconnecting with people*), academic purposes (*e.g., communicating with professors and teaching assistants, gathering info about coursework*), and recreational purposes (*e.g., playing games, looking at pictures and videos, researching people of interest*).

Multitasking of Facebook activity with academic tasks

Multitasking of *Facebook* activities with academic tasks was assessed by the following three items: (1) *How often do you stay logged in on Facebook while you're studying?*; (2) *How often do you stay logged in on Facebook while performing other academic tasks (e.g., researching the literature, writing papers)?*; (3) *How often do you interrupt your studying or performing of other academic tasks because of the activity on Facebook?*. Response format for all three questions was a five-point Likert scale ranging from 1 (*never*) to 5 (*always*). First two items were summed into a "passive" multitasking variable, since even though those behaviors set the grounds for multitasking, they don't measure the actual multitasking activity. The third item is believed to measure the "active" multitasking activity, since it estimates the frequency of the actual switching back and forth between *Facebook* and academic activities.

Academic performance

Academic performance was measured by the following several measures:

- self-reported Grade Point Average (GPA) (*open-ended*)
- self-reported hours per week spent studying (*open-ended*)
- academic performance proficiency (students' ability to perform academic tasks and solve problems) was measured by the four-item scale, used in the study by Yu et al.

(2010), who adapted it from Chao et al. (1994) (e.g. *I am confident about the adequacy of my academic skills and abilities, I have performed academically as well as I anticipated I would*) with responses this time being a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Perception of Facebook's impact on academic achievement

One of the outcomes being examined in this study was students' perception of the *Facebook's* impact on their academic achievement. Participants reported on how they perceive the nature of impact *Facebook* has on their academic performance by expressing the degree of their agreement with the following two statements: (1) *Facebook use has a positive impact on my academic performance.*; (2) *Facebook use has a negative impact on my academic performance.* Response format was again a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Results

Descriptive statistics for research variables, zero-order Pearson correlations coefficients, and alpha reliability coefficients are presented in Table 1. Results confirmed the predicted positive correlation between self-esteem and the frequency of *Facebook*-based communication with friends ($r = .246, p = .000$). However, predicted positive correlation between self-esteem and the frequency of *Facebook*-based communication with family was not confirmed ($r = .112, p = .086$).

There was no significant correlation between students' self-esteem and self-reported GPA ($r = .071, p = .254$), but a significant negative correlation was found between self-esteem and hours per week spent studying ($r = -.172, p = .005$) and a significant positive correlation was found between self-esteem and academic performance proficiency ($r = .378, p = .000$).

GPA was related only to one *Facebook* variable, communication with professors, in predictive direction ($r = .223, p = .001$), However, when controlling for student's major correlation was not significant ($r = .078, p = .242$). Hours spent studying related to none of *Facebook* variables. Academic performance proficiency was positively related to communications with professors ($r = .150, p = .021$), and negatively to active multitasking ($r = -.167, p = .010$), defined as interrupting academic task (studying, doing homework, etc.).

Perceived positive impact of *Facebook* on academic performance was positively correlated with intensity of *Facebook* use ($r = .224, p = .001$), frequency of *Facebook*-based communication with others on academic matters ($r = .216, p = .001$), *Facebook*-based communication with friends ($r = .171, p = .008$) and family ($r = .206, p = .001$), but contrary to expectations it did not correlate with frequency of *Facebook*-based communication with professors ($r = .006, p = .930$).

As predicted, negative perception of *Facebook's* impact on academic performance was positively correlated with *Facebook* intensity ($r = .223, p = .001$), recreational use of *Facebook* in terms of looking at photos and videos ($r = .252, p = .000$), passive multitasking ($r = .184, p = .004$) and active multitasking ($r = .274, p = .000$). Contrary to expectations, it was not correlated with using *Facebook* for playing games ($r = .100, p = .126$).

Table 1.

Means and standard deviations of and correlations among variables (zero-order Pearson correlation coefficients).

