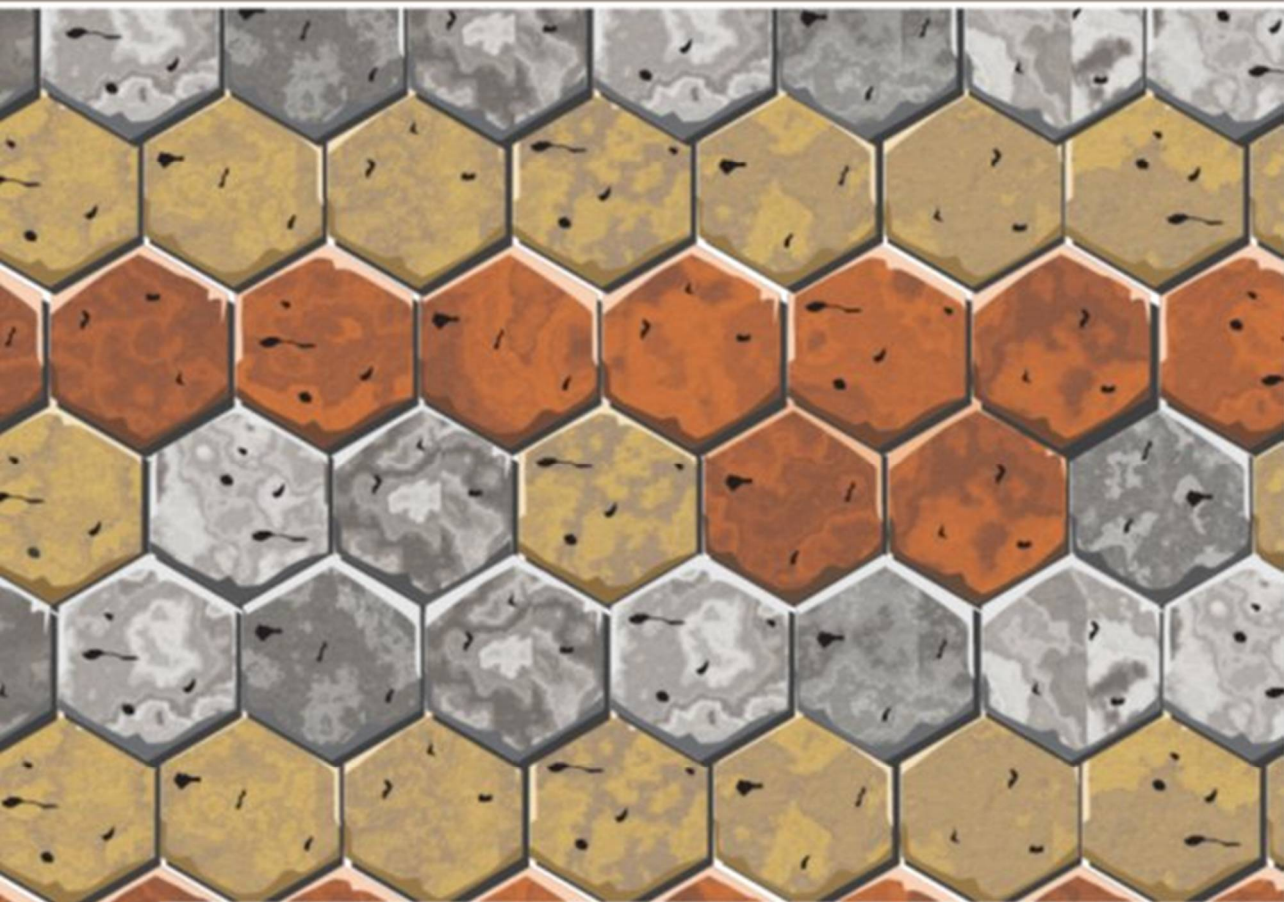


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RELATIONSHIP BETWEEN INTERNET USE AND SELF-REGULATED LEARNING IN EARLY ADOLESCENTS

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Abstract

While research increasingly seeks to establish links between digital technology use and educational outcomes, it rarely focuses on self-regulated learning and early adolescents. The data for the current study were collected through a survey, and the results show that Internet use for the purposes of having fun is negatively related to self-regulated learning among early adolescents, while the relation with Internet use for school purposes tends to be positive. Moreover, Internet-related multitasking during schoolwork was found to be negatively associated with self-regulated learning.

