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Social network site use and academic achievement: A meta-analysis

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ABSTRACT

This meta-analysis examines the relation between use of social network sites and academic achievement. Thirty studies consisting of 21,367 participants are identified. The weighted mean correlation between use of social network sites and academic achievement is $\bar{r} = -0.07$. The weighted mean correlation is negligible ($\bar{r} = -0.02$) for studies assessing Facebook use, and small ($\bar{r} = -0.12$) for studies measuring use of all social network sites. Further, the weighted mean correlation is small ($\bar{r} = -0.10$) for studies assessing the duration of use, and close to zero ($\bar{r} = -0.01$) for studies measuring visiting frequency. The implication of the research for the relation between social network site use and academic achievement is discussed.

1. Introduction

Social network sites (SNSs) are popular in daily life. A recent survey (Pew Research Center, 2015a) found that an estimated 65% of American adults use SNSs. The estimates of percentage for school-age users are even higher. An estimated 71% of teens aged 13–17 use Facebook (Pew Research Center, 2015b), and an estimated 98% of college-age adults aged 18–24 (Experian Marketing Services, 2011) use any social network site (SNS). Therefore, the relation between SNS use and academic performance is an important research topic.

Several empirical studies have been conducted to examine the relation between SNS usage and academic achievement, and had mixed findings. Some studies have reported a negative association between SNS use and academic achievement (e.g., Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2013; Paul, Baker, & Cochran, 2012), while other studies have found little relation. For example, Huang (2011) studied 1549 adolescents with mean age of 15 years, and found that the correlation between SNS use and academic performance represented by test scores in Chinese, mathematics and English was $r = 0.01$. Other studies found a positive relation between use of SNSs and academic achievement. Khan, Wohn, and Ellison (2014) sampled 690 high school students, and reported a correlation between Facebook visiting frequency and course grades of $r = 0.09$.

The direction and magnitude of the relation between SNS use and academic achievement from previous empirical studies is inconclusive, possibly because they had different research contexts. Hence, a meta-analysis is needed to synthesize relevant findings to determine the direction and magnitude of the association between SNS use and academic achievement.

1.1. The relation between SNS use and academic achievement

Researchers have proposed two different viewpoints about the relation between SNS usage and academic achievement. The first position asserts that time spent on SNSs can replace time spent on studying. Students who overuse SNSs consequently devote insufficient time to studying, leading to low academic achievement. Further, students often use Facebook while studying (Junco, 2015) or in class sessions (Paul et al., 2012); therefore, they are too easily distracted to focus on learning. Thus, this position proposes a

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negative association between SNS use and academic achievement.

The second position hypothesizes a positive relation between SNS usage and academic achievement, because using SNSs can help to build social networks and increase social interaction. Usage of SNSs can increase social capital, meaning “the benefits individuals derive from their social relationships and interactions” (Ellison, Steinfield, & Lampe, 2010, p. 873). Some empirical studies (Ellison et al., 2010; Steinfield, Ellison, & Lampe, 2008) support a positive association between SNS use and social capital.

1.2. Moderators

The magnitude and direction of correlation between use of SNSs and academic achievement varies among different studies. The conflicting findings of empirical studies probably resulted from the diversity of their research contexts. Based on the theory of social media and on empirical findings, possible moderators included publication outlet, country where the study was conducted, sites used by participants, scale of time spent, measure of SNS use, domain of academic achievement, participant age and gender.

1.2.1. Publication outlet

As significant results are more likely than non-significant findings to be published (Rothstein, Sutton, & Borenstein, 2005; Sutton, 2009), published and unpublished articles can have different mean correlations. As this study includes both published and unpublished studies, it compares the mean correlations for both outlets.

1.2.2. Country where the study was conducted

The country effect was observed in Karpinski et al. (2013), who sampled 406 students with a mean age of 22.23 years from Europe, and 451 students with a mean age of 25.55 years from the United States. The correlation between time spent on SNSs and GPA was moderate at $r = -0.27$ for European students, and large at $r = -0.61$ for students from the USA. The country effect was also noticeable in Ozer (2014), who sampled 226 undergraduate students from the United States, and 200 undergraduate students from Turkey. The correlation between daily hours spent on SNSs and GPA was $r = -0.06$ for US students, and $r = -0.14$ for Turkish students. As the country effect was observed in the primary research, it needed to be examined.