Variables	<i>M</i>	<i>SD</i>	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
(01) FB-INT	49.9	27.26	(.615)																
(02) Self-esteem	31.2	3.90	-.044	(.804)															
(03) MT-ACT	5.1	1.86	.470**	-.035	(.809)														
(04) MT-PASS	2.3	1.06	.414**	-.031	.670**	-													
(05) FRIENDS	7.8	1.52	.278**	.246**	.233**	.189**	-												
(06) FAMILY	2.9	1.24	.185**	.112	.171**	.116	.315**	-											
(07) FACULTY	1.6	0.91	.161*	-.030	.105	.086	.149*	.237**	-										
(08) AC-MAT	3.2	1.28	.223**	.072	.286**	.229**	.226**	.337**	.181**	-									
(09) PHOTOS	6.9	2.06	.565**	.107	.449**	.384**	.342**	.154*	.072	.181**	-								
(10) GAMES	2.4	1.36	.315**	.046	.156*	.175**	.080	.001	.081	.003	.265**	-							
(11) GPA	3.6	0.73	.005	.071	-.068	-.052	-.013	-.089	.223**	-.075	-.100	-.126	-						
(12) HOURS ^a	5.7	5.65	.058	-.172**	-.075	-.053	.016	.055	-.027	.024	.017	-.040	.122	-					
(13) PROFICIENCY ^a	15.9	2.89	.013	.378**	-.119	-.167**	.114	.126	.150*	-.014	-.018	-.065	.486**	.091	(.822)				
(14) POS-IMP	2.2	1.03	.224**	.162*	.160*	.048	.171**	.206**	.006	.216**	.229**	.119	.069	.013	.192**	-			
(15) NEG-IMP	2.7	1.21	.223**	-.065	.184**	.274**	.127	.024	.098	.058	.252**	.100	-.043	.026	-.085	-.047	-		
(16) Age ^a	20.3	1.63	-.167*	.113	-.157*	-.085	-.101	.027	-.125	-.124	-.109	-.075	-.156*	.003	.010	-.041	-.160*	-	
(17) Gender ^b	1.6	0.48	.158*	.126*	.192**	.196**	.226**	.331**	-.002	.383**	.207**	-.066	-.070	-.049	-.023	.023	.050	-.055	-
(18) Study major ^b	1.7	0.47	.089	.040	.066	.058	.046	-.127	.381**	-.102	-.069	-.015	.421**	-.058	.060	-.156*	.067	-.137*	-.200**

Note: Missing data were excluded by N ranged from 230-277. Coefficient alphas are listed parenthetically on the diagonal where appropriate; FB-INT, Facebook intensity; MT-ACT, active multitasking; MT-PASS, passive multitasking; FRIENDS, frequency of FB-related communication with friends; FAMILY, frequency of FB-related communication with family; FACULTY, frequency of FB-related communication with professors / teaching assistants; AC-MAT, frequency of FB-related communication on academic matters; PHOTOS, frequency using FB for posting, looking at or commenting on photos and videos; GAMES, frequency of using FB for entertainment (e.g., playing games); HOURS, hours spent studying weekly; PROFICIENCY, academic performance proficiency; POS-IMP, perceived positive impact of FB use on academic performance; NEG-IMP, perceived negative impact of FB use on academic performance. ^a Control variables; ^b Dummy coded variables

* p < .05
 ** p < .01

Table 2.
Summary statistics for *Facebook* use.

	%	<i>M</i>	<i>SD</i>
(1) use of <i>Facebook</i> Mobile application	41.9%		
(2) use of email/sms notifications about <i>Facebook</i> activity	39.0%		
(3) frequency of <i>Facebook</i> login's			
several times per day	54.2%		
once daily	28.4%		
several times per week	13.1%		
once weekly	0.4%		
several times per month	2.5%		
once monthly	0.4%		
several times per year	0.8%		
(4) duration of an average <i>Facebook</i> login			
less than ½ hour	48.9%		
½ – 1 hour	36.3%		
1 – 3 hours	11.4%		
more than 3 hours	3.4%		
(5) <i>Facebook</i> engagement		14.08	5.226

Hypothesis 1 predicted that the majority of students use *Facebook*, and with 85.6% of the total sample using the *Facebook*, the results support the hypothesis.

