

Cognitive Load of Multitasking: How Constant Task-Switching Shapes Attention Span

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ABSTRACT

Multitasking has become a normal phenomenon of daily life in the current digital age and is widely regarded as a way to become more productive. However, psychology and neuroscience research show that the constant alternation of the tasks imposes a lot of cognitive load that can adversely influence the capacity to sustain attention and overall performance. The current review presents an investigation in the relation to the multitasking, cognitive load and attention regulation and how more frequent the changes in tasks could be associated with short and long-lasting cognitive performance. It is shown that multitasking can create an illusion of productivity yet it places an enormous burden on working memory, reduces the efficiency in the processing process and predisposes errors, as well. Short-term effects will include disjointed attention, impaired task performance and information loss. Long-term multitasking has been linked to the declining sustained attention, growing mental fatigue, and failure to selectively perform tasks under long-term conditions. The overall implications of the findings to education, productivity, and mental health in the workplace are also demonstrated in the review. Multitasking was also observed to have negative implications on learning performance and deep learning in an academic context and impaired performance and accuracy in a work context. The constant pressure on the attentional resources

causing stress, falling self-regulation, and potential long-term losses of attention also play a psychological role in the strain. The new approaches such as mindfulness training, digital well-being interventions, and appropriate task management practices are offered as the means of changing the problem of cognitive overload. To bring the discussion to a close, it is important to note that, as much as multitasking might seem adaptive in the fast-paced setting, there are negative impacts of multitasking on attention span and this begs the question of balanced task engagement. The identification of these mechanisms would help individuals and organizations to become more effective and healthier in their cognitive practices.

Keywords: Multitasking, Task-switching, Cognitive load, working memory, Attention span, Productivity, Mental fatigue, Learning performance, Digital distractions, Mindfulness interventions.

1. INTRODUCTION

The digital revolution has changed the manner in which people work, learn and relate with their environment in the recent decades. The need to multitask and perform various things at the same time has been increasing significantly with the use of smartphones, laptops and high-speed internet that are becoming an inseparable part of contemporary life [1]. This climate has come to accept multitasking, either in the form of checking emails in meetings, browsing social media in between classes, or alternating between work and personal correspondence throughout the day. Although multitasking has recently gained popularity as an indicator of flexibility and efficiency in the fast-paced world, there is mounting psychology and neuroscience evidence suggesting that this continuous task-switching has some secret costs of cognition[2-4]. These expenses are most important in the impact that these have on working memory, the obstruction of the attentional focus, and the eventual deterioration of the sustained attention span. Multitasking is a term that is widely misconceived. In common culture, multitasking is viewed to be multiple activities happening simultaneously, but, in cognitive science, it is a better term to refer to quick task-switching between competing activities of using similar mental resources [5, 6]. Complex cognitive tasks cannot be automated effectively as opposed to simple physical tasks which can be automated like walking and talking at the same time. In cases where two or more tasks that are

demanding are attempted at the same time, it is not possible that the brain can process them concurrently, but rather, it switches between them and as a result, it incurs a switching cost. Such switching costs do not only slow down performance but also promote errors and reduce general efficiency [7, 8]. One should refer to the concept of cognitive load to comprehend the rationale behind the fact that multitasking is a mentally draining experience. A cognitive load is defined as the sum of mental effort currently being operated up in working memory [9]. The cognitive load theory further breaks this effort into three categories: intrinsic load which is the result of task complexity; extraneous load which is the result of presenting information and finally the germane load which is a result of learning and schema building [10]. Multitasking has the propensity to overload extraneous by obliging the mind to open and shut again and again to tasks and thus absorbing attentional resources that would be channeled to some meaningful processing. This overload leads to poor understanding, poor memory storage, and divided attention as the working memory is limited in capacity [11-13]. Attention is even a selective and limited cognitive resource in itself. It serves as a screening mechanism that helps the brain to zero on the stimuli that is useful and Ignoring the unrelated distractions. As mentioned in neuroscientific studies, the brain areas, including the prefrontal cortex and parietal lobe, are used to control attentional control, and the neurotransmitters, including dopamine, are used to control the flexibility and the stability of focus [14, 15]. Multitasking disrupts this system as it puts too much strain on attentional networks and rejuvenates mental priorities. This process can also lead to attentional fatigue in the long-run as it would become increasingly harder to be capable of being focused on a single task at a time [16].

