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DIGITAL DISTRACTIONS: LEARNING IN MULTITASKING ENVIRONMENT

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Abstract

Modern learning environment is filled with digital distractions. Distractions lead students to engage in multitasking, i.e., task-switching, during the teaching and learning process - to shift attention from learning content to non-course-related activities. Psychological research is mostly focused on examining the negative effects of multitasking in three areas: cognition and academic performance; health; and interpersonal relationships. This paper deals with the field of academic achievement - specifically the effects that digital distractions have on students and the learning process. An analysis of articles published in scientific journals in the last five years has been done. Articles were searched through the EBSCO Discovery Service, and the searched terms were 'multitasking', 'digital distraction' and 'learning', in the title, abstract and/or keywords. In order for the article to be included in the analysis, it was necessary for it to deal with the learning process at least in part. Thus, 11 articles that were the results of empirical studies and 4 review/theoretically oriented articles were selected. The results of empirical studies show that multitasking may reduce learners' capacity for cognitive processing causing poor academic performance. Multitasking is more common in those media that provide instant emotional gratification, such as social media applications and sites. College instructors notice that digital distractions in the classroom negatively affect the teacher-student relationship, impair their job satisfaction, as well as the integrity of the classroom learning environment. Review studies, among other things, show that digital self-control interventions, which have been developed to alleviate the negative impact of digital distractions, are not effective enough. Banning the use of mobile devices in the classroom is not a good solution either, because banning the use of phones can encourage nomophobia, which will also negatively affect concentration and learning. For older students, banning the use of laptops leads to absenteeism from classes. What teachers can do is encourage students to write lecture notes by hand - in addition to making students more active, it has been confirmed that handwritten notes are more detailed than digital ones and lead to a more permanent recall. Technology breaks can also be effective in reducing multitasking: after a period of learning without multitasking, there is a break in which students can check text messages or social media.

Keywords: *Multitasking, digital distractions, learning, students.*

1. Digital distractions and multitasking

The term 'multitasking' implies that a person does several things at the same time. However, people cannot multitask at all - multitasking is a myth (Nass, 2013). We don't do multiple things at once because our brains don't have the capacity to function like that (Wagner, 2018). What we actually do is task-switching. "Thus, what people really mean when they say that a person is able to or are even good at multitasking is that this person, be it children, adolescents or young adults have, through practice, developed the ability to quickly switch between carrying out different tasks or using different media." (Kirschner & De Bruyckere, 2017, p. 139). Despite this knowledge, the term multitasking has become omnipresent in psychological research and is still used today.

The environment the modern man lives in is filled with digital distractions, which have attracted special attention with the outbreak of the Covid-19 pandemic and the transition to work and learning from home. People often have several devices switched on at the same time: smartphones, desktop or laptop computers, and maybe even a smart TV. The devices themselves have several active applications, and the notifications shift attention from the task to the distraction, which becomes a new task - until the next distraction appears. As Aagard notes (2019, p.88), this kind of "media multitasking is not a matter of attention divided, but of attention diverted". The studies are mostly focused on examining the negative

effects of multitasking in three areas: cognition and academic performance; health; and interpersonal relationships (Zamanzadeh, 2021). This paper deals with the field of academic achievement - specifically the effects that digital distractions have on students and the learning process.

The problem of media use, i.e., multitasking, during class lectures was examined even before the pandemic, regardless of online instruction. Students often justify their use of mobile phones or laptops during lectures with course-related searches. However, older studies have already shown that non-course-related, 'distractive' multitasking is highly prevalent in such conditions, and students significantly underestimate the time distractions take up (Kraushaar & Novak, 2010). In the research conducted by Kraushaar and Novak (2010), in addition to self-report measures, students agreed to use activity monitoring spyware. Thus, the precise data was obtained that applications unrelated to the course were used about 42 percent of the time. Students did engage in course-related, 'productive' multitasking, which was associated with greater academic success (Kraushaar & Novak, 2010). Very similar data were obtained for learning at home. Observations of 263 students during 15-minute study periods showed that average time on task was less than six minutes before they switched their focus, most often to a technological distraction such as social media or texting (Rosen, Carrier & Chever, 2013). Students who preferred to task-switch had more distracting technologies available and those who accessed Facebook had lower grades than those who avoided it while learning at home (Rosen, Carrier & Chever, 2013).

The subject of this paper is to summarize the results of recent studies dealing with multitasking, i.e., digital distractions in the learning process.

2. Method

An analysis of articles published in scientific journals in the last five years has been done. Articles were searched through the EBSCO Discovery Service, and the searched terms were 'multitasking', 'digital distraction' and 'learning', in the title, abstract and/or keywords. In order for the article to be included in the analysis, it was necessary for it to deal with the learning process at least in part. Thus, 11 articles that were the results of empirical studies and 4 review/theoretically oriented articles were selected. We will present a summary of the findings that the researchers obtained.

3. Results

3.1. Results of empirical research

In offline settings, experiments have shown that students who have the opportunity for non-lecture-related multitasking using mobile phones achieve lower academic success than students who do not use any digital technological tools, and take notes with pen and paper (Demirbilek & Talan, 2017). During online lectures, students themselves estimate that multitasking (watching TV, checking social media sites, texting, gaming) negatively affects self-efficacy, which jeopardizes academic performance (Alvarez-Risco et all, 2021; Wu & Cheng, 2018). Engaging in social media use while trying to follow instruction or learn may reduce learners 'capacity for cognitive processing causing poor academic performance (Demirbilek & Talan, 2017). At the same time, media multitasking occurs more often in relation to those media that provide instant emotional gratification: primarily social media applications and sites (Baumgartner & Wiradhany, 2021). A strong motivator to use social media also comes from the desire not to miss anything that is happening (the phenomenon called fear of missing out, FoMO). Media multitasking is associated with attention distraction and learning disengagement (Al-Furiah & Al-Awidi, 2020). An environment in which the student is increasingly interrupted by competing media while learning leads to fragmented reading (Liu & Gu, 2019).