Those who do not have an active *Facebook* account ($n = 39$) stated the following reasons as to why not: 28 students (71.8%) stated they are not interested, 6 students (15.4%) said they don't have the time, 1 student (2.6%) claimed never to have heard of *Facebook* before and 7 students (17.9%) stated other reasons (e.g., *Facebook is a waste of time, I don't find it useful etc.*). Nobody stated not having computer or internet access as a reason.

Normality of the distributions was tested where appropriate using the Kolmogorov-Smirnov test. The analysis revealed a significant deviation of the number of friends distribution from the normal distribution ($z = 1.694$, $p = .006$). Therefore, from this point forward the hypotheses referring to this variable were tested using nonparametric analyses.

Results presented in Table 2, confirm the majority of students using the *Facebook* daily, as predicted by hypothesis 2. As for the research questions 1a and 1b, the results showed that 41.9% use *Facebook Mobile* application and 39% receive alerts about *Facebook* activity by e-mail/sms notifications.

Under the research question 2 age- and gender-based differences in *Facebook* use were explored. There was no significant difference in prevalence of *Facebook* users based on their gender (88.8% female vs. 79.8% male participants; $\chi^2(df = 1) = 3.445$, $p = .063$). Also, there was no gender-based difference in percentage of those using *Facebook Mobile* application (38.2% female vs. 49.4% male participants; $\chi^2(df = 1) = 2.194$, $p = .139$), receiving e-

mail/sms notifications for *Facebook* activities (40.5% female vs. 35.9% male participants; $\chi^2(df = 1) = 0.293, p = .588$), *Facebook* login frequency ($\chi^2(df = 6) = 11.210, p = .082$), but male participants had shorter *Facebook* login duration ($\chi^2(df = 3) = 8.071, p = .045$). There was no gender-based difference in *Facebook* engagement either ($t = 1.763, p = .079$).

Significant difference was found on reported number of *Facebook* friends between males and females ($\chi^2(df = 6) = 17.199, p = .009$) with male participants having more *Facebook* friends ($C_{\text{male}} = 300, C_{\text{female}} = 280$). However, overall female participants had higher *Facebook* intensity ($t = -2.124, p = .036$).

Research question 3 explored the difference in *Facebook* use based on students' study major. No study major-based difference in proportion of active *Facebook* users was found (85.1% math vs. 85.8% business; $\chi^2(df = 1) = 0.000, p = 1.000$). Students majoring in math did not differ from those majoring in business on *Facebook* intensity either: there was no significant difference in percentage of participants using *Facebook* with their mobile phone ($\chi^2(df = 1) = 6.327, p = .012$), receiving e-mail/sms notifications for *Facebook* activity ($\chi^2(df = 1) = 0.873, p = .350$), *Facebook* login frequency ($\chi^2(df = 6) = 8.606, p = .197$), average *Facebook* login duration ($\chi^2(df = 3) = 2.993, p = .393$) and there was also no difference in *Facebook* engagement based on students' study major ($t(236) = .528, p = .598$). An interesting finding was that students with business major had more frequent communication with professors than did students with mathematics major.

Statistically significant difference was found on reported number of *Facebook* friends between students of different majors ($\chi^2(df = 6) = 17.051, p = .009$). Business-major students had more *Facebook* friends than math-majors ($C_{\text{business}} = 300, C_{\text{math}} = 200$).