1.2.3. Sites used by participants

Some studies examining the association between SNS use and academic achievement focused specifically on Facebook, whereas others measured the use of all SNSs. No empirical research to date has investigated the effect of the site on which users spent time on the relation between SNS use and academic achievement. The included studies measured the time spent by users on various sites, providing an opportunity to explore this possible effect.

1.2.4. Scale of time spent

Scale of time spent can be measured by an open-ended question. For example, some studies asked participants to fill out the duration of time spent on SNSs, and the reported time spent was on a ratio scale. Studies that asked participants to choose an option from a close-ended question usually measured the time spent or visiting frequency by an ordinal scale. Ratios and ordinal variables may have different variability. As the variability can affect the correlation coefficient (Goodwin & Leech, 2006), the scale of time spent can affect the correlation between SNS use and academic achievement.

1.2.5. Measure of SNS use

The extent of SNS use can be measured by the amount of time spent on SNSs. In contrast, some studies measured the visiting frequency of SNSs. For example, Khan et al. (2014) measured the number of times that users checked SNSs daily. The effect of measure of SNS use was not consistent in primary research. Wen (2015) found a noticeable difference between duration and frequency of SNS use. Specifically, the correlation between writing score and number of times of daily visiting Facebook was $r = -0.05$, and that between writing score and daily minutes spent on Facebook was $r = 0.10$. In contrast, little effect was found in Glogocheski (2015) who sampled 116 freshmen. The correlation between weekly hours spent on SNSs and GPA was $r = 0.00$, and that between daily number of times checking SNSs and GPA was $r = -0.00$.

1.2.6. Domain of academic achievement

Global academic achievement was the most common assessed domain. Few studies assessed other domains, such as writing (Dixon, 2012; Wen, 2015). The effect of domain of academic achievement has not been thoroughly examined to date, and is therefore the focus of the present study.

1.2.7. Participant age

Most studies examining the relation between use of SNSs and academic achievement used college students as participants. Some studies (e.g., Khan et al., 2014; Neto, Golz, & Polega, 2015) examined this relation for adolescents. As no empirical studies to date have investigated the age effect on the relation between SNS use and academic achievement, the current meta-analysis addresses this issue. Examining the age effect could help researchers to understand the development of the relation between SNS use and academic achievement.

1.2.8. Participant gender

Glogocheski (2015) observed the gender effect from 78 female and 38 male freshmen. The correlation between weekly hours spent on SNSs and GPA was $r = -0.12$ for females, and $r = 0.09$ for males. Walsh, Fielder, Carey, and Carey (2013) sampled 483 female freshmen, and found that the correlation between time spent on SNSs and GPA was $r = -0.04$ for fall semester, and $r = -0.08$ for spring semester. As the included studies varied in gender composition, the present meta-analysis investigates the gender effect.

1.3. Purpose

The aim of this meta-analysis is to integrate empirical findings about the correlation between general use of SNSs and academic achievement, rather than the effect of use of SNSs as a learning aid on academic achievement. Moderator effects on this relation were explored to explain the variation of effect sizes.

2. Method

2.1. Literature search

To identify relevant studies, the ERIC, PsycINFO, and ProQuest Dissertations and Theses databases were searched using terms related to SNSs (namely, Facebook, Twitter, Instagram, MySpace, social media, online social network*, and social network* site*) and academic achievement (achievement, performance, attainment, grades, or GPA) through April, 2017. The reference lists for all relevant articles and the previous review article (Hew, 2011) were subsequently examined to find additional studies not identified in computer-based searches.

The present meta-analysis examined the relations of duration of use and visiting frequency of SNSs with academic achievement. Studies using other indicators to represent SNS use were excluded. For example, Lee, Baring, Baring, Maria, and Reysen (2015) was excluded because it measured usage according to the number of sites used by participants. The following inclusion criteria were applied. First, studies should report the correlation between SNS use and academic achievement. Second, studies should use an objective measure of academic achievement, such as GPA. Studies using a subjective measure of academic achievement were excluded. For example, Badri, Al Rashedi, Yang, Mohaidat, and Al Hammadi (2016) was excluded because it asked participants to indicate their performance subjectively with choices from “poor” to “excellent”. Third, studies should report the sample size for computing the weighted mean correlations. Lastly, studies had to be published in English.