The most prevalent anxieties that have been expressed by this phenomenon are the long term impacts of multitasking on attention spans, more particularly the younger generations who were raised in a world flooded with digital stimuli [17]. Although the overall awareness is increased, there is still a lot to know about the overall impact of the continuously changing nature of work, regarding its implications on cognitive wellbeing [18]. The effects that multitasking has on mental health, potential of learning, and development of attention are not as obvious as the fact that multitasking negatively influences the performance of short-term

effectiveness; however, the long-term results of the given practice are more explicit. Further, the majority of the literature is confined to academic or work-based situations and does not answer the question of how habitual multitasking affects natural cognitive processes, as well as, psychological processes or outcomes. Whether some types of multitasking can be less harmful; whether there are individual variations in working memory capacity and self-regulation which could mitigate the adverse effects [19] [20, 21] is unclear as well. The combination of these gaps allows concluding that a deeper study is necessary, which would unify the results of numerous fields of study to give a more accurate idea of the effect of multitasking on the attention span and cognitive functioning, in general. This review thus plays a twofold role one being to review the role of multitasking and task switching in creating cognitive load and second the impact of the two processes on attention span, learning, productivity and mental well-being. The synthesis will be a combination of the knowledge of cognitive psychology, neuroscience, education, and the organizational research to determine the trends of the current findings, gaps in the research, and the future research directions.

The article is extremely imprecise in what it captures of the short and the long-term effects of multitasking. Short term review is guided towards interaction of the fast switching with the working memory, comprehension and task efficiency. In the long term, it is concerned with determining whether the habit MIS is related to the development of sustained attention deficit, mental fatigue and general behavioral implications [22, 23]. Besides that, the review likewise possesses other practical implications in the five primary domains, which are academic performance, workplace productivity, psychological well-being. By doing so not only the researchers but also teachers, employers and people, that are now struggling hard to maximize their mental health in a world where it now has become an inevitable factor in our lives can benefit by learning something useful [24]. Lastly is that two sided sword of multitasking. On the one hand, it is the flexibility and fluidity needed by the realities of the current world and, on the other hand, it poses a threat to the stability of paying attention, which is a primary component of learning, decision-making, and overall mental performance. The balance of these forces is a significant finding to influence more healthy habits of cognitive practice, and digital

multitasking [25] interventions to support the augmented demands. It is the purpose of the review to contribute to that knowledge by presenting a systematic and evidenced-based discussion of the cognitive load and attention span impacts of constant task-switching.

1.1. Cognitive Load Theory

John Sweller was the first to formulate the Cognitive Load Theory (CLT) during the late 1980s, as a theory to explain the process by which knowledge is received and stored in the human brain. In its very basis, the theory is focused on the fact that the human working memory is also finite in terms of capacity and time. The long-term memory has much more capacity to store information, whereas working memory is only capable of holding and processing few chunks of information at a time. Tasks that require resources that are beyond the capacity of the working memory to accommodate cause the performance to be poor leading to incomplete learning, errors or low efficiency. This paradigm forms a very fundamental basis in establishing the reasons why multitasking places such a huge burden on cognition [26-28]. CLT separates cognitive load into three different categories, including intrinsic load, extraneous load and germane load. Intrinsic load is a difficulty of task that arises due to its complexity. As an example, mathematical equations provide examples where one needs to know the rules of arithmetic put an intrinsic burden on working memory. Extraneous load on the other hand comes about due to the presentation of information or the condition within which working in takes place [27, 29, 30]. An example is when one tries to learn what is in poorly crafted lecture slides containing irrelevant images or background noise that adds to extraneous load. Lastly, the germane load is the mental work that goes into schemas and meaningful connections that are required in long-term learning. Extraneous load is high when a particular person multitasks. Task switching interferes with attention, causes more mental shift, and generates unwanted processing requirements. Meanwhile, intrinsic load in any given task is still present causing pressure on working memory to be compounded. Due to the limited capacity of the working memory, multitasking may lead to reduced germane load that is, the individual will not have much room to develop deeper meaning or transfer information to the long-term memory. The correlation of cognitive load and working memory and attention capacity explains