Key words: self-regulated learning, Internet use, early adolescents, multitasking

Introduction

Early adolescents are aged between 11 and 14 years (Marjanovič Umek and Zupančič, 2004). According to Erikson (1980) this is the time of discovering one's identity and place in the society. George and Odgers (2015) summarized the reasons why research on the influence that the Internet has on our lives should be focused on early adolescents:

- typical ways of Internet use coincide with critical developmental tasks of early adolescence (e.g. social media relates to the growing need for peer interaction);

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- early adolescence is an especially vulnerable period due to social, cognitive, biological, and psychological changes;
- today, this age group has never experienced a world without the Internet.

Nevertheless early adolescents are rarely included in research on the influence of the Internet on users' lives (Mills, 2016; Seo and Choi, 2018; Sigerson and Cheng, 2018; Tokunaga, 2017; van der Schuur, Baumgartner, Sumter and Valkenburg, 2015).

Due to the omnipresence of the Internet among young people, there is a growing body of research on the relations among related trends and learning and teaching. There is also growing proof of the unfavourable relations Internet use has with various aspects of learning. The use of the Internet for entertainment is associated with lower school achievement in many studies (e.g. Beland and Murphy, 2016; Gentile et al., 2011; Kim, Kim, Park, Kim and Choi, 2017; Lau, 2017; Roberts, Foehr and Rideout, 2005, 2010; Samaha and Hawi, 2016; Srivastava, 2010). A specific field in Internet use research focuses on Internet-related multitasking, which is defined as "...any form of multitasking with Internet technologies, for example, smartphones, computers, and so on" (Loh and Kanai, 2016: 509). A meta-analysis of the studies in this field confirmed relatively unequivocal negative relations between multitasking and learning (van der Schuur et al., 2015). With regard to the use of the Internet for educational purposes, the findings tend to be less consistent. Some studies identify a strong motivational role of the Internet in education, which leads to favourable learning outcomes (e.g. Folkesson and Swalander, 2007). Others state that the use of Internet for learning introduces too many distractions to improve the results (e.g. Perry and Steck, 2015). Some studies reported positive relations between the use of the Internet for educational purposes and learning achievement (Kim et al., 2017; Ozer, 2014), others found no such relations (Lau, 2017).

Based on reviews (e.g. Mills, 2016) and a search of the literature, self-regulated learning has received little research attention as an important aspect of learning. Self-regulated learning is defined as an active, constructive process in which learners construct goals and then monitor, control and regulate their own cognition, motivation and behaviour guided by goals and the context of the environment (Pintrich, 2004). It includes a multitude of cognitive, metacognitive, behavioural, motivational, and emotional aspects of learning

(Panadero, 2017). In the most cited models (Pintrich, 2004; Zimmerman, 2005, 2008) these aspects are divided into the following phases: before learning (planning), during learning (control and regulation) and after learning (reflection and evaluation).

The role of self-regulated learning in school achievement is empirically well supported (e.g. Dent and Koenka, 2016; Pintrich and de Groot, 1990; Tomec, Pečjak and Peklaj, 2006; Zimmerman and Martinez-Pons, 1988). However, educational practitioners are concerned that the skills of self-regulation are declining among younger people, who are growing up in an increasingly digital world (e.g. Lešnjak Opaka, 2020; Parsons and Adhikari 2016). While teachers and researchers do note some of the positive effects the Internet can have on learning, the opinion still prevails that students tend to be exposed to too much digital technology, and that the Internet is not always used wisely (Lešnjak Opaka, 2020; Ofcom, 2016; Rideout, 2012; Roberts et al., 2005, 2010).