2.2. Analysis

The variance of Pearson Product-Moment correlation coefficient has some undesirable statistical properties; for instance, its magnitude is strongly affected by the correlation (Borenstein, 2009). Therefore, this study used the normalized correlation based on the equation of Fisher's transformation of r to Z_r as an effect size, and the inverse variance as a weight for the computation of the mean correlation.

A fixed-effect model assumes all studies to have the same true effect size. The variation of effect sizes is due to the sampling error (within-study variation). The within-study variance for Z_r is $N - 3$. Therefore, the fixed-effect models used the inverse of $N - 3$ as a weight (Shadish & Haddock, 2009). In contrast, a random-effects model allows the true effect size to vary across studies. The variation of effect sizes can be caused by both within- and between-study variation. The random-effects model used the inverse of within-study plus between-study variances as a weight. Random-effects models are more general than fixed-effect models, and were therefore adopted in the present meta-analysis.

2.3. Dependence

The issue of dependence arises when multiple effect sizes are coded from a single sample. For example, some studies (e.g., Glogocheski, 2015) measured the extent of SNS use based on both duration and frequency of use, and therefore coded two correlations (between duration of use and academic achievement, and between frequency of use and academic achievement) from a single sample. To address the problem of dependence, the mean correlation was computed for each sample, except when examining the moderator effect of measure of SNS use.

3. Results

3.1. Description of included studies

The present meta-analysis included 30 studies, consisting of 34 independent samples comprising 21,367 participants. Table 1 presents the summary of included studies. Of the 30 studies, 18 were journal articles; 10 were dissertations, and 2 were Master theses. Twenty-seven of the 34 samples were from USA, and 2 were from Turkey. China, Jordan, Kuwait, Saudi Arabia and Europe each had 1 sample. The mean age of the sample was available in 26 samples, and was 19.47 years (range, 14–27 years old). Twenty-nine samples used GPA to represent academic achievement. Glass, Prichard, Lafortune, and Schwab (2013) and Khan et al. (2014)

Table 1

Summary of studies on the relation between social networking sites use and academic achievement.

Study	Publication Outlet	Country	N	Age	female	SNSs	SNS Measure	extent of use	domain of AA	ES
Abu-Shanab and Al-Tarawneh (2015)	journal	Jordan	113	16	NA	Facebook	NA	duration	global	-0.06
Al-Menayes (2015)	journal	Kuwait	1327	21.87	0.70	SNSs	Likert	duration	global	-0.09 ^a
Alwagait, Shahzad, and Alim (2015)	journal	Saudi Arabia	95	NA	NA	SNSs	NA	duration	global	0.07 ^a
Bellur et al. (2015)	journal	USA	361	19.20	0.57	Facebook	NA	duration	global	-0.11 ^a
Brubaker (2013)	dissertation	USA	73	20.78	0.41	Facebook	ratio	duration	global	0.03
Cohen (2011)	dissertation	USA	283	NA	0.83	Facebook	Likert	frequency	global	-0.14
Dixon (2012)	dissertation	USA	295	NA	NA	Facebook	Likert	duration	writing	-0.07
Glass et al. (2013)	Journal	USA	255	19	0.37	Facebook	Likert	duration	global	-0.15
Glogocheski (2015), #1	dissertation	USA	78	19.50	1	SNSs	Likert	duration, frequency	global	-0.12, -0.16
Glogocheski (2015), #2	dissertation	USA	38	19.50	0	SNSs	Likert	duration, frequency	global	0.09, 0.18
Heffner (2016)	thesis	USA	116	NA	NA	SNSs	Likert	duration	global	-0.24
Huang (2011)	dissertation	China	1549	14.97	0.48	SNSs	Likert	duration	Chinese, Math & English	0.01
Hyatt (2011)	dissertation	USA	613	NA	0.68	SNSs	ratio	duration	global	-0.11
Jacobsen and Forste (2011)	journal	USA	1026	18	0.65	SNSs	NA	duration	global	-0.10 ^a
Junco (2012)	journal	USA	1839	21	0.64	Facebook	ratio	duration	global	-0.04
Karpinski et al. (2013), #1	journal	Europe	406	22.23	0.62	SNSs	NA	duration	global	-0.27
Karpinski et al. (2013), #2	journal	USA	451	25.55	0.78	SNSs	NA	duration	global	-0.61
Khan et al. (2014)	journal	USA	690	15.50	0.51	Facebook	NA	frequency	global	0.09
Lin, Peng, Kim, Kim, and LaRose (2011)	journal	USA	117	26	0.50	Facebook	Likert	duration	global	.04 ^a
Long (2012)	thesis	USA	66	15.20	0.61	SNSs	ratio	duration	global	-0.22
Michikyan, Subrahmanyam, and Dennis (2015)	journal	USA	256	21.92	0.75	Facebook	ratio	duration	global	-0.06 ^a
Neto et al. (2015)	journal	USA	345	14.83	0.51	SNSs	NA	frequency	global	0.01 ^a
O'Brien (2011)	dissertation	USA	153	18.80	0.74	Facebook	Likert	frequency, duration	global	0.13, -.01
Ozer (2014), #1	dissertation	Turkey	200	22.65	NA	SNSs	Likert	frequency, duration	global	-0.07, -0.14
Ozer (2014), #2	dissertation	USA	226	21.34	NA	SNSs	Likert	frequency, duration	global	-0.20, -0.06
Pasek, More, and Hargittai (2009), #1	journal	USA	1049	NA	NA	Facebook	Likert	frequency	global	0.01
Pasek et al. (2009), #2	journal	USA	660	NA	NA	Facebook	Likert	frequency	global	0.12
Paul et al. (2012)	journal	USA	340	26.73	0.52	SNSs	Likert	duration	global	-0.13 ^a
Qahri-Saremi & Turel (2016)	journal	USA	6855	14	0.53	SNSs	NA	duration	global	-0.14
Rosen, Carrier, and Cheever (2013)	journal	USA	261	18.61	0.56	Facebook	Likert	frequency	global	-0.02 ^a
Sendurur, Sendurur, and Yilmaz (2015)	journal	Turkey	412	NA	0.51	SNSs	NA	duration	global	-0.23
Swang (2011)	dissertation	USA	130	16.87	0.36	SNSs	Likert	duration	global	-0.10
Walsh et al. (2013)	journal	USA	483	18.07	1	SNSs	ratio	duration	global	-0.06
Wen (2015)	dissertation	USA	201, 206	18	0.64	Facebook	ratio	duration, frequency	writing	0.10, -0.05