why multitasking is ineffective [9, 31, 32]. The working memory is usually able to work with a set of 4-7 items at a time. Attention acts as a filter that determines the amount of stimuli that gets in the working memory and those that are disregarded. When people are multi-tasking, the attention is divided and the working memory is overloaded with conflicting inputs. Such overload causes the brain to distribute resources unproductively resulting in slower processing and increased mistakes. Cognitively, multitasking cannot be simply called ineffective because it has a direct negative impact on the processes of deep learning and sustained attention [32].

1.2. Multitasking and Task-Switching

Multitasking is commonly considered as the ability to do two or more things simultaneously in ordinary language. Nevertheless, cognitive studies indicate that human beings cannot really multi-task in instances involving complex cognitive tasks. The brain instead does a form of task-switching where attention moves speedily between tasks. As an illustration, when a student writes an essay but at the same time opens social media, he or she is not reading and posting simultaneously. Instead, their brain switches between writing and reading and there is a cost associated with each one. The best examples of multitasking are in real life [2, 33, 34]. During studies, students usually give themselves the chance to study and at the same time watch videos or answer messages. At work, employees don't have time to reply to emails, visit meetings and write reports at the same time. Individuals also tend to do what is termed in the literature as media multitasking, i.e., talking to their friends and checking their phones [35]. Though these practices are normal in contemporary society, they impose covert cognitive hidden costs. Task switching in the brain has systems that are based on the executive control processes that are operated by the prefrontal cortex. Whenever an individual goes between one task and another, the brain will go through two processes: goal shifting (that is deciding to concentrate on a new activity) and rule activation (that is, changing brain settings to fit in the new activity) [36, 37]. Indicatively, in case of transition between writing an email to answering a phone call, the brain will have to turn off the mental rules governing writing an email and turn on the ones governing verbal conversation. This is a fast process that takes up mental resources and time [38]. The expenses and constraints of switching continuously are well known. One, switching presents

time delays although it may be a matter of fraction of a second, which adds up in long multitasking intervals. Secondly, the task-switching process increases the rate of errors, since the brain might not completely inhibit the rules of the task that has been carried out before, and it will also result in the interference. Thirdly, multitasking compromises efficiency since the individual has to reorient themselves several times to do multiple tasks and, therefore, has less time to commit themselves to any single task. Research indicates that multitaskers are slower to accomplish tasks and are memory impaired than those who concentrate on a single task at a time [39-41]. Regular pattern of swapping tasks can gradually undermine the brain and its capacity to sieve out distractions and this forms a loop of less attention and overdependence on fragmented attention [13].

1.3. Neurocognitive Mechanisms of Attention

To achieve this, it is significant to examine the neurocognitive mechanisms that govern attention and control in order to comprehend the effects of multitasking on attention. Attention is not a one-dimensional process, but is rather a complicated system of brain activity with numerous brain regions and neurotransmitter systems engaged [42]. The executive processes are centered on the prefrontal cortex which includes the planning process, decision-making process, and task control process. It is tasked with making the significant stimuli visible, and the non-relevant stimuli not visible. There is a repetitive reconnecting of attention by the prefrontal cortex when multitasking and this leads to cognitive fatigue [43]. The parietal lobe is also significant in that it assists in spatial awareness and movement of attention of many sensory inputs. Meanwhile the anterior cingulate cortex is a conflict-monitoring system of conflicting tasks, and this fact shows that there is need to alter the allocation of attention [44]. Dopamine and norepinephrine, which are part of the neurochemicals, are important in the maintenance of attentional control. Dopamine mediates learning and concentration related to rewards that is significant to being alert to the task at hand and norepinephrine is important in being alert and responsive to new stimuli. Over-task switching may cause dysregulation of such systems resulting in diminished stability of attention and an increased vulnerability to distractions [45]. Financial costs of switching rapidly can be found in functional imaging. The frequency of switching causes the activation of the prefrontal cortex

and anterior cingulate cortex, which denotes the use of more energy. This hyperactivation in the long-term is related to mental fatigue and reduced efficiency. There can also be neuroplastic changes; those that have been used to multitask may develop weakened neural circuits on sustained attention, and pathways on quick shifting may be strengthened. This implies that continued multitasking may reorganize the attentional networks and individuals would be more likely to be distracted in the long term [2, 46]. As shown in Figure 2, the sustained attention score steadily declines as the number of task switches per hour increases, highlighting the direct relationship between frequent task switching and attentional fragmentation.