Scollan and Gallagher (2017) suggest that the use of the Internet affects self-regulation, while self-regulation affects the use of the Internet, although this topic is still fairly unexplored. A number of authors thus call for more research on the links between Internet use and self-regulation (e.g. Baumgartner, Weeda, van der Heijden and Huizinga, 2004; Soror, Steelman and Limayem, 2012). Some studies which relate the use of the Internet with certain aspects of self-regulated learning have identified changes in certain cognitive characteristics, such as changes in attention (e.g. Loh and Kanai, 2016; Mills, 2016; Nicholas, Rowlands, Clark and Williams, 2011; van den Eijnden, Lemmens and Valkenburg, 2016), capacity and ways of retention and recall (e.g. Mueller and Oppenheimer, 2016; Srivastava, 2010; Terras and Ramsay, 2012), as well as changes in metacognition (e.g. Burkett and Azevedo, 2012) or executive functions (e.g. Baumgartner et al., 2014; Ophir, Nass and Wagner, 2009). If the findings of the effects that the use of the Internet has on the cognitive components of self-regulated learning are unsettling, the relations with the motivational aspects seem more promising. Students tend to be fond of learning with digital technology (Folkesson and Swalander, 2007; Fraillon, Ainley, Schulz, Friedman and Gebhardt, 2013), and the enjoyment they feel while using it contributes to favourable learning outcomes (Mills, Knezek and Wakefield, 2013). However even when it comes to motivation some warn against the negative effects. Internet-related multitasking can

undermine the positive effects this increased motivation generally has on learning (Srivastava, 2010). It is also wrong to believe that the connections between motivation and the use of the Internet can be generalized to all representatives of the younger generations (Kirschner and Bruyckere, 2017; Terras and Ramsay, 2012).

There are few studies which introduce the concept of self-regulated learning into research on Internet use. A positive correlation between the use of the Internet for learning purposes and self-regulated learning has been found in a university student population (Prakash Kute and Pote-Palsamkar, 2017), although Burkett and colleagues (2012) reported that the great variety and number of representations of learning content, typical of the Internet environment, impairs the meta-understanding of the focal material. Another study which included high school students came to the conclusion that the use of tablet computers in class does not contribute to a more self-regulated learning (Perry and Steck, 2015).

Based on observations from educational practice and the scientific literature we can infer that unreflective use of the Internet may have negative relations with self-regulated learning. Since the few studies on this topic included only university and high school students, in the current work we focus on the period of early adolescence, when the Internet starts becoming an important part of one's life (Ofcom, 2006). It is also at this time of life that a dramatic increase in Internet use occurs (Roberts et al., 2010). However, since this is the age when children are still in compulsory education, where personal mobile Internet devices (typically smartphones) are more or less prohibited, we are specifically interested in the relations between the Internet use and self-regulated learning that takes place at home, as this is the environment where such technologies are used the most (Fraillon et al., 2014).

The study aims to answer one general research question:
What are the relations between Internet use and the self-regulated learning of early adolescents in the context of the schoolwork that takes place at home?

Method

The data was gathered with a survey. The sample consists of 104 students aged 11–14 years in the 6th (35%), 7th (25%) and 8th grades (40%) of four randomly chosen primary schools in Slovenia. Forty-five of the students are female and 59 are male.

The data collection took place in February and March 2020. Informed consent forms were signed by the parents of the participants. The participants provided data using printed questionnaires while in class, and supervised by the first author.