Research Question 4 explored whether *Facebook* users differ in age, academic achievement and self-esteem in comparison to *Facebook* non-users. Multivariate testing was conducted, with academic achievement variables (GPA, hours per week spent studying, academic performance proficiency) and self-esteem used as dependent variables and having/not having *Facebook* account used as factor. Gender, age and students' major were entered as covariates. Results revealed in non-significant statistics (Wilks' $\lambda = 0.996, p = .919$). Univariate analysis revealed there were no differences in GPA ($F(1,246) = 0.277, p = .599$), hours spent studying weekly ($F(1,246) = 0.615, p = .434$), academic performance proficiency ($F(1,246) = 0.336, p = .563$) or self-esteem ($F(1,246) = 0.000, p = .988$). When compared to non-users based on the age, it was found that *Facebook* users were younger ($M_{\text{users}} = 20.13, SD_{\text{users}} = 1.478$ vs. $M_{\text{non-users}} = 20.93, SD_{\text{non-users}} = 2.212; F(1,273) = 8.365, p = .004$).

Present study also rose a question on how many students perceive their *Facebook* use having a positive impact and how many perceive their *Facebook* use having a negative impact on their academic performance (Research question 5). For this analysis the measures were recoded into dichotomous variables because. Response categories 1 (*strongly disagree*) and 2 (*somewhat disagree*) were recoded into the category 0 (*no*), while categories 4 (*somewhat agree*) and 5 (*strongly agree*) were recoded into the category 1 (*yes*). Response category 3 (*neither agree nor disagree*) was excluded from this analysis. Only 10.3% believe that their using the *Facebook* influences their academic performance in a positive way (7.8% females vs. 14.3% males; $\chi^2(df = 1) = 0.959, p = .328$), while 35.9% believe that *Facebook* use has a negative impact on their academic performance (37.8% females vs. 32.7% males; $\chi^2(df = 1) = 0.182, p = .669$). Perceiving the *Facebook* as a positive impact on one's academic achievement had no correlation with students' age ($r = -.041, p = .530$), but perception of the

negative impact on their academic achievement was negatively correlated with students' age ($r = -.160, p = .014$).

Hypothesis 3 predicted that the frequency of students' *Facebook*-based communication with friends and family will be positively correlated with their level of self-esteem. To investigate this relationship, controlling for gender and age, a hierarchical regression analysis was conducted. In the first step, students' gender and age were entered and the model was statistically significant ($F(2,229) = 3.165, p = .044$). Gender was a significant predictor of self-esteem ($\beta = .141, t = 2.145, p = .033$), but age was not ($\beta = .101, t = 1.538, p = .125$). These two variables together accounted for 1.8% of the variance in self-esteem. In the second step of the analysis, *Facebook*-based communication with friends and *Facebook*-based communication with family were entered. This step added significantly to the variance explained ($\Delta R^2 = .027, \Delta F(2,229) = 3.165, p = .044$). These four predictors accounted for 6.5% of the total variance in self-esteem. As expected, there was a significant positive effect for students' communication with friends ($\beta = .237, t = 3.479, p = .001$), but contrary to expectations *Facebook*-based communication with family had no significant unique effect ($\beta = .009, t = 0.130, p = .897$). Once the *Facebook*-based communication variables were entered, gender failed to have a significant effect ($\beta = .085, t = 1.231, p = .219$).

Hypothesis 4 predicted that students' perceived positive impact of *Facebook* on their academic performance would be positively related to their *Facebook* intensity, *Facebook*-based communication with professors/teaching assistants, with others on academic matters, and with friends and family. Because student's major was correlated with perceived positive impact of *Facebook* ($r = -.156, p = .016$), it was also included as control variable, along with gender and age. Hierarchical analysis was performed, in which in Step 1 control variables were entered, in Step 2 *Facebook* intensity was entered and in Step 3 *Facebook*-based communication with professors, informing at *Facebook* regarding faculty duties, *Facebook* communication with friends and family were entered. Table 3 displays the standardized regression coefficient (β) for each variable in each block. After Block 1 in the equation, $R^2 = .015, F(3,228) = 2.173, p = .092$. However, the addition of the *Facebook* intensity in the second block did cause a significant change in ΔR^2 of .056 ($\Delta F(1,227) = 13.952, p = .000$). In the Step 3 *Facebook* academic purposes variables, and *Facebook* social support variables were entered and this block did also cause a significant change in ΔR^2 of .054 ($\Delta F(4,223) = 3.461, p = .009$). Interestingly, the effect of gender was significant in this final model ($t = -2.178, p = .030$). As predicted, *Facebook*-based communication on academic matters made a significant contribution to the prediction of perceived positive impact of *Facebook* on academic activity ($t = 2.174, p = .031$) and *Facebook*-based communication with family approached significance, ($t = 1.925, p = .056$). *Facebook* intensity made also significant contribution in predictive direction ($\beta = .141, t = 2.718, p = .030$). However, contrary to expectations, communication with friends and communication with professors were not significant predictors. Control variables explained 3% of variance in perceived positive impact of *Facebook* on academic performance, intensity of *Facebook* use additional 6% of variance, and *Facebook* informative and social support variables entered in Step 3 explained additional 5% of variance. These results showed that *Facebook* purposes had significant contribution, even after controlling for *Facebook* intensity. Hypothesis 4 was partially supported.

