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Correlation between Facebook use for educational purposes and academic performance of students

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ABSTRACT

In this paper a research on the application of Facebook in education is presented. A total of 139 students of the Faculty of Education in Sombor (Serbia) participated in the research. The results establish a positive correlation between the academic performance of students and the frequency of use of Facebook for educational purposes. The factor of perceived usefulness greatly affected the decision of students to use Facebook as a learning aid. No significant difference in the frequency of use of Facebook for general purposes has been reported between the groups of students divided by the academic performance.

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1. Introduction

Education is a complex process, and its effectiveness is influenced by many factors. Except from the teacher, students can also acquire useful information through cooperation with other students (Jonassen, 1995; Jonassen, Howland, Moore, & Marra, 2003). Cooperation with other students enables the transfer of knowledge acquired by individual members of the group to all other members. Furthermore, questions of a group member can point out the deficiencies in the knowledge of other members, or encourage the entire group to consider a certain relevant topic. Calvo-Armengol, Pattachini and Zenou (2008) concluded that under the influence of their social networks, students achieved better results in school.

Social networking sites (SNSs) are very popular today, especially among the younger population (Fewkes & McCabe, 2012; Junco, 2012b). SNSs enable students to share their knowledge in a simple way, ask for the help of other students, and ask questions (Ooi & Loh, 2010; Rambe, 2012; Selwyn, 2009). On the other hand, SNSs can be very useful for teachers as well, because they can reach out to their students more easily, even when they are outside of school (Mazer, Murphy, & Simonds, 2007). The teacher can use a SNS as a forum or a blog (Barczyk & Duncan, 2013), with options for easy networking and communication with their students. Also, SNS can be used as a Learning Management System (LMS) (Irwin, Ball, Desbrow & Leveritt, 2012; Manca & Ranieri, 2013).

The factor of motivation is also very important when it comes to the application of SNSs in education. Educational use of SNS depends directly on purpose of its use and indirectly on its adoption. Main purpose of SNS use are social relations while the most important factor in predicting the adoption of SNS is social influence (Arteaga Sánchez, Cortijo, & Javed, 2014). SNSs can enhance students experience of participation in a course and make students feel more connected with their colleagues. SNSs positively influence the development of communities of practices which facilitate knowledge sharing, collaboration, interaction, and learner-centered activities (Barczyk & Duncan, 2013).

Work done at home is essential for the thorough acquisition of knowledge, however, a certain number of students lack the motivation to study outside of school. Placing educational content and notifications important for the subject onto the popular SNS, results in the students being more often in contact with the educational materials, and consequently thinking about their subjects more often (Clough, 2010).

The use of SNSs as a learning aid can easily produce a counter-effect with the students. It can distract them by diverting their attention from the educational to the numerous entertaining contents which can be found on these sites (Cassidy, 2006). According to prior research, students who spend more time using SNSs were less successful during their studies (Junco, 2012a, 2012b; Kirschner

& Karpinski, 2010), however, the results of this research do not support that conclusion.

This research deals with the use of SNSs in education as a learning aid which facilitates knowledge-sharing and discussion among students, enables easier access to information, and reminds students to study. When the use of a technical aid is in question, it is of crucial importance that users accept the utilization of that aid. Because of that, one of the most important factors in choosing a suitable SNS, besides technical characteristics, is the popularity of that network among students. In this research, only one social network, Facebook, had been used, because of its popularity among the students participating in this research, as well as because of its major global popularity (Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2013). The main reason for choosing this network is the great motivational factor that Facebook has on students for its use, and also the great number of hours they spent on it (Junco, 2012b).

The study included 139 students (77 female, 62 male; average age: 21,74) of the Faculty of Education, in Sombor (University of Novi Sad) who had the opportunity to use two Facebook groups as learning aid during the course "Designing Educational Software and Media". One Facebook group was created by the teacher and the other by the students.

