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DIGITAL DEMENTIA IN UNIVERSITY STUDENTS – TRUTH OR MYTH?

Abstract: This study investigates the phenomenon of digital dementia—cognitive decline associated with excessive use of digital devices—among university students, with a focus on memory, attention, and emotional resilience. The objective was to explore whether digital dementia presents a measurable impact on cognitive abilities in students and to identify mitigating factors relevant to foreign language acquisition and academic performance. A structured online survey comprising 34 questions was administered to 141 students from two faculties at the University of Zagreb: the Faculty of Mining, Geology, and Petroleum Engineering, and the Faculty of Transport and Traffic Sciences, Department of Aeronautics. The survey assessed digital usage habits, memory performance, problem-solving abilities, emotional well-being, and social interaction patterns. Results reveal that students in Aeronautics, due to structured, hands-on training and greater engagement in cognitively protective activities like sports, music, and multilingualism, exhibited fewer symptoms of digital dementia compared to their peers in Petroleum Engineering, who reported higher reliance on digital tools and more cognitive and emotional strain. These findings suggest that academic structure, lifestyle, and extracurricular

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engagement can play a critical role in enhancing cognitive resilience. The study advocates for balanced digital usage, promotion of active learning, and curriculum adaptations to support mental health and learning efficacy in technology-driven educational environments.

Keywords: digital dementia, memory atrophy, excessive technology use, forgetfulness.

1. INTRODUCTION

Digital dementia is a term coined by German neuroscientist Manfred Spitzer to describe a decline in cognitive abilities typically associated with brain injuries (Spitzer, 2023, 51). This term, although relatively recent, originated in South Korea in the 1990s, where there was a significant rise in disorders related to attention, memory, and concentration (Wachter, 2015). These cognitive declines were also accompanied by a lack of empathy and emotional distancing in adults.

We are currently at a unique juncture in human history where our lives—and our brains—are being profoundly influenced and altered by digital media. Historically, people spent their leisure time reading, socializing, engaging in sports, or participating in various activities involving collaboration and interaction with community members. Today, however, there is a notable shift towards spending more time on digital media, as Spitzer observes, “even more than on sleeping (Spitzer, 2023, 11)”.

Following the advent of television, it was widely believed that this new medium would enhance our lives and democratize access to science, technology, and culture globally. This optimism spurred the development of diverse language learning techniques, such as learning through television, language laboratories, computer-based learning, and e-learning methods. However, these approaches have largely proven ineffective because no technological substitute can fully replicate the benefits of direct human interaction (Spitzer, 2023, 14).

Thomas Edison anticipated this shift in 1913 when he remarked, “Books will soon be obsolete in the schools. Scholars will soon be instructed through the eye. It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in ten years.” (Spitzer, 2023, 13). The past 30 years have seen a deep integration of information technology into all aspects of daily life. Yet, this technological infusion has had unforeseen consequences: tools designed to benefit us undermine our ability to concentrate (essential for learning), reflect deeply (for critical thinking), memorize effectively, develop language skills, and communicate coherently. These impairments affect personal development, including intelligence, ethics, moral attitudes, and identity.

2. LITERATURE REVIEW

The decline in cognitive abilities is observable without complex scientific testing. One simple way to notice this is through our use of telephone numbers. In the 1980s, before the pervasive spread of digital technology, an average person could memorize numerous phone numbers and navigate using physical maps or by remembering routes and landmarks (Woollett et al., 2009; Maguire et al., 2006). Today, however, we seldom attempt to memorize phone numbers, instead storing them in our smartphones, and we rely heavily on navigation systems, often ignoring the actual route and blindly following on-screen directions. Despite the intention of technological advances to simplify our lives, these changes have had adverse effects (Chomsky, 2012, 29).

Elementary school children no longer memorize songs and rhymes, which historically have been fundamental for developing the brain's capacity to store information. This shift is crucial as it affects their future learning abilities. Students have also ceased to engage in critical thinking, often accepting the first result provided by search engines without questioning the validity of the information they encounter (Spitzer, 2023, 93, Sparrow B, Liu J, Wegner DM., 2011).