The following questionnaires were used:

- The Use of the Internet Survey was designed specifically for the present study. Its initial version was based on similar research instruments which measure the use of the Internet (Mills et al., 2013; Roberts et al. 2005, 2010; Sigerson and Cheng, 2018) or multitasking (Baumgartner et al., 2014; Foehr, 2006; Ophir et al., 2009; Ozer, 2014; Srivastava, 2010) and was later modified using data from a pilot study. It is intended to be completed by early adolescents and besides the demographic data gathers data about the time spent on the Internet each day for both fun and schoolwork. The reliability, as measured with Cronbach's alpha (0.76), is acceptable. Another part of the survey measures the scope of Internet-related multitasking, and this section proved to be highly reliable, with a Cronbach's alpha of 0.91. The construct validity was checked with an exploratory factor analysis that resulted in five underlying factors which explain 50% of the common variance: multitasking with short messages or social media, media multitasking, multitasking with computer games and video during schoolwork, browsing the Internet during schoolwork and multitasking during non-school activities.

- Children's Perceived Use of Self-Regulated Learning Inventory – CP-SRLI (Pečjak, Pirc, Podlesek, Komidar and Peklaj, 2019), which is a translation and an adaptation of a foreign instrument (Vandeveldt, Van Keer and Rosseel, 2013). This inventory is based on the Pintrich model of self-regulated learning, which was specifically adapted to fit the period of early adolescence. It is one of few tools that target early adolescents and addresses the concept of self-regulated learning as a whole (task orientation, planning, motivation, self-efficacy, monitoring, learning strategies, motivational

strategies, persistence, and self-evaluation). The validity and reliability of the instrument were checked by its authors. The construct validity was checked with a confirmatory factor analysis which showed that the concept of self-regulated learning is measured in accordance with the model proposed by Pintrich (2004) and adapted for early adolescents by Vandeveldel et al. (2013). Criterion validity was further confirmed by positive correlations with externally assessed metacognition and school grades. The reliabilities of the subscales measured with omega ranged from 0.64 and 0.88 and were acceptable, except for the subscale Planning which resulted in a questionable value of reliability of 0.47. In the present sample the subscale in question reached a Cronbach's alpha value of an acceptable 0.63 while the inventory as a whole turned out highly reliable, with a Cronbach's alpha of 0.96.

The collected data was processed using the statistical programme SPSS. Since the time spent on the Internet was not measured on an interval scale but on an ordinal one, the nonparametric Spearman rho coefficient for measuring correlations was preferred.

The research was approved by the ethical commission of the Faculty of Education of the University of Ljubljana.

Results with interpretation

1. Descriptive statistics

Table 1: Time spent on the Internet

	Me	Mo	SD
for fun			
games	3	2	1.46
browsing	2	2	0.92
SMS	3	2	1.32
video	4	4	1.23
photos	2	1	1.08
social media	2	1	1.16
for school			
browsing for information	2	2	0.98
ppt	4	4	1.42
translate	2	2	0.85
exercise	2	2	0.98
SMS	2	2	1.18
homework	2	1	0.92
students at school	1	1	1.04
teachers at school	3	3	1.01

1 – 0 min, 2 – 5–15 min, 3 – 15–30 min, 4 – 30–60 min

Converting the gathered data into hours and minutes reveals that an average early adolescent spends more than 5.5 hours on the Internet a day (ranging from 3 h 18 min to 7 h 53 min). Of this, more time is spent on the internet for fun (3 h 1 min) than for school (2 h 22 min). The most time is spent online watching videos, preparing PowerPoint presentations, playing computer games and communicating via short messages, in this order.

Table 2: Self-regulated learning

	M	Me	Mo	SD
task orientation	3.34	3.33	3.33	0.67
planning	3.60	3.75	4.50	0.78
extrinsic regulation	2.21	2.00	1.00	0.96
introjected regulation	3.22	3.25	3.25	0.87
identified regulation	4.16	4.33	5.00	0.79
intrinsic motivation	2.92	3.00	2.75	0.89
self-efficacy regulation	3.55	3.44	3.22	0.76
self-efficacy motivation	3.65	3.75	3.00	0.96
monitoring	3.44	3.42	3.29	0.71
surface learning strategies	3.67	3.66	4.00	0.90
deep-level learning strategies	3.21	3.33	3.33	0.98
motivational strategies	3.25	3.25	3.00	0.88
persistence	3.65	3.67	3.17	0.82
product evaluation	3.77	3.67	3.00	0.90
process evaluation	2.72	3.00	3.00	0.88
self-regulated learning (sum)	3.43	3.42	3.00	0.63

2. Time spent on the Internet for fun

The amount of time early adolescents spend on the Internet for fun is related to the degree they self-regulate their learning, as shown in Table 3.