Hypothesis 5 predicted that students' perceived negative impact of *Facebook* on their academic performance would be positively related to their *Facebook* intensity and use of *Facebook* for recreational purposes, and to multitasking of *Facebook* activities with

performing academic tasks. Results of hierarchical regression analysis are presented in Table 4. Age was a significant predictor in block 1 ($\beta = -.136, t = -2.010, p = .046$), but the equation generated an R^2 of .36 which was not significant ($F(3,225) = 1.942, p = .124$). *Facebook* intensity was entered in the second step resulting in a significant change R^2 explaining additional 4% ($\Delta F(1,224) = 8.500, p = .004$). In the Step 3 variables of using *Facebook* for recreational purposes were entered, resulting in non-significant change in R^2 ($\Delta F(2,222) = 2.702, p = .069$). Multitasking variables entered in the Step 4 explained additional 3% of

Table 3.

Summary of hierarchical regression analysis – beta coefficients (β) for variables predicting perceived positive impact of *Facebook* on academic achievement.

	Step 1	Step 2	Step 3
Gender	-.010	-.048	-.155*
Age	-.078	-.046	-.042
Students' major	-.166*	-.187**	-.157*
<i>Facebook</i> intensity		.224**	.182**
<i>Facebook</i> communication with professors			-.037
<i>Facebook</i> communication on academic matters			.156*
<i>Facebook</i> communication with friends			.074
<i>Facebook</i> communication with family			.141
Step 1. adjusted $R^2 = .015; F(3,228) = 2.173, p = .092$			
Step 2. adjusted $R^2 = .068; F(4,227) = 5.211, p = .000$			
Step 3. adjusted $R^2 = .107; F(8,223) = 4.448, p = .000$			

* $p < .05$; ** $p < .01$

Table 4.

Summary of hierarchical regression analysis – beta coefficients (β) for variables predicting perceived negative impact of *Facebook* on academic achievement.

	Step 1	Step 2	Step 3	Step 4
Gender	.046	.013	-.002	-.027
Age	-.136*	-.108	-.105	-.112
Students' major	.047	.028	.046	.032
<i>Facebook</i> intensity		.195**	.091	.056
<i>Facebook</i> use for posting/looking/commenting on photos/videos			.182*	.157
<i>Facebook</i> use for entertainment (e.g., playing games)			.009	-.002
Passive multitasking				-.083
Active multitasking				.234**
Step 1. adjusted $R^2 = .012; F(3,225) = 1.942, p = .124$				
Step 2. adjusted $R^2 = .044; F(4,224) = 3.630, p = .007$				
Step 3. adjusted $R^2 = .058; F(6,222) = 3.558, p = .003$				
Step 4. adjusted $R^2 = .083; F(8,220) = 3.571, p = .001$				

* $p < .05$; ** $p < .01$

variance ($\Delta F(2,220) = 3.944, p = .021$). The results showed that active multitasking made a significant contribution, independent of intensity of *Facebook* use, to the prediction of negative *Facebook* impact on academic performance. Hypothesis 5 was partially supported. In final model only active multitasking (e.g., *interrupting studying or homework with Facebook activities*) was a significant predictor of perception of negative influence of *Facebook* on academic performance, ($t = 2.720, p = .007$). Using *Facebook* for looking at photos and videos approached significance, ($t = 1.938, p = .054$). The overall R^2 for the final model that included all eight explanatory variables was .115, and the adjusted $R^2 = .083$, thus explaining 8% of the variance in dependent variable.