The widespread introduction of computers and other digital devices into homes and classrooms has exacerbated these issues. Angrist and Lavy (2002, 735) demonstrated that the introduction of computer-aided instruction significantly negatively impacted the math achievement of fourth-grade students and had a negative but statistically insignificant effect on student achievement in other subjects and higher grades. Similarly, Fuchs and Woessmann (2004) found a “statistically significant positive correlation between the availability of computers at home and student performance in math and reading, which reverses into a statistically significant negative one as soon as other family-background influences are extensively controlled for in multivariate regressions” (Fuchs and Woessmann, 2004, 1). This suggests that children with home computers are more likely to use them for gaming rather than educational purposes, thereby undermining the intended educational benefits.

Moreover, Fuchs and Woessmann note that the usage of computers “between a few times a year and several times a month” (2004,15) contrasts starkly with the everyday, extended use seen today. A study by Christakis (2004) found that early exposure to television correlates with subsequent attention disorders, implying that early exposure to any digital screen could have similar effects. Such disorders typically lead to poor academic performance and social isolation (Kraut et al.). Although much of young people's screen time is spent on social networks, these interactions tend to be superficial and emotionally unfulfilling, leading to social isolation rather than enhanced social connections. This indicates that social networks and the social interactions they facilitate often leave young people feeling unhappy and emotionally empty.

The early and pervasive presence of screens and digital devices in children's lives begins virtually from birth. Many parents use YouTube cartoons to keep their demanding young children occupied, a phenomenon observable in various public places where children are frequently seen engrossed in their parent's mobile phones or tablets. This behaviour continues as children grow, becoming accustomed to entertaining themselves with computer games. However, Sharif and Sargent (2006) demonstrated that such activities negatively impact academic performance. Their study revealed that "the odds of poorer school performance increased with increasing weekday television screen time and cable movie channel availability and decreased with parental restriction of television content restriction." (Sharif and Sargent, 2006,1). This finding highlights the simple fact that time spent on digital activities detracts from study time. Spitzer (2023) offers another perspective: children might gravitate towards computer games to escape the reality of their poor grades.

The negative impact of computer and video game use was further explored by Weis and Cerankosky in 2010, who provided evidence that video games could displace educational after-school activities and hinder the development of reading and writing skills in some children (2010, 1).

The alarming effects of excessive digital device usage were first reported in South Korea. Researchers described a case involving a 15-year-old boy who developed memory problems, failed school tests, and eventually could not remember the six-digit code to enter his house. Diagnosed with early onset dementia, his condition was attributed to intense digital exposure. From the age of five, he had been continuously exposed to television and video games, impairing his brain's ability to transfer information to long-term memory. Over the years, Korean doctors have observed an increasing number of cases involving memory issues, attention disorders, and emotional flattening—a symptom of digital dementia characterized by an inability to connect emotionally and respond appropriately to emotional stimuli. Korean doctors hypothesize that frequent use of digital devices enhances the development of the left brain, responsible for rational thinking, while neglecting the right brain, which is crucial for concentration. Over time, this imbalance leads to cognitive disorders, such as shortened attention spans and reduced memory capacity, potentially culminating in early onset dementia. A growing number of young people today are experiencing these issues (Baek Il-Hyun, Park Eun-Jee, 2013).

Although digital devices were initially designed to ease the burden of memorizing large amounts of information, their overuse leads to a decline in cognitive skills and perceptual awareness. An additional concern is that the left and right prefrontal lobes, which mature around 17 to 19 years old, are particularly vulnerable during the period when teenagers are heavily exposed to digital devices (Manwell et al, 2022).

Another significant issue linked to digital dementia is emotional flattening, the inability to form and maintain emotional relationships and respond

appropriately to different emotional cues. In 2009, Bushman and Anderson tested the hypothesis that violent video games and movies desensitize individuals to violence and reduce their willingness to assist those in pain. They conducted two studies, one involving video games and the other movies.

In Study 1, participants were divided into two groups and played either a violent or nonviolent video game for 20 minutes. They then completed a lengthy questionnaire. During this time, they were exposed to a staged event where a loud fight occurred outside the lab, resulting in an injured person. The findings showed that participants who played violent games took longer to help the injured victim, perceived the fight as less severe, and were less likely to notice the fight compared to those who played nonviolent games.

Study 2 involved moviegoers who encountered a scenario where a young woman with an injured ankle struggled to pick up her crutches outside the theatre. This staged incident occurred either before or after the movie. Results indicated that individuals who had just watched a violent movie were slower to assist the woman compared to those in the other three conditions: those who watched a nonviolent movie or witnessed the scenario before the movie.