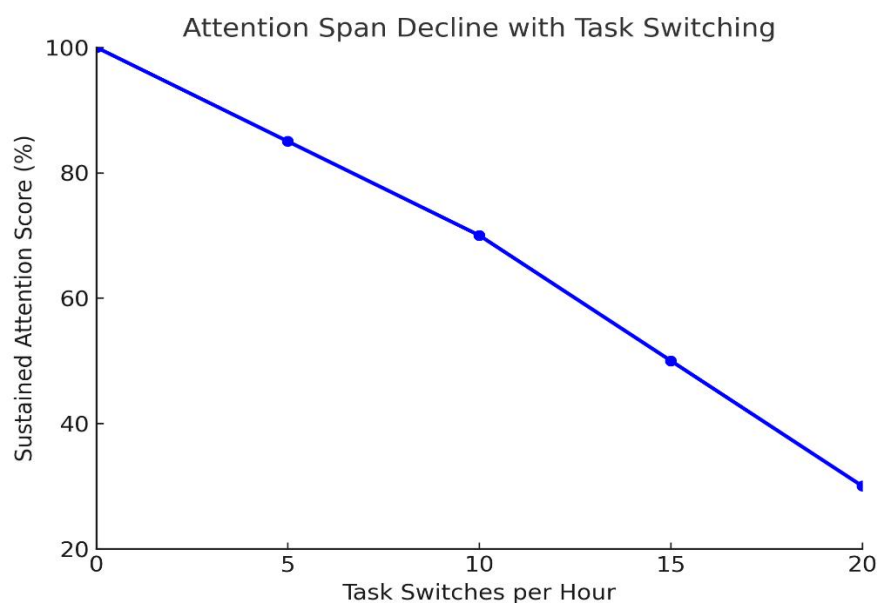


FIGURE 2. SUSTAINED ATTENTION DECREASES PROGRESSIVELY WITH HIGHER FREQUENCY OF TASK SWITCHING PER HOUR

The consequences of multitasking on attention can be categorized into the short-term lapses and long-term lapses. Multitasking in the short run is likely to result in discontinuous attention. Task switching disrupts the working memory and it becomes difficult to retain the thought processes. An example is that when a student receives a message and breaks reading to reply, then s/he finds it difficult to remember what s/he had just read thus the student develops superficial understanding [47, 48]. On the same note, employees who check emails in the meetings can only miss important information, and end up committing errors or

miscommunication. Such interruptions are not insignificant, even small gaps can increase the rate of errors by twofold and time of completion may be increased by a considerable margin. Of more concern are the long-term effects [49]. Multitasking on a regular basis may also train the brain to be always stimulated to the point of not being able to maintain concentration on one activity. This is also known as attention fragmentation and is observed as a failure to focus (long periods) even in the absence of distraction [50]. Research indicates that chronic multitaskers perform worse in the sustained attention tasks than those who single-task habitually do so. Also, sustained multitasking is associated with cognitive fatigue, stress and decreased cognitive endurance. It is a fact that comparative studies of multitaskers and single-taskers reveal a lot of differences. Single-taskers are generally more comprehensive, accurate and consolidating of memory [51]. In comparison, multitaskers demonstrate less profound processing and demonstrate reduced memorization. Even self-perception is different, multitaskers tend to think that they are more productive, but objective data show slow progress of the tasks and poor results [52]. The gap between the perceived and the actual performance depicts the illusion of multitasking- it seems to be efficient and in real sense, it compromises attention and productivity. Overall, it is clear that there is a great deal of evidence that multitasking impairs both short-term and long-term attentional processing. Although the brain is flexible and can adjust to the needs of the environment, continuous switching of tasks seems to drive attentional systems out of the optimal range, which leads to decreased ability to focus and engage in the process [6, 53].