Previous studies have dealt with the correlation between the time spent on Facebook and academic performance (Junco, 2012a, 2012b, 2015; Kirschner & Karpinski, 2010; Sendurur, Sendurur, & Yilmaz, 2015). However, in these papers Facebook use for educational purposes was not considered separately from Facebook use for non-educational purposes. Some research has studied the relationship between the use of Facebook for educational purposes and academic performance (Ainin, Naqshbandi, Moghavvemi, & Jaafar, 2015; Dyson, Vickers, Turtle, Covan, & Tassone, 2015), but they used perceived performance as a measure of academic performance instead of actual GPA which is more reliable. In previous studies it was not established whether there is a correlation between the frequency of use of Facebook as an aid to learning and actual number of points attained by students during the course (Arteaga Sánchez et al., 2014; Hew, 2011; Manca & Ranieri, 2013). The main purpose of this research is to discover whether there is a correlation between the academic performance of students (based on actual number of points) and the frequency of use of Facebook as a learning aid. Also, an attempt was made to determine whether the factor of perceived usefulness significantly affects the frequency of use of the Facebook as a learning aid. Although it was not the aim of the research, it was checked whether the use of Facebook for general purposes has a negative effect on the students' academic performance.

2. Literature review

2.1. SNSs use in education

Computer-mediated social networks have been developing at an increasing rate in the last 30 years (Mazer et al., 2007). Today, social software is usually represented in the form of SNSs such as Twitter, MySpace and Facebook, which have hundreds of millions of users (Selwyn, 2009). SNSs are virtual spaces where people of similar interest gather to communicate, share photos and discuss ideas with one another (Boyd & Ellison, 2008; Mao, 2014; Raacke & Bonds-Raacke, 2008). The functioning of SNSs depends in a great deal on the users' preferences, because of a large number of possibilities offered by these sites.

The orientation of SNSs towards self-presentation, the viewing of personal information of others, and offering multiple means for communication and exchange, has proved attractive to students in high school, college and university settings (Selwyn, 2009). More

than 90% of university students in the USA use SNSs (Junco, 2012b). The vast majority of users reported that they use SNSs every day (Smith & Caruso, 2010).

The significant level of use of SNSs by students of diverse ages reveals the potential of the application of SNSs in education (Al-rahmi, Othman, & Musa, 2014). Claims have been made that SNSs have many desirable qualities of good educational technologies, such as enabling peer communication and adapting to the social context of learning in particular schools, universities, or local communities (Mason, 2006). SNSs could be used in education to support communication between students, information gathering and participation in collaborative learning networks that could be based on common interests and affinities, and not only on the immediate learning environment (Kitsantas, Dabbagh, Chirinos, & Fake, 2016; Maloney, 2007). SNSs have significant positive effect on collaborative learning (Al-rahmi et al., 2014). When it comes to SNSs like Facebook, students are willing to invest their time and energy in order to establish a connection with those who share their interests and are part of their educational communities (Al-rahmi et al., 2014; Maloney, 2007).

Although learning was not the main reason for joining the community for most of the members, as many as 89% consider informal learning an important outcome of their participation in the community (Clough, 2010). Social networking provides students with the opportunity to engage in their education and learning, through promoting critical thinking about their own learning, which is one of the traditional goals of education (Bugeja, 2006). SNSs enable a radical change in the educational system, and enable better motivation for students in order to make them engaged, as opposed to being passive observers of the educational process (Ziegler, 2007).

However, there are also some negative effects of SNSs. Students reported that social networking can be addictive, distractive and have negative impact on their social interactions, emotional health and work completion (Kitsantas et al., 2016). Complicated efforts in designing, scaffolding, and interacting with students are necessary in order to use SNSs as effective learning tools (Mao, 2014).

2.2. The use of Facebook in education

In the previous years, Facebook became the most popular SNS (Junco, 2015; Karpinski et al., 2013). More than 87% of college students log onto Facebook on a daily basis (Junco, 2012b). Students use Facebook as an important social domain, and as a means for communication (Fox, Morris, & Rumsey, 2007). Facebook has great potentials in teaching and learning, in part because of its popularity among students, and also because of its functions which provide pedagogical, social, and technological advantages (Wang, Woo, Quek, Yang, & Liu, 2012).

Students use Facebook for sharing their experiences from the university (Selwyn, 2009), and for the exchange of practical and academic information (Rambe, 2012). Facebook offers the opportunity for communicating both on the student-teacher and student-student relations (Al-rahmi et al., 2014; Sendurur et al., 2015), and unlike official course sites, they enable a higher level of interaction, and a less formal way of communicating (Mazer et al., 2007).