These studies collectively suggest that exposure to violent media, whether through video games or movies, reduces sensitivity to others' pain and suffering. This desensitization is evident in the delayed or diminished willingness to help those in need.

Spitzer (2023, 192) concludes that the passive consumption of movies and television has similar effects to actively playing violent computer or console games. The decline in basic human empathy after playing violent video games can be empirically measured through changes in bodily functions such as pulse rate and perspiration. Carnagey, Anderson, and Bushman (2007, 489) confirmed that after playing a violent video game for twenty minutes, players exhibit slower pulse rates and less sweating when exposed to scenes of real violence.

These issues are of profound importance for modern societies. As concluded by Manwell et al. (2022) and numerous other studies (Neophytou E, Manwell LA, Eikelboom R., 2019; Madigan S, Browne D, Racine N, Mori C, Tough S., 2019; Tamir DI, Templeton EM, Ward AF, Zaki J. 2018), continuous sensory stimulation—resulting from excessive exposure to digital devices and screens—affects brain development, increasing the risk of emotional, behavioural, and cognitive disorders. This overexposure impairs concentration and the ability to recall past memories or acquire new information. If such exposure occurs during critical periods of brain development, there is an increased risk of amnesia and early onset dementia. It even alters the brain's structure, affecting the grey and white matter volumes and raising the risk of mental disorders.

Manwell et al. (2022, 1) hypothesized that “excessive screen exposure during critical periods of development in Generation Z will lead to mild cognitive impairments in early to middle adulthood, resulting in substantially

increased rates of early onset dementia in later adulthood.”. They predict that from 2060 to 2100, Alzheimer’s disease and related dementias (ADRD) rates will rise significantly. Compared to previous generations, Generation Z (average 17-19-year-olds) spends approximately six hours a day using digital devices, a sharp contrast to past generations who had little or no exposure at that developmental stage. Manwell et al. predict a four-to-six-fold increase in Alzheimer’s disease and related dementias, which could lead to severe societal and economic crises and potentially collapse overburdened healthcare systems (Manwell et al., 2022, 1).

3. METHODOLOGY

The survey consisted of 34 questions, including three demographic questions to gather baseline information. The remaining questions were designed to investigate a range of activities and behaviours potentially linked to digital dementia or its prevention. These questions examined the participants’ ability to speak foreign languages, their involvement in sports activities, and whether they played musical instruments.

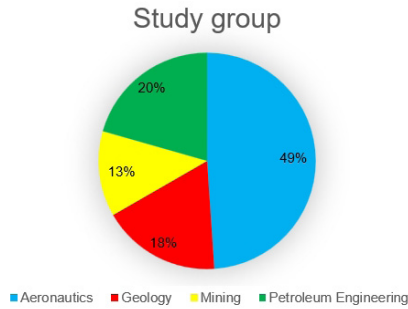
Additionally, the survey assessed their capacity to memorize phone numbers and perform simple arithmetic without the assistance of a calculator.

The survey also explored the students’ attitudes and behaviours related to their mobile phones. This included the number of hours they spent on their phones each day, the specific uses of their phones, and their reading and research habits. We also investigated the age at which they first began using digital devices, the duration of daily use in elementary and high school, and their current daily use.

Further, the survey addressed the nature of the participants’ friendships, contrasting online and real-life interactions, and gauged their attitudes towards these relationships.

4. RESULTS AND DISCUSSION

This study utilized a survey designed by the authors and distributed via Google Forms. The survey was administered to a total of 141 students from the University of Zagreb. Of these participants, 72 students, accounting for 51.1% of the sample, were enrolled in the Faculty of Mining, Geology, and Petroleum Engineering, while 69 students, representing 48.9% of the sample, were from the Department of Aeronautics within the Faculty of Transport and Traffic Sciences. The gender distribution consisted of 45 female students (31.9%) and 96 male students (68.1%), which aligns with the traditionally male-dominated nature of these academic disciplines. The age distribution showed little variation, with 87.2% of participants aged 18 to 20 years and 12.8% aged 21 to 23 years.



Graph 1

4.1. Demographic Analysis / Age and Gender Distribution

The majority of respondents at both faculties are within the age group of 18-20, which is a critical developmental stage for cognitive functions. This age group is particularly vulnerable to the impacts of excessive digital device use, as their cognitive faculties are still maturing. The gender distribution, with responses from both male and female participants, allows for a comparative analysis of how digital habits may differently affect cognitive health in young men and women.