NA = not available.

Female = proportion of females; domain of AA = domain of academic achievement.

^a The information was not reported, but was obtained by contacting the authors.

measured global grades, while Dixon (2012) and Wen (2015) measured writing performance. Huang (2011) measured academic achievement from test scores in Chinese, Mathematics and English.

3.2. Publication bias

To address the potential problem of publication bias, the correlation between the rank of standardized effect size and sample size was computed. The Spearman rank correlation ($r_s = 0.04$, $p = .34$) and Kendall's rank correlation ($\tau = 0.09$, $p = .62$) were both statistically non-significant. Rosenthal's (1991) test was also performed to estimate the number of missing studies with a mean correlation of 0 that would be needed to reduce the statistical significance to 0.05. The number of such studies required was 1,393, which exceeded the threshold (Rosenthal, 1991; $5k + 10 = 180$, where $k = 34$ samples). Lastly, the trim and fill method was used. No effect size was imputed. Hence, the publication bias was not a threat to the validity of this study.

Table 2
Moderator analyses.

Indicator	k	Mean	95% CI		Q_B	p
			upper	lower		
Publication outlet					2.99	.22
Journal	20	-0.07	-0.12	-0.03		
Dissertation	12	-0.06	-0.13	0.01		
Thesis	2	-0.23	-0.90	0.76		
Country where study was conducted					2.22	.14
USA	27	-0.07	-0.11	-0.02		
Turkey	2	-0.18	-0.80	0.63		
Site					10.49**	.00
Facebook	15	-0.02	-0.07	.03		
SNS	19	-0.12	-0.16	-.08		
Scale of time spent					.02	.88
Likert	17	-0.05	-0.10	-0.01		
Ratio	7	-0.06	-0.14	0.02		
Measure of SNS use					7.67**	.00
Duration	28	-0.10	-0.13	-0.06		
Frequency	12	-0.01	-0.07	0.05		
Domain of Academic Achievement					0.49	.48
Global	31	-0.08	-0.12	-0.04		
Writing	2	-0.03	-0.75	0.73		