Students usually respond positively to the use of Facebook for educational purposes (Fewkes & McCabe, 2012; Irwin et al., 2012). A considerable number of students does not want to take classes conducted entirely on Facebook, but they feel that Facebook should be one of the tools used for teaching and learning (Manca & Ranieri, 2013). Facebook walls are a valuable means of exchange for students who are actively using Facebook with their peers on the course (Selwyn, 2009).

By offering virtual consultations through Facebook, teachers can enhance student satisfaction on the student-teacher relation outside of classroom (Li & Pitts, 2009). Students who accessed the teacher's Facebook page with a high level of mediated immediacy reported a high level of motivation, affective learning and positive attitude towards the teacher and the course, and they also graded the atmosphere in the classroom more positively (Mazer et al., 2007, 2009). On the other hand, students emphasised that there are negative associations between the teacher's Facebook use and teacher's credibility (Mazer et al., 2007). Teachers should be more passive than active when interacting with students on Facebook outside of classes, i.e. they should avoid commenting on personal pictures of students, or sending friend requests on their own initiative (Teclehaimanot & Hickman, 2009).

One of the potential ways of using Facebook in education is the use of a Facebook group as a LMS. Students are generally satisfied by using a Facebook group for educational purposes, because the basic functions of LMS can be easily implemented (Wang et al., 2012). Such a mode of application enables a shift of focus from content-based learning to process-based learning (Vogel & Klassen, 2001), and facilitates a transition from passive to active learning (Herse & Lee, 2005). LMSs are suitable for student enrolment, exams, assignments, course descriptions, lesson plans, messages, syllabus, and basic course material, but they often lack an element of social connectivity and do not support sufficiently self-governed and problem-based learning activities (Irwin et al., 2012).

Schroeder and Greenbowe (2009) observed that for discussion students rather use Facebook, than other forums, even if their use was made obligatory. Besides using Facebook more frequently, discussion on this site raised more complex topics and generated more detailed answers (Schroeder & Greenbowe, 2009). As a possible explanation for this situation Schroeder and Greenbowe indicated the frequency of use and time the students spend on Facebook. Facebook reduce the risk of technological frustration which very often negatively affect the success of distance learning (Manca & Ranieri, 2013). Facebook is preferred over eLearning Commons (such as Blacboard or Moodle) as a learning aid because students consider that Facebook enables them to become more acquainted with their classmates, feel like valued participants, learn more course material (Barczyk & Duncan, 2013) and share information more efficiently.

There are a number of benefits related to the students' use of Facebook for educational purpose, such as identifying and finding learning materials, helping friends answer questions, connecting with others to discuss projects, sharing lecture and study notes, receiving notifications regarding course and increasing interaction with other students and instructors (Al-rahmi et al., 2014; Irwin et al., 2012; Kitsantas et al., 2016; Manca & Ranieri, 2013). Facebook use for collecting and sharing information is positively related to academic performance of students (Junco, 2012b). Studies (Shih, 2011; Wang, Sheu, & Masatake, 2011) demonstrated that Facebook may have positive impact on English writing skills, vocabulary and knowledge.

On the other hand, it has been noted that some features of social networking sites may clash with current pedagogical paradigms (Selwyn, 2009). Previous research shows that students who use Facebook tend to have lower grades, and spend less time studying (Kirschner & Karpinski, 2010), while students who use Facebook more frequently achieved weaker college outcomes (Junco, 2012a). More recent research has shown that there was no significant difference in academic performance between students who spent different number of hours daily on Facebook (Ainin et al., 2015). Time spent on Facebook was negatively predictive of GPA only for freshmen students (Junco, 2015). There was a concern that social networks can cause withdrawal, alienation, and disconnection of learners from education, and have a damaging effect on traditional skills and literacy (Brabazon, 2007). It is argued that social networks can distract students from educational to some other contents (Cassidy, 2006; Kitsantas et al., 2016). Students who spend more time on Facebook tend to postpone academic work more often (Sahin, 2014). There are studies that suggest that the Facebook is very rarely used for educational purposes (Hew, 2011; Mao, 2014). In contrast, there are studies that show that the majority of students used Facebook for educational purposes or would like to use it (Fewkes & McCabe, 2012; Gray, Annabell, & Kennedy, 2010).