Table 3: Spearman rho correlations between self-regulated learning and the time spent on the Internet for fun (only the statistically important correlations are shown)

	games	brow sing	SMS	video	photos	social media	total
SRL	-.329**						
TO	-.234**						
PL							
ER				.201*		.235*	.211*
INR	-.342**						
IDR	-.290**						
IM					.204*		
SER	-.315**						
SEM							
MT	-.328**						
LSL	-.320**						
LDL	-.368**					.220*	
MTS	-.234**						
P			-.231*	-.250**			-.237**
SPR	-.340**			-.207**			
OD							
SPR							
OC					.286**	.208*	

* $p < 0.05$ ** $p < 0.01$

SRL – self-regulated learning, TO – task orientation, PL – planning, ER – extrinsic regulation, INR – introjected regulation, IDR – identified regulation, IM – intrinsic motivation, SER – self-efficacy regulation, SEM – self-efficacy motivation, MT – monitoring, LSL – surface learning strategies, LDL – deep-level learning strategies, MTS – motivational strategies, P – persistence, SPROD – product evaluation, SPROC – process evaluation

The results show that the total time early adolescents spend on the Internet for fun is negatively related to two self-regulated learning aspects. Early adolescents who spend more time on the Internet for fun need more external regulation of their motivation and are less persistent in their schoolwork.

Among the Internet activities which are negatively related to self-regulated learning it is playing computer games that stands out, which is negatively related to self-regulated learning overall, as well as with its many components. Early adolescents who spend more time playing computer games are less task-oriented, and use the two more adaptive forms of motivation regulation (the introjected and

identified) less often. They also regulate their self-efficacy less, monitor their learning processes less, use surface as well as deep-level learning strategies and motivational strategies less, and self-evaluate their learning products less. Green and Bavelier (2003) reported that playing computer games widens one's visual attention, but this does not seem to be beneficial in the context of learning. Individuals with such widened attention continue to apply this even when narrow-focused attention is in place (Loh and Kanai, 2016; van den Eijnden et al., 2016). Computer games have also been acknowledged as an important obstacle to self-regulated learning by teachers (Rideout, 2012), while another study found connections between playing video games and procrastination in learning (Nordby, Løkken and Pfuhl, 2019).

Early adolescents who spend more time dealing with short messages are slightly less persistent than others. In earlier studies both teachers (Rideout, 2012) and high school students (Flanigan and Babchuk, 2015) agreed that paying attention to short messages impedes learning.

Watching Internet videos is negatively related to three aspects of self-regulated learning. Early adolescents who watch more Internet videos need more extrinsic regulation to do their schoolwork, are less persistent and self-evaluate their learning product poorly. The need for external regulation in combination with poor persistence may cause early adolescents to be lured into watching appealing videos more easily. But it is also possible that watching videos harms executive functions and consequently the self-regulated learning processes. A causal relation between watching fast-paced videos and an immediate decline in executive functions has been proven in young children (Lillard and Peterson, 2011), and this may apply to early adolescents as well.

Taking and editing photos is positively related to two self-regulated learning aspects, namely internal motivation and process self-evaluation.

The use of social media has an unusual pattern of relations to self-regulated learning. It is related with more use of deep-level learning strategies and process evaluation on the one hand, and with a greater need for external regulation of motivation on the other.