** $p < .01$.

3.3. Mean correlation coefficients and outlier analyses

The correlation of the 34 samples ranged from -0.61 to 0.14 with unweighted mean $\bar{r} = -0.08$ and $SD = 0.14$. The correlation for the USA sample in Karpinski et al. (2013; $r = -0.61$) was 3 standard deviations above the unweighted mean. The weighted mean correlation between SNS use and academic achievement was $\bar{r} = -0.09$, and the weighted mean correlation excluding this sample was $\bar{r} = -0.07$. The effect of large effect size of the USA sample in Karpinski et al. (2013) was noticeable. To avoid the influence of extreme values, the effect size of the USA sample in Karpinski et al. (2013) was replaced by the next largest value, with the correlation of $r = -0.27$. The weighted mean correlation after winsorizing the extreme value, was again $\bar{r} = -0.07$, which is small based on Cohen's (1992) guidelines. The homogeneity test was not significant with $Q = 33.53$ ($p = .44$), indicating that the distribution of the correlation was homogenous under random-effects assumptions.

Studies with large sample size received more weight than small studies when computing the weighted mean correlation. To address the issue of the heavy weight of studies with large sample sizes, the present study explored the effect of a large sample size on the weighted mean correlation. The mean sample size was 639.76 participants (range, 38–6855 participants) with a standard deviation of 1200.84 participants. The number of participants in Qahir-Saremi and Turel (2016; $N = 6855$) was 3 standard deviations above the mean. The weighted mean correlation excluding that study was $\bar{r} = -0.07$. Qahir-Saremi and Turel (2016) study was included for further analyses, as its large sample size had a minor effect on the weighted mean correlation.

3.4. Moderator analyses

3.4.1. Publication outlet

Table 2 presents the categorical moderator effects. Twenty samples were published in journals, 12 in dissertations and 2 in theses. The mean correlations were small for journals and dissertations ($\bar{r} = -0.07$ and -0.06 , respectively), and moderate for theses ($\bar{r} = -0.23$). Nonetheless, the effect of publication outlet was not significant ($Q_B = 2.99$, $p = .22$).

3.4.2. Country where the study was conducted

Two countries, namely USA and Turkey, had more than 1 sample. Therefore, the mean correlations were computed separately for these two countries, and were $\bar{r} = -0.07$ for USA, and $\bar{r} = -0.18$ for Turkey. The country effect was also not significant.

3.4.3. Sites used by participants

Fifteen samples assessed the use of Facebook, and 19 samples assessed all SNS use. The mean correlation was near 0 ($\bar{r} = -0.02$) for studies measuring Facebook use, and small ($\bar{r} = -0.12$) for studies measuring all SNS use. The effect of site was significant, with $Q_B = 10.49$ ($p = .00$).

3.4.4. Scale of time spent

The scale of time spent was available in 24 samples. Studies using Likert ($r = -0.05$) and ratio ($r = -0.06$) scales both had small mean correlations, and the effect of scale of time spent was not significant ($Q_B = 0.02, p = .88$).

3.4.5. Measure of SNS use

Multiple correlation coefficients were coded for multiple measures of SNS use from the same sample to yield 40 effect sizes, comprising 28 for duration of time spent, and 12 for visiting frequency. The mean correlation was small ($r = -0.10$) for research assessing duration of time, and close to zero ($r = -0.01$) for those measuring visiting frequency. The effect of measure of SNS use was significant with $Q_B = 7.67 (p = .00)$.

3.4.6. Domain of academic achievement

The most frequently assessed domain was general academic achievement, while two samples assessed writing achievement. The effect of domain of academic achievement was not significant, with $Q_B = 0.49 (p = .48)$.

3.4.7. Participant age

Weighted regression analyses were used to assess the effect of continuous moderators, namely mean age of participants and proportion of female participants in the sample. The mean age was available for 26 samples, and the regression coefficient $b (-0.01)$ was not significant ($p = .09$). Therefore, the mean sample age was not associated with the correlation between SNS use and academic achievement.

3.4.8. Participant gender

Empirical studies rarely report correlations specifically for males and females. Therefore, this work coded the proportion of female users. Twenty-six samples reported the proportion of female participants. The regression coefficient $b = -0.14$ was not significant ($p = .25$).

4. Discussion

The relation between SNS use and academic achievement should be examined because of the reported negative association between multitasking and academic achievement (Bellur, Nowak, & Hull, 2015) and concerns over addiction to SNSs (Carbonell & Panova, 2017; Müller et al., 2016; Wu, Cheung, Ku, & Hung, 2013). Although empirical studies have been conducted to investigate this relation, no meta-analysis has been performed to synthesize their findings. To address this void, the present meta-analysis estimated the overall relation, and examined moderator effects on it.