3. Research method

3.1. Facebook as a learning aid

The study took place over a one semester period. The instructional domain of the activity was the course "Designing Educational Software and Media". Classes and exercises were conducted in the classroom. In addition to regular classes and all the other resources that are usually available to students (such as internet, books …), teacher recommended students to use Facebook as a learning aid. For this reason a closed-type Facebook group was created. All the students attending the course joined. Throughout the term, the teacher uploaded lessons covered in class, necessary literature, all information concerning the subject and class schedule to the group's wall. The students were encouraged to use the group for consultations with the teacher, for communication with other students in issues related to the subject matter and for sharing useful materials which facilitated their learning. Besides this group, the students had already been independently using another Facebook group, primarily intended for sharing academic and practical information and for discussion about the subject matter, however this group was used for social and entertainment purposes as well. Information regarding Facebook use as a learning aid, presented in the following part of this subsection, was gathered by interviews with teachers and students and by observation of contents and data of the both of the aforementioned groups.

During the course, students have used the group wall and private messages to communicate with teacher. The questions were about learning materials, homework assignments, examinations, important schedule reminders, announcements, and many other course-related matters. Although this was not measured, the subjective feeling of the teacher was that the communication with students was more frequent and of better quality compared to the previous years, when Facebook was not used as a learning aid. By posting statuses with questions on the group wall, students have also initiated communication with other students. Students who knew the answers felt comfortable posting a response, which created open dialogue. Students who did not know the answer to the questions, by liking the question showed that they also want to know the answer, and that particular question indicated deficiencies in their knowledge. In numerous situations students posted a response before the question was seen by the teacher.

Students shared and uploaded alternative sources of information which they found on the internet, such as links to books, presentations and video tutorials that they considered useful. Besides students who used "like" feature to indicate that certain shared material was useful to them, teacher also used "likes" and comments to highlight the useful material or to indicate the materials that were not of sufficient quality. Links and uploaded files that teacher and other students shared enabled easier access to useful literature.

Some students uploaded the working versions of their seminar works on the wall of the group expecting feedback. Based on feedback from teacher and their peers, students were able to

correct mistakes that they did not notice and to gain an impression of the quality of the current version of their seminar works.

The vast majority of students' activities on the Facebook group took place outside of classrooms and regularly scheduled class periods. Notifications from the group led to the situation that students spend part of the time, intended for social and entertainment purposes, to review the activities on the Facebook group and possibly answer questions from other students. Overall, use of Facebook group as a learning aid has had a positive impact on the process of learning by facilitating access to useful information and communication with teacher and knowledgeable peers. However, the frequency and manner of the Facebook group use was largely dependent on the students themselves, while the primary role of teacher was to guide this process in the right direction.

The main difference between student-created (informal group) and teacher-created group is that the communication in the student group was less formal and there was social and entertainment content. There was certain number of students who have contributed only to the student group with their questions, comments, links, likes and files but all the students followed the events in both groups. The student group was more frequently used for discussion with colleagues and sharing materials but almost all educational topics were covered equally well in both groups. On the other hand, teacher-created group was clearer and better organized. Group with less irrelevant (non-educational) content enabled students to find useful information much easier.

3.2. Research objectives and hypotheses

The main purpose of this research is to discover whether there is a correlation between the academic performance of students and the frequency of use of Facebook as a learning aid. The secondary objective of this study was to determine whether the factor of perceived usefulness significantly affect the frequency of use of the Facebook as a learning aid. As an unexpected outcome of the study, the data showed whether the use of Facebook for general purposes have a negative effect on the students' academic performance.

