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 (Steinfield 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.
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).

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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. * Control variables; † Dummy coded variables

*p < .05
**p < .01
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 (\( C_{male} = 300, C_{female} = 280 \)). 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 (\( \chi^2(236) = .528, p = .598 \)). 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 (\( C_{business} = 300, C_{math} = 200 \)).

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 (\( M_{users} = 20.13, SD_{users} = 1.478 \) vs. \( M_{non-users} = 20.93, SD_{non-users} = 2.212 \); \( F(1,273) = 8.365, p = .004 \)).

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 
\( r = -0.160, p = .014 \).

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 \((r = -0.156, p = .016)\), 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 \((\beta)\) 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 \(\Delta R^2\) 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 \(\Delta R^2\) 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 ($\beta = -0.136$, $t = -2.010$, $p = .046$), 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 ($\beta$) for variables predicting perceived positive impact of Facebook on academic achievement.

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-.010</td>
<td>-.048</td>
<td>-.155*</td>
</tr>
<tr>
<td>Age</td>
<td>-.078</td>
<td>-.046</td>
<td>-.042</td>
</tr>
<tr>
<td>Students’ major</td>
<td>-.166*</td>
<td>-.187**</td>
<td>-.157*</td>
</tr>
<tr>
<td>Facebook intensity</td>
<td></td>
<td>.224**</td>
<td>.182**</td>
</tr>
<tr>
<td>Facebook communication with professors</td>
<td></td>
<td></td>
<td>.037</td>
</tr>
<tr>
<td>Facebook communication on academic matters</td>
<td></td>
<td></td>
<td>.156*</td>
</tr>
<tr>
<td>Facebook communication with friends</td>
<td></td>
<td></td>
<td>.074</td>
</tr>
<tr>
<td>Facebook communication with family</td>
<td></td>
<td></td>
<td>.141</td>
</tr>
</tbody>
</table>
| 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 ($\beta$) for variables predicting perceived negative impact of Facebook on academic achievement.

<table>
<thead>
<tr>
<th></th>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
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<tbody>
<tr>
<td>Gender</td>
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<td>.013</td>
<td>-.002</td>
<td>-.027</td>
</tr>
<tr>
<td>Age</td>
<td>-.136*</td>
<td>-.108</td>
<td>-.105</td>
<td>-.112</td>
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<tr>
<td>Students’ major</td>
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<td>.028</td>
<td>.046</td>
<td>.032</td>
</tr>
<tr>
<td>Facebook intensity</td>
<td>.195**</td>
<td>.091</td>
<td>.056</td>
<td></td>
</tr>
<tr>
<td>Facebook use for posting/looking/commenting on photos/videos</td>
<td></td>
<td>.182*</td>
<td>.157</td>
<td></td>
</tr>
<tr>
<td>Facebook use for entertainment (e.g., playing games)</td>
<td></td>
<td>.009</td>
<td>-.002</td>
<td></td>
</tr>
<tr>
<td>Passive multitasking</td>
<td></td>
<td></td>
<td>-.083</td>
<td></td>
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<tr>
<td>Active multitasking</td>
<td></td>
<td></td>
<td>.234**</td>
<td></td>
</tr>
</tbody>
</table>
| 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.

References