The relation between using the Internet for fun and self-regulated learning is predominantly negative, in accordance with previous research (Kim et al., 2017). It may be that early adolescents who self-regulate their learning less find more time to use the Internet for fun. Poor self-regulation skills are one of the causes of using the Internet for fun more often and for longer, and they also make the consequences of using it this way more negative (Gentile et al., 2011; Soror et al., 2012; Yildiz, 2017). But it is also possible that Internet use diverts attention from self-regulated learning or harms the self-regulation skills. Some authors claim that being online affects the development of self-regulation, but the mechanisms and scope of this remain relatively unclear (Crone and Konijn, 2018; Scollan and Gallagher, 2017). Crabb (2003) offers an explanation of a mutual influence, suggesting that poor self-regulation skills result in more use of technology, which in turn further harms the self-regulation skills.

3. Time spent on the Internet for school

The relation between the time spent on the Internet for academic reasons and self-regulated learning is mainly positive, and the correlations from our sample are presented in Table 4.

Table 4: Spearman rho correlations between self-regulated learning and the time spent on the Internet for school (only the statistically important correlations are shown)

	browsing for information	ppt	translate	exercise	SMS	homework	students at school	teachers at school	total
SRL		.226**		.313**					.222**
TO		.224**		.258**	.272**				.256**
PL									
ER									
INR									
IDR									
IM	.262**			.330**	.228*				.311**
SER		.201*		.277**					
SEM									
MT		.304**	.220*	.332**					.247*
LSL		.197*		.273**	.234*				.254*
LDL		.243**		.238*					.230*
MTS		.233*		.273**					.233**
P									
SPR									
OD				.233*				-.207*	
SPR									
OC		.258**		.371**	.287**	.278**			.379**

* $p < 0.05$ ** $p < 0.01$

For the meaning of abbreviations see Table 3.

Based on the results of this study, the participants who use the Internet for school purposes more often and for longer are better at self-regulating their learning. They are more task-oriented and internally regulated, they use more surface as well as deep-level learning and motivational strategies, and evaluate their learning processes more.

The positive relation between the use of the Internet for school and self-regulated learning is in line with earlier findings (Kim et al., 2017; Kute and Pote-Palsamkar, 2017; Talae, Sylva, Evangelou and Noroozi, 2018). Authors from the field of self-regulated learning warn that learning with the use of the Internet tends to be demanding due to the multitude of representations offered, and thus well-developed self-regulated learning skills are a necessary condition for such learning to be efficient (Burkett and Azevedo, 2012; Kavčič et al., 2021; Loh and Kanai, 2016; McEwen and Dubé, 2015; Terras and

Ramsay, 2012; Yen, Chen, Wang, Chen, Hsu and Liu, 2018). A relation between the use of the Internet and the motivational aspects of self-regulated learning has also been acknowledged in the literature (Kaye, 2017; Perry and Steck, 2015).

It is the activity of looking for extra learning exercises and using them to practice that stands out in the data. This is related to self-regulated learning in general, as well as with most of its components. Moreover, the role of the Internet in the autonomous consolidation of knowledge is also recognized in the literature (Kaye, 2017).

Early adolescents who use the Internet to search for various school-related information tend to be more internally motivated with regard to schoolwork.

Using the Internet to prepare PowerPoint presentations is positively related to self-regulated learning as such, as well as specifically with task orientation, self-efficacy regulation, monitoring, surface and deep-level learning strategies, motivational strategies and process evaluation.

The use of an Internet translator is only related to the greater use of surface learning strategies.

The participants who use the Internet for communicating with their schoolmates about school topics do not self-regulate their learning in general more. Nevertheless they are more task-oriented and internally regulated, use more surface learning strategies and evaluate their learning processes more. Keeping in contact with schoolmates using digital platforms is a kind of motivational strategy, and early adolescents can encourage each other and set examples in this way. The use of digital communication tools in learning is controversial in the literature, as some authors have found it is positively related to learning (e.g. Ozer, 2014), while others found no or even a negative relation (e.g. Lau, 2017).

The time spent doing homework on the Internet only correlates positively with process evaluation.