3.2.1. Correlation between the frequency of use of Facebook for educational purposes and the academic performance

Some research indicates a negative correlation between the frequency of use of Facebook and academic performance of students (Junco, 2012a; Kirschner & Karpinski, 2010). However, it is very important to separate the use of Facebook in general and its use for educational purposes within a certain subject. "Clearly, certain uses of Facebook result in negative academic outcomes, while others result in positive ones" (Junco, 2012b). Prior research offers several positive examples of the use of Facebook in education (Ainin et al., 2015; Barczyk & Duncan, 2013; Irwin et al., 2012; Manca & Ranieri, 2013; Shih, 2011; Wang et al., 2011; Wang et al., 2012) which may be assumed to contribute to the success of the educational process. Based on this, the following hypothesis is formulated:

H1. The frequency of use of Facebook for educational purposes is in positive correlation with the students' academic performance in the subjects they used Facebook for.

3.2.2. The effect of perceived usefulness of Facebook in education on the frequency of use by the students

Prior research showed that despite the teacher's suggestions, students more frequently use other learning aids (Barczyk & Duncan, 2013; Schroeder & Greenbowe, 2009). "Perceived usefulness and perceived ease of use are the key factors of the technology acceptance model" (Lai & Chen, 2010, p. 951). Decision of students

to use Facebook as a learning aid is probably affected by the fact that Facebook reduces the risk of technological frustration because people are already familiar with the features of this tool (Manca & Ranieri, 2013). This significantly affects the factor of perceived ease of use (Davis, 1989).

Another important factor in accepting to use a certain technological feature is the perceived usefulness, which is defined as 'the degree to which a person believes that using a particular system would enhance his or her job performance' (Davis, 1989). Students will be more willing to use Facebook if it helps them to achieve better learning outcomes. Facebook can be an important means of communication between students, and on the student-teacher relation as well (Irwin et al., 2012; Mazer et al., 2007; Maloney, 2007; Rambe, 2012; Wang et al., 2012). Based on this communication, students can more easily acquire relevant information about the subject matter, and therefore, more easily fulfil the required assignments. The use of Facebook for discussion proved to be a useful means, and a better approach than other technical solutions like forums and LMSs (Irwin et al., 2012; Schroeder & Greenbowe, 2009). It also democratises student access to knowledgeable peers (Rambe, 2012). Discussion provides students with a better understanding of the subject matter, and points out deficiencies in their knowledge. Based on this, the following hypothesis is formulated:

H2. The perceived usefulness positively affects the acceptance and frequency of use of Facebook as a learning aid.

3.2.3. The relationship between the frequency of use of Facebook in general and academic performance

Prior research (Junco, 2012a; Kirschner & Karpinski, 2010) indicate the existence of a negative correlation between the use of Facebook and academic performance. This conclusion is logical from the perspective that more time spent on using Facebook, leaves less time available for studying. However, that does not mean that Facebook is the only thing that can distract students' attention, because there are many other activities, like television, internet, socializing, etc. Negative relation between Facebook use and academic performance is likely mitigated by multitasking (Junco, 2015). More recent research has shown that there was no significant difference in academic performance between students who spent different number of hours daily on Facebook (Ainin et al., 2015). Time spent on Facebook was negatively predictive of GPA only for freshmen students (Junco, 2015). For this reason, it can be assumed that students who do not use, or rarely use Facebook do not achieve a significantly better academic success. Based on this, we formulate the hypothesis:

H3. There is no significant difference in the frequency of use of Facebook for general purposes between the groups of students divided by the academic performance.

3.3. Experimental design

The study included 139 students (77 female, 62 male; average age: 21.74) of the Faculty of Education in Sombor (Serbia). More than 96% of the students who participated in the research stated that they use Facebook. Students voluntarily participated in the research. The instructional domain of the activity was the course "Designing Educational Software and Media" that the participants followed during the semester. All participants were domain novices and they had never before been trained to use digital tools for learning. The learning material included sections on: (1) Tools for creating educational software and multimedia; and (2) design principles for developing multimedia learning material. During the

course, students were given the opportunity to use two Facebook groups as one of the available learning aids. It is expected that students who use more frequently this kind of learning aid, achieve better grades.

3.4. Procedure

The study took place over a one semester period which started in October 2014. At the end of the terms, the students were given a questionnaire about their use of both of the aforementioned groups for educational purposes. Each student was informed that participation in the survey was voluntary.