1.4. Academic Performance in Students

One of the most researched settings where the effect of multitasking can be observed is the academic setting. There is a growing exposure of students, and most so higher education students, to digital distractions in classrooms and study rooms. Studies have continued to reveal that multitasking has negative effects on learning. In cases where learners are trying to split their focus between learning and other non-study activities like texting or checking social networks, learning is not very good and the information stays in the short-term memory. Indicatively, comparison of reading comprehension tasks conducted during instant messaging with uninterrupted reading shows that in instant messaging, the recall made was much lower [54, 55].

The requirement of alternating between study content and digital messages interminably prescribes an additional cognitive load against the less-attentiveness to germane load- schema formation and intense learning. Such practices are not only harmful in terms of short-run performance in tests but also, in long-run academic performance [56]. The other problem is in the lecture-based settings where taking notes using the laptops is usually accompanied with indecent surfing. During lectures, multitasking not only distracts the person doing it, but also the other people seated next to them, which diminishes the learning efficiency of the group. Research indicates that even up to short pauses like responding to one text, a sequence of missed information, which is hard to regain, may occur [57]. Multitasking patterns among students, therefore, help in causing discontinuities in learning, poor time management, and eventually poor performance.

1.5. Productivity at the workplace and Accuracy

Multitasking in the workplace is a concept that is confused with productivity. Combining taking emails, attending meetings and working on reports is always a common thing among employees. Although this gives a sense of being busy, it has been proved that multitasking reduces the efficiency and the chances of making mistakes are much higher. Individual task-switches use cognitive resources and repeated switching of tasks reduces the general progress [24, 58]. This relationship between multitasking and workplace productivity is illustrated in Figure 1, which shows that as the number of simultaneous tasks increases, accuracy declines while task completion time rises. As an example, the time spent by a worker alternating between writing a report and answering e-mail can be 25-40 percent longer than the time spent on a report had that person concentrated on it. Under multitasking conditions, error rates increase as well. Critical error is more likely to occur in professions that need high levels of accuracy, including healthcare and aviation, which have recorded that distractions and divided attention are the main factors that cause critical errors. In even fewer challenging jobs, like administrative one, multitasking is associated with increasing the number of clerical errors, miscommunication, and poor quality of outputs. The financial expenses are also high with organizations losing their productivity due to inefficiencies in the organization as workers are exposed to high levels of stress and reduced job satisfaction [40, 59].

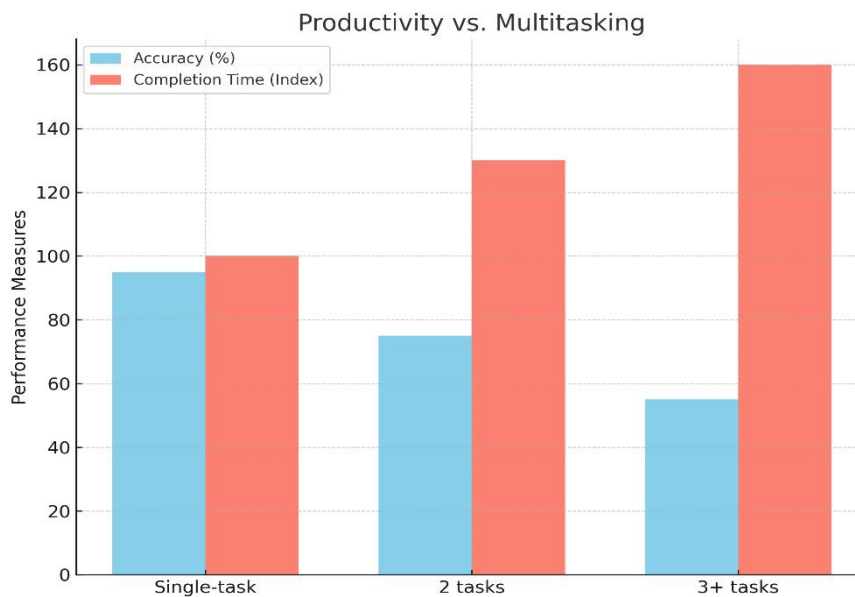


FIGURE 1.1 PRODUCTIVITY DECREASES WITH MULTITASKING: ACCURACY DROPS AND TASK COMPLETION TIME INCREASES AS TASK LOAD RISES