The mean correlation between SNS use and academic achievement was low ($r = -0.07$), however, with magnitude comparable to the correlation between SNS use and well-being in Huang (2017). Hattie (2009) has conducted a very comprehensive synthesis over 800 meta-analyses on the relations between academic achievement and potential influences. He found that the average effect of homework on academic achievement was $d = 0.29$, which was approximately equal to $r = 0.14$. Hence, the effect of SNS use is not suitable to be considered trivial as it can offset half the effect of homework on academic achievement.

Some research contexts had particularly low correlation magnitudes. For example, the mean correlation for studies assessing Facebook use was near 0 ($r = -0.02$), while studies measuring all SNS use revealed a small negative association. These findings indicate that academically poor students tend to spend slightly more time on SNSs than academically good students. As all the included studies are correlational, the causal relation cannot be established. The mean correlation for research measuring visiting frequency was again near zero ($r = -0.01$), possibly because visiting frequency is an unsophisticated measure of SNS use.

Some research settings indicated high correlations between SNS use and academic achievement. Because these correlations were based on few samples, they need to be interpreted with caution. For example, the mean correlation for studies conducted in Turkey was small to moderate ($r = -0.18$), but it was based on only two samples. Nevertheless, the present study did not find a significant country effect, possibly due to the low statistical power of small number of effect sizes for Turkey. Further research is needed to elucidate the cross-culture effect on the relation between SNS use and academic achievement. Similarly, the mean correlation for theses ($r = -0.23$) was moderate, which was not similar to those for journal articles and doctoral dissertations, and yet the effect of publication outlet was not significant. Again, master's theses only yielded two effect sizes.

Studies on the relation between SNS use and academic achievement usually use undergraduate students as participants. As mentioned previously, few studies that examined this relation for adolescents were found. No studies to date have investigated this relation for children. More work is needed to address this void.

This study also has some limitations. First, separate means for each popular SNS, such as Twitter or MySpace, could not be computed, because the primary research rarely reported the correlation specifically for each SNS platform. Second, the homogeneity of effect sizes may account for the non-significant effects of most moderators.

5. Conclusions

The present meta-analysis estimated the overall relation between SNS use and academic achievement, and found a small negative mean correlation. The measurement of SNS use was associated with the relation between SNS use and academic achievement. Specifically, studies using Facebook use as a sole indicator to represent SNS use, or using visiting frequency to indicate the extent of

SNS use, had means near zero.

Disclosure

No competing financial interests exist.