3.5. Measures

3.5.1. Correlation between the frequency of use of Facebook for educational purposes and the academic performance

The frequency of the use of Facebook as a learning aid was measured by the question: 'How often did you use Facebook groups as a learning aid?'. Students had the following choices offered: 'never', 'very rarely', 'sometimes', 'often' and 'very often'. The students' answers were graded from 1 for the lowest level of use, to 5 for the highest level of the use of Facebook as a learning aid. These grades were used for comparison with the number of points of students, attained at the course, in order to determine whether there is a correlation. Student's answers regarding the frequency of the use of Facebook as a learning aid were confirmed on the basis of data collected from the Facebook group.

3.5.2. The effect of perceived usefulness of Facebook in education on the frequency of use by the students

In order to record students opinion about perceived usefulness of Facebook as a learning aid, we used the survey method to collect our data. The questionnaire consisted of 5 items. To achieve content validity of the instrument, the questionnaire has been developed, based on previous research (Lambić, 2014; Wang et al., 2012). Some of the items used were slightly modified to suit the context of the research. The questionnaire was pre-tested by a group of five educational experts. Also, in the previous year a pilot test involving 27 final year students of Faculty of Education was undertaken to validate the questionnaire. All 5 items were measured by the five-point Likert scale (from 1 = strongly disagree to 5 = strongly agree).

The 44 students who never used Facebook groups as a learning aid, or very rarely, were classified into the group of students who refuse the use of Facebook as a learning aid. The other 95 students were classified into the group that accepts the use of Facebook (see Table 1).

3.5.3. The relationship between the frequency of use of Facebook in general and academic performance

The question about the frequency of the use of Facebook for general purposes had the following choices offered: 'Less than once a week', 'Once a week', 'Several times a week', 'Once a day', 'Several times a day'; and to the question about the duration of one session on Facebook: 'Less than 5 min', 'Less than 15 min', 'About half an hour', 'About an hour', and 'More than 2 h'. The students' answers

were graded from 1 for the lowest level of use, to 5 for the highest level of the use of Facebook. The 85 students with more than 60% of the points attained at the course were classified into the group with higher success, while the 28 students with less than 40% of points were classified into the group with lower success.

3.6. Analyses

Correlation was used to evaluate the relationship between the frequency of use of Facebook for educational purposes and the academic performance (number of points). Non-parametric Wilcoxon's rank-sum test was used to determine the difference in the attitudes toward the perceived usefulness of the groups of students who accept or refuse the use of Facebook as a learning aid. The reliability of construct used to measure the attitude of students towards the perceived usefulness of Facebook as a learning aid was checked. The internal consistency was decided according to Cronbach's alpha, a reliability of 0.82 was obtained. Obtained value exceeds the acceptable level of 0.70 (Nunnally, 1978).

Besides the items concerning the use of Facebook for educational purposes, the questionnaire contained two items regarding the frequency of the use of Facebook for general purposes (not just educational, but entertaining as well), and time spent in these activities. Non-parametric Wilcoxon's rank-sum test was also used to determine the difference between groups of students with higher and lower success at the course, regarding Facebook use for general purposes. Cohen's d was used to determine effect sizes.

4. Results

The Spearman's rank correlation coefficient was used in order to determine whether there is a correlation between the frequency of the use of Facebook as a learning aid and the academic performance of students. The calculated coefficient value of 0.482 shows a moderate positive correlation between the frequency of the use of Facebook as a learning aid and number of points, which should be considered statistically significant ($p < 0.001$). Therefore the hypothesis H1 is confirmed.

In order to determine the difference in the attitudes of the groups of students who accept or refuse the use of Facebook as a learning aid toward the perceived usefulness of Facebook, non-parametric Wilcoxon's rank-sum test was used. All items had a p-value less than 0.01 (see Table 2.), indicating that students from the group that accepts the use of Facebook have significantly higher opinion about the perceived usefulness of Facebook as a learning aid than students from the other group. Therefore, perceived usefulness have positive influence on the acceptance and frequency of use of Facebook as a learning aid which confirms hypothesis H2. Cohen's d values for all items are greater than 0.9 which is considered to be a relatively large effect size.