Researchers have shown that when information is fragmented, decreased reading comprehension occurs, which is very unfavourable for content adoption (Liu & Gu, 2019). Students interrupt their work on the assignment even without external distractions (such as media) - mind wondering happens, intentionally or unintentionally (Ralph et all, 2020). Opportunity to media multitask does increase overall reports of being off-task, but the role of the media may be more complex. Researchers believe that an increased tendency to have an off-task locus of attention occurs because of intentionally shifting attention away from the primary task (Ralph et all, 2020). In an environment where multiple sources of information are constantly competing for our attention, it is possible that we have created a habit of interrupting what we do, taking frequent breaks and finding content that offers instant gratification - if we do not have ICT devices, we will create non-digital distractions on our own. This would mean that one-time removal of media multitasking capabilities does not completely solve the problem of focusing on the task.

College instructors have noticed that digital distractions in the classroom negatively affect the teacher-student relationship, impair their job satisfaction, as well as the integrity of the classroom learning environment (Flanigan & Babchuk, 2020).

Although it is possible that media multitasking occurs in a cognitively adaptive manner - that students choose combinations that require lower cognitive demands and do not lead to cognitive overload (Baumgartner & Wiradhany, 2021), it is still a phenomenon with negative effects. If media multitasking is intense and/or occurs over long periods of time, cognitive overload will occur, leading to insufficient message processing and stress response (Baumgartner & Wiradhany, 2021). All of this jeopardizes academic performance. One of the ways to reduce multitasking among students during lectures is technology breaks (Guinness, Beaulieu & MacDonald, 2018). If there is an agreement that, after a period of learning without multitasking, there will be a break in which students can check text messages or social media, the frequency of multitasking decreases. In two out of the eleven studies analysed, no connection was found between media multitasking and the learning approach or academic achievement/performance (Law & Stock, 2017; Wiradhany, van Vugt & Nieuwenstein, 2019).

3.2. Conclusions from theoretical and review papers

In a theoretical paper exploring the concept of multitasking, Aagard (2019) concludes that distractions in the learning process do not lead to cognitive overload; the real problem is attention directed towards educationally irrelevant activity. He believes that there is no point in asking whether this activity impairs learning because the answer is obvious. It should be examined when it happens, how it is experienced, and why it occurs so frequently (Aagard, 2019). Dontre (2020) presents a literature review of the effects of three forms of technology on student distraction: laptops, smartphones, and social media use. Many students are used to coming to lectures with laptops and taking notes that way. However, studies show that off-task activities will also take place, which are disruptive for both the off-task students as well as their neighbouring students. The solution can only be more responsible use of laptops, because, in case they are not allowed to use a laptop, many students choose not to come to class at all, which is an even less favourable option (Elliot-Dorans, 2018; according to Dontre, 2020). As far as smartphones are concerned, the results of the research speak in favour of negative effects on learning. The use of social media can increase engagement and communication between students and teachers, but the use of social media in the classroom is largely disruptive and generally increases academic distraction (Dontre, 2020). Zamanzadeh and Rice (2021) present selected empirically established negative effects of multitasking in three areas: academic, health, and interpersonal. These authors find several studies, conducted between 2009 and 2017, that speak of adverse consequences in three academic subfields: cognition, performance, reading and studying. The last, fourth paper from this group talks about digital self-control interventions, which are intended to alleviate the negative impact of digital distractions (Biedermann, Schneider & Drachsler, 2021). However, the results obtained are not very encouraging. The analysed “interventions showed varying degrees of effectiveness, and especially interventions that relied purely on increasing the participants’ awareness were barely effective. For those interventions that sanctioned the use of distractions, the current literature indicates that the sanctions must be sufficiently difficult to overcome, as they will otherwise be quickly dismissed.” (Biedermann, Schneider & Drachsler, 2021, p.1). However, the authors conclude that digital self-control interventions are one of the ways to address the problem, but there are still many open issues related to them.

4. Conclusion

The results of the vast majority of papers speak of the negative effects of digital distractions, i.e., multitasking, on the learning process. The mobile phone seems to be the most distractive device, and for older students, who come to lectures with laptops, it is the laptop itself; social networking apps and websites stand out in regard to the applications. Students engage in off-task activities in order to gain instant emotional gratification. Simply put, distractions lead to positive emotions, they are fun. However, these fun activities also lead to poorer reading comprehension, poorer content adoption, and lower grades. How should distractions be fought? Banning devices cannot be the answer. As noted by Al-Furiah and Al-Awidi (2020), a restrictive policy towards the use of smartphones can encourage nomophobia (fear of having no mobile phone), which will also negatively affect concentration and learning. For older students, the ban on the use of laptops leads to absenteeism (Elliot-Dorans, 2018; according to Dontre, 2020). Self-monitoring interventions and restriction-based interventions show insufficiently good results (Biedermann, Schneider & Drachsler, 2021). It is especially difficult to determine which content should be banned, because learners may need to communicate with their peers on a social media site or watch learning-related content on the same platform where they watch entertaining videos. What teachers can do is encourage students to write lecture notes by hand - in addition to making students more active, it has been confirmed that handwritten notes are more detailed than digital ones and lead to a more permanent recall. Technology breaks can also be effective in reducing multitasking: after a period of learning without multitasking, there is a break in which students can check text messages or social media. The only thing that is certain is that digital content will not become less distractive - we need to be more resilient.

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