4.2. Study Group

The study examines how digital device usage affects cognitive abilities across different academic fields, including Geology, Mining, Petroleum Engineering, and Aeronautics. While field-oriented disciplines like Geology may experience unique effects (Kastens et al. (2009), Aeronautics students, who rely heavily on precision, attention, and quick decision-making, provide insight into how essential cognitive functions such as spatial awareness and memory might be impacted by digital media use (Vidulich & Tsang, 2003; Wickens, 2002; Ophir, Nass, & Wagner, 2009).

4.3. Language proficiency and cultural influence

Research suggests that multilingualism, prevalent among Aeronautics students, enhances memory, problem-solving, and cognitive flexibility, potentially offering protection against cognitive decline associated with digital dementia (Morales et al., 2013; Bak et al., 2014; Adesope et al, 2010, Craik et al, 2010). Studies show that bilinguals and multilinguals often outperform monolinguals in tasks that require switching attention, inhibiting distractions, and adapting to new rules—key aspects of executive function and cognitive flexibility.

Bialystok (2009) found that bilingual individuals have advantages in executive control due to the constant practice of managing multiple language

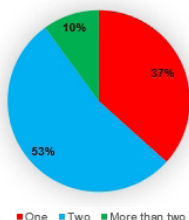
systems. This flexibility can help resist cognitive decline, especially in high-stress or multitasking environments (such as aeronautical fields).

Multilinguals regularly activate and manage different vocabulary systems and grammar rules, which exercises working memory and metalinguistic awareness (awareness of how language works).

Adesope et al. (2010) conducted a meta-analysis showing that bilingualism is associated with enhanced working memory, abstract reasoning, and metacognitive skills. These are protective factors against memory loss and can delay the onset of age-related cognitive decline.

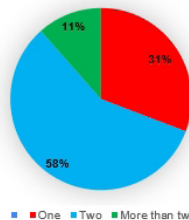
By engaging complex cognitive processes, multilingual individuals may experience fewer symptoms of digital dementia—a hypothesis worth exploring further. Additionally, cultural exposure, often linked to language proficiency, influences digital habits and cognitive resilience through diverse media engagement and adaptability. Aeronautics students, due to their field's global nature, frequently interact with multiple languages and cultures, fostering cognitive flexibility and reducing vulnerability to digital dementia, as shown in Graph 2. In contrast, Petroleum Engineering students, whose field has a more region-specific focus, exhibit lower levels of multilingualism and cultural exposure, which is shown in Graph 3, potentially limiting these cognitive advantages. Investigating these differences could provide valuable insights into the protective role of multilingualism and cultural adaptability in mitigating the effects of digital dementia.

How many languages do you speak?
(NOT counting Croatian) - AN



Graph 2

How many languages do you speak?
(NOT counting Croatian) - RGN

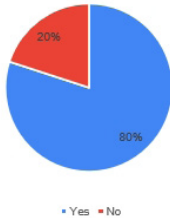


Graph 3

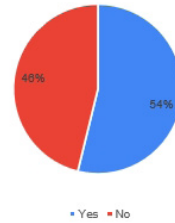
4.4. Lifestyle factors

Engagement in sports and music, known to enhance cognitive functions like memory, attention, and executive function, varies among respondents. Aeronautics students showed slightly higher participation as shown in Graph 4, possibly influenced by the physical and mental discipline required in their training and the fact that they have physical education as an obligatory subject during all six semesters, which may support cognitive resilience against digital dementia. In contrast, Petroleum Engineering students, though also engaged as noted in Graph 5 may prioritize academic demands over such activities, potentially limiting these cognitive benefits.