References

- Eligible studies are marked with a single asterisk.
- (*)Abu-Shanab, E., & Al-Tarawneh, H. (2015). The influence of social networks on high school students' learning. *International Journal of Web-based Learning and Teaching Technologies*, 10, 49–59.
- (*)Al-Menayes, J. J. (2015). Social media use, engagement and addiction as predictors of academic performance. *International Journal of Psychological Studies*, 7, 86–94. <http://dx.doi.org/10.5539/ijps.v7n4p86>.
- (*)Alwagait, E., Shahzad, B., & Alim, S. (2015). Impact of social media usage on students academic performance in Saudi Arabia. *Computers in Human Behavior*, 51, 1092–1097. <http://dx.doi.org/10.1016/j.chb.2014.09.028>.
- Badri, M., Al Rashedi, A., Yang, G., Mohaidat, J., & Al Hammadi, A. (2016). Students' intention to take online courses in high school: A structural equation model of causality and determinants. *Education and Information Technologies*, 21, 471–497. <http://dx.doi.org/10.1007/s10639-014-9334-8>.
- (*)Bellur, S., Nowak, K. L., & Hull, K. S. (2015). Make it our time: In class multitaskers have lower academic performance. *Computers in Human Behavior*, 53, 63–70. <http://dx.doi.org/10.1016/j.chb.2015.06.027>.
- Borenstein, M. (2009). Effect sizes for continuous data. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.). *The handbook of research synthesis* (pp. 221–235). New York: Russell Sage Foundation.
- (*)Brubaker, E. V. (2013). *The relationship between Facebook activity and academic performance among African American students* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3558311).
- Carbonell, X., & Panova, T. (2017). A critical consideration of social networking sites' addiction potential. *Addiction Research and Theory*, 25, 48–57. <http://dx.doi.org/10.1080/16066359.2016.1197915>.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155–159. <http://dx.doi.org/10.1037/0033-2909.112.1.155>.
- (*)Cohen, A. (2011). *Higher education students' perspectives of the relevance of the online social networking site Facebook to education* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3457229).
- (*)Dixon, G. A. (2012). *Facebook, writing and language learner variables at a large metropolitan community college* (Doctoral Dissertation) Available from: ProQuest Dissertations and Theses database. (UMI No.3504044).
- Ellison, N. B., Steinfield, C., & Lampe, C. (2010). Connection strategies: Social capital implications of Facebook-enabled communication practices. *New Media & Society*, 13, 873–892. <http://dx.doi.org/10.1177/1461444810385389>.
- Experian Marketing Services (2011). The 2011 Social media consumer trend and benchmark report. <http://www.experian.com/assets/simmons-research/brochures/experian-marketing-services-2011-social-media-consumer-report2.pdf>.
- (*)Glass, R., Prichard, J., Lafortune, A., & Schwab, N. (2013). The influence of personality Facebook use on student academic achievement. *Issues in Information Systems*, 14, 119–126.
- (*)Glogocheski, S. W. (2015). *Social media usage and its impact on grade point average and retention: An exploratory study to generate viable strategies in a dynamic higher education learning environment* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3662954).
- Goodwin, L. D., & Leech, N. L. (2006). Understanding correlation: Factors that affect the size of r. *The Journal of Experimental Education*, 74, 251–266. <http://dx.doi.org/10.3200/jexe.74.3.249-266>.
- Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York: Routledge.
- (*)Heffner, T. M. (2016). *The effects of social media use in undergraduate students* (Master's Thesis). Available from: ProQuest Dissertations and Theses database. (UMI No. 1011245).
- Hew, K. F. (2011). Students' and teachers' use of Facebook. *Computers in Human Behavior*, 27, 662–676. <http://dx.doi.org/10.1016/j.chb.2010.11.020>.
- (*)Huang, H. (2011). *Social media addiction among adolescents in urban China: An examination of sociopsychological traits, uses and gratifications, academic performance, and social capital* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3514530).
- Huang, C. (2017). Time spent on social network sites use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking*, 20, 346–354. <http://dx.doi.org/10.1089/cyber.2016.0758>.
- (*)Hyatt, R. Y. (2011). *The influence of time spent by students engaged in co-curricular involvement, online social networking, and studying and doing coursework on their academic achievement* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3465635).
- (*)Jacobsen, J. C., & Forste, R. (2011). The wired generation: Academic and social outcomes of electronic media use among university students. *Cyberpsychology, Behavior, and Social Networking*, 14, 275–280. <http://dx.doi.org/10.1089/cyber.2010.0135>.
- (*)Junco, R. (2012). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior*, 28, 187–198. <http://dx.doi.org/10.1016/j.chb.2011.08.026>.
- Junco, R. (2015). Student class standing, Facebook use, and academic performance. *Journal of Applied Developmental Psychology*, 36, 18–29. <http://dx.doi.org/10.1016/j.appdev.2014.11.001>.
- (*)Karpinski, A. C., Kirschner, P. A., Ozer, I., Mellott, J. A., & Ochwo, P. (2013). An exploration of social networking site use, multitasking, and academic performance among United States and European university students. *Computers in Human Behavior*, 29, 1182–1192. <http://dx.doi.org/10.1016/j.chb.2012.10.011>.
- (*)Khan, M. L., Wohn, D. Y., & Ellison, N. B. (2014). Actual friends matter: An internet skills perspective on teens' informal academic collaboration on Facebook. *Computers & Education*, 79, 138–147. <http://dx.doi.org/10.1016/j.compedu.2014.08.001>.
- Lee, R. B., Baring, R., Baring, R., Maria, M. S., & Reysen, S. (2015). Attitudes towards technology, social media usage and grade-point average as predictors of global citizenship identification in Filipino university students. *International Journal of Psychology*. <http://dx.doi.org/10.1002/ijop.12200>.
- (*)Lin, J., Peng, W., Kim, M., Kim, S., & LaRose, R. (2011). Social networking and adjustments among international students. *New Media & Society*, 14, 421–440. <http://dx.doi.org/10.1177/1461444811418627>.
- (*)Long, J. R. (2012). *Relationship of self-concept, depression, academic estimation, and online social networking in adolescents*. Unpublished Master's Thesis of University of Montana.
- (*)Michikyan, M., Subrahmanyam, K., & Dennis, J. (2015). Facebook use and academic performance among college students: A mixed-methods study with a multi-ethnic sample. *Computers in Human Behavior*, 45, 265–272. <http://dx.doi.org/10.1016/j.chb.2014.12.033>.
- Müller, K. W., Dreier, M., Beutel, M. E., Duven, E., Giral, S., & Wölfling, K. (2016). A hidden type of internet addiction? Intense and addictive use of social networking sites in adolescents. *Computers in Human Behavior*, 55, 172–177. <http://dx.doi.org/10.1016/j.chb.2015.09.007>.
- (*)Neto, R., Golz, N., & Polega, M. (2015). Social media use, loneliness, and academic achievement: A correlational study with urban high school students. *Journal of Research in Education*, 25, 28–37.
- (*)O'Brien, S. J. (2011). *Facebook and other Internet use and academic performance of college students* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3457926).
- (*)Ozer, I. (2014). *Facebook addition, intensive social networking site use, multitasking, and academic performance among university students in the United States, Europe, and Turkey* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3670739).
- (*)Pasek, J., More, E., & Hargittai, E. (2009). Facebook and academic performance: Reconciling a media sensation with data. *First Monday*, 14. <http://dx.doi.org/10.26907/10.26907>.