1.6. Digital Multitasking

Digital multitasking has been intensified by all those devices such as smartphones and social media, and they pose a distinct issue concerning learning and productivity. Messages and social network, messaging applications, and email notifications interrupt concentration several times per hour. Such distractions are especially disastrous since they take advantage of attentional biases to novelty and social approval. Studies on digital multitasking have shown that a smartphone, even when not used, reduces cognitive performance with the establishment of subconscious distraction [60, 61]. Digital multitasking in education is associated with poor grades and reduced concentration in the learning activities. Checking of phones in work places decreases the percentage achieved in terms of tasks and deadline. Furthermore, digital multitasking can create addictive behavior, where individuals train themselves to seek micro-satisfactions that the social media offers, rather than doing more demanding tasks. The feedback structure of this practice gradually kills the capacity to focus and ability to work hard [62, 63].

2. PSYCHOLOGICAL AND BEHAVIORAL RESULTS

2.1. Stress and Cognitive Fatigue

Multitasking is a burden on the mental resources, in most cases leading to stress and mental depletion. The executive control networks of the brain are worked, which is very energy-consuming, due to the task-switching habitual demands. This constant stimulation, over time, causes mental fatigue, therefore, reducing the performance and concentration. Physical consequences of mental exhaustion entail slowness of thinking, irritability and inability to solve problems. A higher level of stress also accompanies the pressures of multitasking in order to maintain a number of tasks at once when productivity is at a low level [64, 65]. This creates a vicious circle whereby people work more hours to compensate the lowered productivity in an academic and a working environment that is an even bigger cause of fatigue.

2.2. Habitual Multitasking Development

The negative effect of the digital era is habitual multitasking. Many individuals become accustomed to working in jobs that are distracting all the time and even to being interrupted. One such example is the fact that students reading phone and checking phone in the process are not comfortable when they do not get any kind of stimulus during the process of working [66]. On the same note, the professionals might end up in a situation when they are compelled to have the email tabs opened at any one time, owing to the fear that they will not be informed on matters of concern. Such a multitasking habit changes the behavioral pattern and the capacity to concentrate on something becomes more of an exception. Time causes the brain to anticipate something new and the fast change in actions and this undermines the tracks relating to serious focus and durability of the attention [67].

2.3. Connections with Attention Deficit Tendencies and Anxiety

The problem of habitual multitasking slowly turns into the fact of psychological asset and the emergence of anxiety disposition and attention disorders. This may cause the person to feel anxious since he/she feels overwhelmed through the confining demands every time he is bombarded with anything. One of the reasons why stress and anxious thoughts arise is the fear of the loss of control when there is no possible way to control interruptions [50]. Additionally, the prevalence of multitasking tendencies are also comparable to the signs of attention deficit

disorders including impulsivity, distractibility, and lack of concentration. Although multitasking does not directly bring about the attention deficit disorders in clinical settings, it can either intensify the attentional difficulties in susceptible groups, or even mimic such behaviors in healthy populations [68]. This brings up some questions regarding the psychological impact of multitasking lifestyle in the long term, especially in the teenagers and young adults.

2.4. Strategies to Reduce Cognitive Load

Since the effects of multitasking are negative, it is important to work out measures that would decrease cognitive load and allow increasing attention control. There are a number of evidence-based strategies that could assist people, teachers, and institutions to cope with the complications of incessant task-switching.

2.5. Task Management and Prioritization

One of the most feasible methods of reducing cognitive overload is through proper task management. Prioritization methods, including the Eisenhower Matrix or the Pomodoro Technique, get one task at a time and reduce the useless distractions. It is advisable to dedicate certain times to emails or messages so that a person is not interrupted during the day [69]. Subdivision of large tasks into small and manageable portions also minimizes the intrinsic cognitive load, and they can be done with less switching attention. Organizations may reinforce these practices through development of work processes that dishearten multitasking like setting of dedicated working time without meetings or notifications [70].