The time spent on the Internet during classes at school is not related to self-regulated learning. This lack of relation was also obtained in experimental studies in which teaching with the help of digital

technologies failed to result in any learning progress (Loh and Kanai, 2016; Perry and Steck, 2015).

Much the same is true for the time the teachers spend using the Internet during classes. Only one weak correlation was found, and even this is negative. The more the teachers use the Internet during classes the less the students self-evaluate their learning products. This finding is in accordance with the self-reports of slightly older adolescents from abroad, who reported a reduced focus on the teacher's oral explanation when accompanied by a PowerPoint presentation (Flanigan and Babchuk, 2015), and this phenomenon was also noticed by teachers (Terras and Ramsay, 2012). A number of authors observe how the fast and non-linear movements from one thing to another, which are typical for the Internet, impede attention, cause shallower data processing and reduce retention (Loh and Kanai, 2016; Mills, 2016; Nabuco de Abreu, 2017; Nicholas et al., 2011).

4. Internet-related multitasking

The relations between self-regulated learning and the Internet-related multitasking are mainly negative, as shown in Table 5.

Table 5: Spearman rho correlations between self-regulated learning and the Internet-related multitasking (only the statistically important correlations are shown)

	total multitasking	multitasking with short messages or social media	media multitasking	games and videos during schoolwork	browsing the Internet during schoolwork	multitasking during non-school activities
SRL			.245*	-.420**		
TO			.275**	-.358**		
PL				-.290**		
ER	.237**					
INR			.193*			
IDR	-.113*			-.370**		
IM	-.159*		.243*			
SER	-.143*			-.377**		
SEM	-.247**			-.374**		
MT			.245*	-.343**		
LSL				-.360**		
LDL				-.337**		
MTS	-.291**		.215**	-.279*		
P	-.156**			-.422**		
SPR				-.408**		
OD						
SPR						
OC			.285**	-.226**	.203*	

* $p < 0.05$ ** $p < 0.01$

For the meaning of abbreviations see Table 3.

Early adolescents who multitask with the Internet more often are less task-oriented and use the identified and internal regulation of motivation less. They regulate their self-efficacy poorly and are less motivated by it. They use motivational strategies less and are less persistent in their tasks. One way of interpreting these relations is that individuals who tend to multitask more have more difficulties fighting off unwanted distractors and are less flexible in regulating their cognitive processes, i.e. have poorly developed executive functions (Bowman, Levine, Waite and Gendron, 2010; Baumgartner

et al., 2014; Chen and Yan, 2016; Foehr, 2006; Kirschner and Bruyckere, 2017; Lau, 2017; Loh and Kanai, 2016; Mills, 2016; Ophir et al., 2009; Ugur and Koc, 2015; van der Schuur et al., 2015). Moreover, the causal direction may be circular since poor executive functions cause more vulnerability with regard to multitasking, while at the same time the multitasking behaviour further deteriorates executive functioning (Baumgartner et al., 2014).

As expected, the correlations turn out strongest and most numerous when Internet-related multitasking, and specifically playing computer games and watching Internet videos, takes place when the students are doing schoolwork. This is in line with the neuroscience findings on multitasking which proved that it causes scattered thoughts, constant focus shifting and superficial data processing, and thus learning while multitasking results in a worse retention (Bowman et al., 2010; Foehr, 2006; Mills, 2016; Srivastava, 2010). During multitasking data is not processed by the hippocampus, which usually organizes and categorizes the incoming data, but instead is processed by the striatum, which is intended for memorizing procedural knowledge and skills, and is not suitable for the retention of data (Nabuco de Abreu, 2017; Tancig, 2015, 2018, 2020). The removal of smartphones, which are the most common source of distractions, from classes was shown to cause better learning outcomes in one study (Beland and Murphy, 2016). Correlational and qualitative studies also showed that multitasking tends to be related to poor learning (Chen and Yan, 2016; Flanigan and Babchuk, 2015; van der Schuur et al., 2015).