Discussion and conclusions

The majority of students (85.6%) use *Facebook*, suggesting that *Facebook* use is quite common. Results also confirm that *Facebook* is being used equally often by both male and female students, and by students with different majors (business major vs. math major). However, female participants were higher in overall *Facebook* intensity.

In the present study, *Facebook* users differed in neither self-esteem nor any of the variables describing academic achievement (GPA, hours spent studying weekly, academic performance proficiency) in comparison to *Facebook* non-users. *Facebook* users were younger than non-users, supporting the idea that younger people are more inclined to use new technologies.

Self-esteem was found to correlate positively with frequency of using *Facebook* for communication with friends, which is in line with previous research reporting a positive impact of interaction with friends on social networking sites on participants' self-esteem (Valkenburg et al, 2006; Yu et al, 2010). As for the relationship between self-esteem and academic performance variables, self-esteem had no significant positive relation with GPA, but there was a significant positive correlation with academic performance proficiency which measures the students' ability to perform academic tasks and includes students' evaluation of their own academic performance (whether they perform academically as well as they anticipated).

Like any other technology, *Facebook* can have a positive impact on one's life and achievements, but if used inappropriately it can also have a negative impact on several aspects of one's life, including the academic sphere. Results in this study demonstrate that only 10.3% of participants think that *Facebook* influences their academic performance in a positive way, while 35.9% think that *Facebook* has a negative influence on their academic performance. Perceiving *Facebook* as a positive influence on one's own academic achievement had no correlation with age, but perception of its negative impact on one's own academic achievement was negatively correlated with age, suggesting that younger students are more prone to using *Facebook* in a harmful way. This may for example include devoting too much time to *Facebook* for recreational purposes instead of doing academic duties or multitasking of *Facebook* with schoolwork.

When considering *Facebook*'s potential to impact academic achievement in a positive or negative way, it is important to distinguish between purposes one uses the *Facebook*, i.e. to what degree is *Facebook* being used for academic purposes (like communication with faculty staff and gathering information about academic matters), to what degree for social supportive

purposes (like communication with friends and family) and to what degree for recreational purposes (like playing games, looking at photos and videos).

As predicted, students' perceived positive impact of *Facebook* on their academic performance was found to be positively related to their *Facebook* intensity and frequency of *Facebook*-based communication for academic purposes. Using *Facebook* for academic purposes had unique predictive power. Social networking regarding faculty duties provides a direct, informational support. Also, as predicted using *Facebook* for recreational purposes had predictive power for negative impact of *Facebook* on perceived academic performance, independently of intensity of *Facebook* use.

On the other hand, students' perceived negative impact of *Facebook* on their academic performance was positively related to active multitasking (interrupting studying or homework with *Facebook* activities), even after intensity of using *Facebook* is controlled for. These results are in line with previous studies showing detrimental effect of multitasking while doing schoolwork (Mayer and Moreno, 2003; Junco and Cotten, 2010) and clearly demonstrating that multitasking impacts the ideal academic efficiency of learner. Multitasking (interrupting) did not correlate with GPA and hours spent studying weekly, but it correlated with academic performance proficiency, in fact suggesting that one can never be as effective and efficient while multitasking as when engaging in one thing at a time.

The study demonstrated that not only the intensity of *Facebook* use, but the purpose for which it is used is significant for both positive and negative academic outcome.

There are limitations to the present study. The study's design is correlational, therefore no causal statements can be made. Also, some statistical findings presented were close to, even though lower than the standard of $p < .05$ level of statistical significance. Therefore, future research should include larger and wider sample to provide better statistical power.

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