2.6. Mindfulness Training and Attention Training

Mindfulness practices have been the focus of attention because of the purpose of increasing focus and decreasing stress. Deep breathing, meditation, or body scanning help people to become more aware of the moment they are in and teach people to resist distractions. Training activities which stimulate concentration neural pathways, such as working memory exercises and sustained attention exercises, are strengthened. With time, these practices make people cognitively resilient and thus they are well prepared to handle multitasking pressures. Studies have shown that educational establishments and workplaces that implement mindfulness largely record better performance, a decreased stress level, and overall well-being of the participants [71, 72].

2.7. Digital Interventions to Well-Being

Digital well-being interventions should be targeted due to the fact that attentional fragmentation is a major driver of digital multitasking. They are restricting the use of notifications, the use of distraction-blocking applications during working hours, and the initiation of "digital detoxes. Temptations to multitask can also be minimized by creating device free areas in classrooms or meetings. Also, attentional systems can be reconditioned over time through cultivating healthy habits, including setting screen time limits, engaging in single-tasking activities on purpose. The organizations can take the active role in promoting digital hygiene policies, advising employees to break free of the constant connectivity and assisting employees in using the technology in moderate use [72-74].

3. AIMS AND OBJECTIVES

1. To investigate the impact of frequent task switching on sustained attention and cognitive performance.
2. In a study of the patterns of attention, there should be a decline with the varying levels of multitasking.
3. To support the psychological meaning of the topic of attention fragmentation in the context of productivity and mental health.

4. NEW TRENDS AND FUTURE DIRECTIONS

Multitasking, cognitive load and attention span are now being investigated and they are being shaped by the evolution of neuroscience, psychology and technology. The areas that are promising to provide our knowledge in these phenomena are numerous and present answers on how we can handle the cognitive overload in our day to day lives. The AI-based aids of task management is one of these trends. Productivity applications are becoming increasingly interested in artificial intelligence and can arrange the work plan and optimize actions and minimize unnecessary distractions. These mechanisms may potentially reduce the reduction of cognitive load and attention in extensive time because of the customized notifications and organization of work processes. The tools will have the potential of ensuring people find equilibrium between their productivity and mental wellbeing in a more complex virtual environment.

The second frontier, in this case, is the brain-computer interface (BCI) research. The

real-time analysis of the quantity of attention becomes possible by maximizing effort BCIs, which are capable of allowing direct communication between neuron activity and the fabric in question. Early signs suggest that BCI would be able to detect lapses in attention or mental load, and could provide remedial feedback, whereupon individuals would be less susceptible to multitasking requirements. Although the field is still in its experimental stage, it provides new opportunities to improve human attention management and decrease adverse effects of switching the tasks. Lastly, longitudinal researches on attention span are required in order to outline the long-term impacts of digital multitasking. Consistent findings on the cognitive development across years or decades through constant-task-switching are captured in few studies, as most of the current researches demonstrate short-term performance outcomes. The long-term studies are required to disclose that the multitasking habits involve permanent attentional impairment, or whether there is an ability of individuals to adjust to such requirements with time. This would be especially useful in informing the educational policies and workplace policies.

5. CONCLUSION

Multitasking is the new norm in the digital age, although studies have continually revealed that repeated task switching is a stress on the working memory, less efficient, and also disruptive to attention. The cognitive load theory explains why small mental resources are easily overloaded in the event of a conflict between multiple tasks, and neuroscience emphasizes the overload of the brain regions that control attention and executive functions. These impacts are manifested in the school and work. Learners also identify poor understanding and poor learning performance and workers identify poor performance and higher rates of failure. Psychologically, the regular multitasking is linked to stress, cognitive burnout and attentional impairment, which are problems that have long-term effects on the mental health. Despite these risks, there are good strategies. Mindfulness exercises, task prioritization, and digital well-being are the possible ways of reducing cognitive overload. Additionally, AI-powered task management and brain-computer interface are a novel technology that can introduce new ways of attention maintenance. Still, the long-term research needs to be carried out in order to understand the long-lasting effects of multitasking on attention. On the whole, it can be said that

multitasking can be considered a good practice, yet its hidden price to the cognition system and mental health is impossible to ignore. Attention might be a crucial resource to promote in a more digital world, and focused attention to tasks and supportive measures should be promoted.

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