Groups of students with higher and lower success at the course were compared regarding Facebook use for general purposes. Non-parametric Wilcoxon's rank-sum test was used and p-value 0.059 is obtained (see Table 3.), which indicates that there is no significant difference in the frequency of the use of Facebook between the students with higher and lower academic success, which confirms

Table 1
The number of points and frequency of use of Facebook groups as a learning aid.

Number of points x	x ≤ 20%	20% < x ≤ 40%	40% < x ≤ 60%	60% < x ≤ 80%	80% < x
Number of students	8	20	26	54	31
Frequency of use	Never	Very rarely	Sometimes	Often	Very often
Number of students	9	35	41	36	18

Table 2
Perceived usefulness.

	Accept	Refuse	p	Cohen's d
I consider Facebook groups helped me understand the subject matter better	3.49	2.50	<.01	1.45
I think that the questions of other students on the Facebook groups indicated deficiencies in my knowledge of the subject matter	3.58	2.68	<.01	1.01
The use of Facebook groups made it easier for me to access necessary literature for the preparation of my seminar work	3.59	2.50	<.01	1.13
By using a "Facebook" groups I obtained information indicating important parts of the subject matter more easily	3.52	2.73	<.01	1.13
The use of Facebook groups enabled me an easier access to useful information concerning subject matter	3.86	3.05	<.01	0.91

Table 3
Facebook use for general purposes.

	Higher success	Lower success	p	Cohen's d
How often do you use Facebook?	4.56	4.29	0.0594	0.39
How long does one of your visits to the Facebook site usually lasts?	3.44	3.29	0.6109	0.14

hypothesis H3. Cohen's d value for frequency of the use of Facebook for general purposes was 0.39 which is considered to be a medium effect size.

5. Discussion

The research confirmed a positive correlation between the frequency of use of Facebook as a learning aid, and the academic performance (number of points) of students in their subject. This was consistent with the findings of previous research which also suggested that Facebook use in education have positive effect on the teaching process (Ainin et al., 2015; Irwin et al., 2012; Manca & Ranieri, 2013; Shih, 2011; Wang et al., 2011). It is necessary to make a clear distinction here between the use of Facebook for general (non educational) purposes, and their use for educational purposes. Still, the higher success of students could have been the consequence of the fact that successful students usually spend more time learning and using learning aids, including here the Facebook group as well. In any case, based on the data acquired by this research, we can classify Facebook groups as a useful learning aid.

Facebook encompasses many different technical functionalities. The majority of the students (55%) considered comments the most useful which is consistent with previous research (Barczyk & Duncan, 2013). The comments feature enabled students to readily communicate with their peers about academic topics and thus develop a greater sense of community (Barczyk & Duncan, 2013). About 15% of the students considered statuses the most useful. Statuses enhanced visibility of deficiencies in students knowledge of the subject matter (Rambe, 2012). Students used Facebook groups for discussion about the subject matter, and based on the questions of other students discovered deficiencies in their own knowledge. The use of Facebook enabled students to communicate more easily with their colleagues who at the time possessed a greater understanding of certain parts of the subject matter, which had a positive influence on their knowledge (Ainin et al., 2015; Rambe, 2012), consequently leading to a better academic performance compared to students who had not managed to use adequately this convenience provided by the application of Facebook in education.

The students used Facebook groups to facilitate the process of gathering academic information (Kitsantas et al., 2016). Previous studies have pointed out that there is a positive influence of the use of Facebook for exchange of academic information, on cognitive scaffolding of learners (Rambe, 2012). The use of Facebook for gathering and sharing information was positively predictive of the learning outcome (Junco, 2012b; Kitsantas et al., 2016). About 21% of the students considered links to other sites the most useful and

about 9% considered shared documents the most useful. Because of the automatic notifications, about the posting of a comment or a link, sent to the students as soon as they log onto Facebook it is sufficient that only one student asks a question (which is probably of interest to other group members as well), and the obtained answer will be instantly available to other students as well. Students can get answers to their questions from other students or the teacher. With easier acquiring of academic information, the learning process is simplified, i.e. students have to spend less time on gathering information, leaving more time and energy for studying and dealing with the subject matter.