- 5210/fm.v14i5.2498.
- (*)Paul, J. A., Baker, H. M., & Cochran, J. D. (2012). Effect of online social networking on student academic performance. *Computers in Human Behavior*, 28, 2117–2127. <http://dx.doi.org/10.1016/j.chb.2012.06.016>.
- Pew Research Center (2015a). Social media usage: 2005–2015. <http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/>.
- Pew Research Center (2015b). Teens, social media & technology overview 2015. <http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015/>.
- (*)Qahri-Saremi, & Turel (2016). School engagement, information technology use, and educational development: An empirical investigation of adolescents. *Computer Education*, 102, 65–78. <http://dx.doi.org/10.1016/j.compedu.2016.07.004>.
- (*)Rosen, L. D., Carrier, L. M., & Cheever, N. A. (2013). Facebook and texting made me do it: Media-induced task-switching. *Computers in Human Behavior*, 29, 948–958. <http://dx.doi.org/10.1016/j.chb.2012.12.001>.
- Rosenthal, R. (1991). *Meta-analysis procedures for social sciences*. Newbury Park, CA: Sage.
- Rothstein, H. R., Sutton, A. J., & Borenstein, M. (2005). *Publication bias in meta-analysis*. West Sussex, England: John Wiley & Sons.
- (*)Sendurur, P., Sendurur, E., & Yilmaz, R. (2015). Examination of the social network sites usage patterns of pre-service teachers. *Computers in Human Behavior*, 51, 188–194. <http://dx.doi.org/10.1016/j.chb.2015.04.052>.
- Shadish, W. R., & Haddock, C. K. (2009). Combining estimates of effect size. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.). *The handbook of research synthesis* (pp. 257–277). New York: Russell Sage Foundation.
- Steinfeld, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology*, 29, 434–445. <http://dx.doi.org/10.1016/j.appdev.2008.07.002>.
- Sutton, A. J. (2009). Publication bias. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.). *The handbook of research synthesis and meta-analysis* (pp. 435–452). New York, NY: Russell Sage Foundation.
- (*)Swang, M. D. (2011). *From Facebook to gradebook: An examination of the relationship between teen use of social networking sites and academic achievement* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3491814).
- (*)Walsh, J. L., Fielder, R. L., Carey, K. B., & Carey, M. P. (2013). Female college students' media use and academic outcomes: Results from a longitudinal cohort study. *Emerging Adulthood*, 1, 219–232. <http://dx.doi.org/10.1177/2167696813479780>.
- (*)Wen, H. (2015). *Use of social networking technologies: Effects on college students' academic writing* (Doctoral Dissertation). Available from: ProQuest Dissertations and Theses database. (UMI No. 3714772).
- Wu, A. M. S., Cheung, V. I., Ku, L., & Hung, E. P. W. (2013). Psychological risk factors of addiction to social networking sites among Chinese smartphone users. *Journal of Behavioral Addictions*, 2, 160–166. <http://dx.doi.org/10.1556/JBA.2.2013.006>.