The other aspect of multitasking that takes place during the schoolwork (browsing the Internet for information of interest) isn't negatively related to self-regulated learning. On the contrary, the participants who browse the Internet during schoolwork evaluate their learning processes better. This is not in line with the neuroscience findings on multitasking. However, we may presume that the Internet data is used as feedback during schoolwork, and therefore adds to the self-evaluation of learning processes.

There are no relations between self-regulated learning and whether or not a student is multitasking with short messages or social media while doing schoolwork. This finding is unexpected, since other authors reported that waiting for short messages, receiving and then replying to them while studying is the most common form of

distraction during the learning process (Chen and Yan, 2016; van den Eijnden et al., 2016).

The findings of this study show that the Internet-related multitasking which takes place during non-school activities is not related to self-regulated learning, or is only positively related to it. Early adolescents who combine different Internet activities use more introjected and internal regulation of motivation, use more motivational strategies and evaluate their learning processes more.

Conclusion

Some of the efforts students make with regard to their schooling achievement take place at home (e.g. homework, preparing papers and presentations, rehearsing, understanding and memorizing new study material, etc.). It is during early adolescence that these tasks start being more demanding, and it is also during this period that various Internet technologies start gaining a more prominent role in their lives. The students' growing independence and the greater availability of technologies make the Internet more easily accessible. Moreover, both teachers and parents expect the Internet to serve as a learning tool for this age group. At the same time they are concerned that the Internet, with its many tempting distractions, poses obstacles for learning. The present study confirms both the positive and negative effects of the Internet on students' learning.

The study proves that using the Internet for fun is mainly negatively related to self-regulated learning in early adolescence. This finding contributes to the body of research on this topic which also found consistently negative yet relatively weak relations between learning and Internet use (e.g. a review by van der Schuur et al., 2015). The results also show that not all fun Internet activities relate to self-regulated learning the same way. Computer games are reported as the most addictive Internet activity, with watching videos as the most time-consuming activity, and both are negatively related to self-regulated learning, while some activities, namely browsing the Internet for relevant information, using social media or taking and editing photos, interfere with self-regulated learning less, or even positively.

Early adolescents who multitask with computer games or by watching Internet videos during schoolwork are more likely to self-regulate their learning poorly. On the other hand, the Internet-related

multitasking that takes place during students' free time is not related to self-regulated learning, or is related to it positively.

Using the Internet for learning purposes is positively related to self-regulated learning. The two activities most strongly and consistently related to self-regulated learning are searching for extra exercises on the Internet for rehearsal purposes, and preparing PowerPoint presentations. However, the use of the Internet by teachers during classes is negatively related to self-evaluation of the related learning products.

The findings of this study highlight the importance of using the Internet in education more thoughtfully. They underline the belief that these new technologies are neither a problem nor a solution for education (Apple, 1988), as they can be neither or both. However, their productive use should be taught to early adolescents because this is one of the most important periods of development.

Although this study offers some interesting findings it also has some issues which make them difficult to generalize. The main research limitation refers to the small sample size. The data gathering started just before the COVID-19 pandemic and the related school closures, so our final sample was smaller than intended. This limits both the data processing and generalization of results. Another weakness of the study is the correlational design, which does not allow causal conclusions. The related field is demanding for experimental research, and more longitudinal studies are needed in this context. Self-reported data was used in this study and this demands good self-observation and honesty among the respondents. This can be an issue with early adolescents, who are prone to giving socially desirable answers. However, our results confirm what the current literature states and offer further findings, as well as suggesting directions for future research. Causal relationships should be determined using experimental and longitudinal designs. The effective strategies that early adolescents practice to regulate their use of the Internet for fun should be identified, as well as effective ways of teaching them in practice. The use of the Internet in ways that support self-regulated learning should be described more precisely. The use of the Internet by teachers during classes should also be looked at closely, since it turned out to be problematic in terms of support for the students' self-regulated learning.

Resources

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