Regardless of the teacher's recommendation, students tend to use certain learning aids to a greater or lesser extent (Schroeder & Greenbowe, 2009). A great number of students might be choosing Facebook (SNS) as a learning aid, because they had been using it before, and therefore it provides them with a sense of familiarity (Manca & Ranieri, 2013). A very important aspect of the decision to accept or refuse the use of a learning aid is the perception of its usefulness in improving job performance (Al-rahmi et al., 2014; Davis, 1989). The group of students who accepted the use of Facebook as a learning aid, had noticed its advantages in discussion (Barczyk & Duncan, 2013) and academic information gathering to a greater extent.

The students used the group they created on their own more frequently than the one in which the teacher participated as well. One of the possible reasons for this situation could be that a certain number of students do not feel comfortable participating in a group in which one of the members is the teacher (Hewitt & Forte, 2006). Future research could explore whether there are other factors that have influenced the students to use their group more frequently.

The results of this research show no correlation between the frequency of the use of Facebook for general purposes and academic performance which confirms the findings of previous research which also suggested that there was no significant difference in academic performance between students who spent different amount of time on Facebook (Ainin et al., 2015; Junco, 2015). There is research indicating lower academic performance of students who use Facebook (Junco, 2012a; Kirschner & Karpinski, 2010). However, Facebook and other SNSs are not the only potential distractors from studying (socialisation, video games, internet, television, sports, etc.), so the question arises whether students who do not participate in only one potentially distracting activity will achieve better grades than others. Negative relation between Facebook use and academic performance is likely mitigated by multitasking (Junco, 2015). It is possible that the negative correlation between the Facebook and academic performance was established by observing a specific group of students, who prefer

Facebook to other entertaining activities. The real question here is what percent of students would, in a situation where Facebook is inaccessible to them, opt for learning instead of another form of entertainment.

6. Recommendations *for future research*

In this research a positive correlation between the academic performance of students and the frequency of use of Facebook as a learning aid is established. Future research should investigate whether the effects achieved by using Facebook as a learning aid differ from the effects that are achieved by using other learning aids usually available in the educational process. It would also be interesting to compare the effects of application of different SNSs in education.

Students had the opportunity to use two Facebook groups as learning aids, one created by the teacher and the other by the students. The students used the group they created on their own more frequently than the teacher-created group. Future research could explore possible reasons for this situation and compare the effects of application of teacher-created and students-created group as a learning aid. It would be interesting to explore to what extent mentioned Facebook groups influenced students, who visited the Facebook for non-academic contents, to participate in academic discussion or provide answers to other student's questions.

There is research indicating lower academic performance of students who use Facebook. The results of this research show no correlation between the frequency of the use of Facebook for general purposes and academic performance. Facebook and other SNSs are not the only potential distractors from studying so future research should explore what percent of students would, in a situation where Facebook is inaccessible to them, opt for learning instead of another form of entertainment.

7. Conclusion

The research described in this paper provides new data about the effects that could be achieved by the application of Facebook as a learning aid. It has been proven that the use of Facebook in education has positive effects on the knowledge of students. There is a positive correlation between the frequency of use of Facebook groups as a learning aid and actual number of points attained by students during the course "Designing Educational Software and Media". This research encompassed the use of only one SNS—Facebook, however it does not reduce the importance of this research, since the focus was not on the technical features of the site, but the advantages that could be attained by enabling easier communication in the student-student and student-teacher relations. For educational purposes, students typically used comments, links and chat, i.e. the basic functions of SNSs. For this reason, the acquired results are applicable to other SNSs with similar technical and social features, that exist today or will exist in the future.

In order for SNSs to be applicable in education, it is of key importance that students accept their use. Perceived usefulness has an important role in the students' decision about the use of a certain learning aid. The research also indicates that the use of Facebook for general purposes does not have a negative effect on the students' academic performance. Students from the groups with higher and lower success used Facebook with approximately the same frequency, and spent approximately the same amount of time on the site.

Based on this research, it can be concluded that teachers should have their own accounts (groups) on SNSs that the majority of students use, but that they should also encourage students to use the accounts or groups they already have for educational purposes, as a means for discussion, and as a tool for gathering information. It is especially important that the lecturers present all the advantages student can get from the use of SNSs as a learning aid, in order to get as many students to participate in social networks that can contribute to the educational process.

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