Do you do any sports? - AN

**Graph 4**

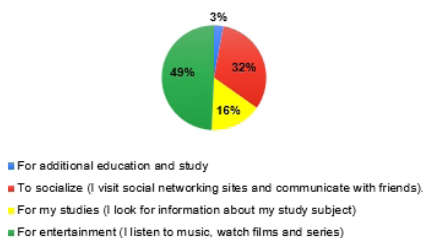
Do you do any sports? - RGN

**Graph 5**

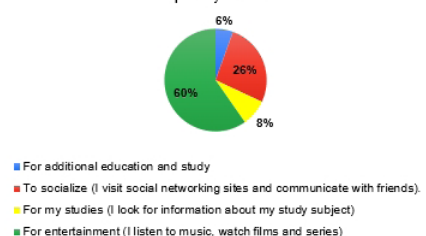
4.5. General digital use

Dependence on technology can be reflected in how well individuals remember phone numbers or manage daily tasks without digital tools. Difficulty recalling phone numbers may indicate over-reliance on devices and early signs of digital dementia (Kaspersky Lab, 2015, Spitzer, 2023). This connection can be explored through correlations with self-reported cognitive issues. In aeronautics studies, where precision is crucial, students' reliance on digital tools for memorizing schedules or key details warrants attention. Heavy dependence might increase their risk of digital dementia, affecting operational knowledge retention. However, Aeronautics students report fewer memory lapses than Petroleum Engineering peers, likely due to their structured training, which reinforces task management and memory retention. When asked what they use their digital device for most frequently for only 16 % of Aeronautics students use it for studies as seen in Graph 6 in comparison to 8% of Petroleum Engineering students as seen in Graph 7. In contrast, flexible schedules in Petroleum Engineering may encourage reliance on digital reminders, leading to more frequent forgetfulness. This suggests that structured routines in aeronautics training might offer protective cognitive benefits against digital dementia, even with significant digital device use.

What do you use your digital device for most frequently? - AN

**Graph 6**

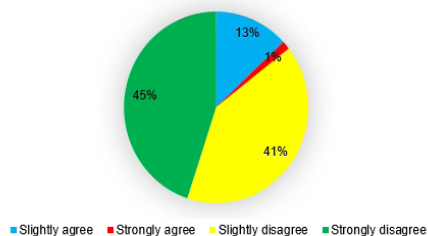
What do you use your digital device for most frequently? - RGN

**Graph 7**

4.6. Social and Emotional Aspects (Empathy and Social Interactions)

Empathy and social cognition, essential for effective communication, may be impacted by excessive digital media use (Uhls et al. 2014, Konrath, O'Brien, and Hsing, 2011; Turkle, 2015). Aeronautics students reported slightly higher levels of empathy and social understanding, which may be attributed to the collaborative nature of their training that emphasizes teamwork, communication, and coordinated decision-making. Research in social neuroscience confirms that empathy develops through repeated social interaction and role-based collaboration (Decety and Jackson, 2006). Cooperative learning environments, like those in aviation education, are also shown to enhance interpersonal skills and social cognition (Johnson and Johnson, 2009). In contrast, Petroleum Engineering students, whose training often involves more solitary and technical tasks, may have fewer opportunities for such engagement, which can limit the development of empathic abilities (Keller, 1985). Moreover, increased reliance on digital communication—a trend more prevalent in technically oriented disciplines—has been associated with reduced face-to-face interaction and declining empathy over time (Konrath, O'Brien, and Hsing, 2011; Turkle, 2015). These findings suggest that discipline-specific training environments and modes of communication may significantly influence students' social cognition and emotional awareness.

Friendships and relationships are just too difficult, so I tend not to bother with them - AN

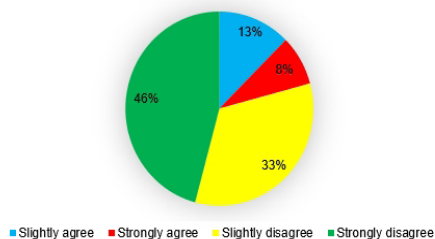


Graph 8

4.7. Perception of intrusiveness

Perception of intrusiveness, linked to social awareness, may be impaired by heavy digital device use, affecting the ability to gauge social cues. For Aeronautics students, situational and social awareness are critical for both professional and interpersonal success, making any decline in these skills particularly concerning (Uhls et al., 2014; Konrath et al., 2011; Misra et al., 2014; Salas et al., 2006; Wickens, C. D., 2002). Assessing whether digital media impacts their ability to sense intrusiveness is essential for understanding its effects on their social behaviour and professional performance. Both groups demonstrated a similar understanding of social

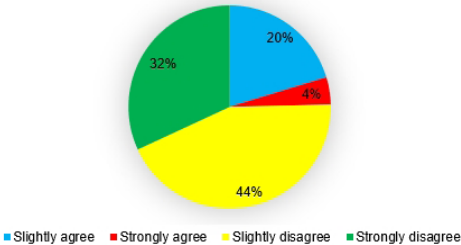
Friendships and relationships are just too difficult, so I tend not to bother with them - RGN



Graph 9

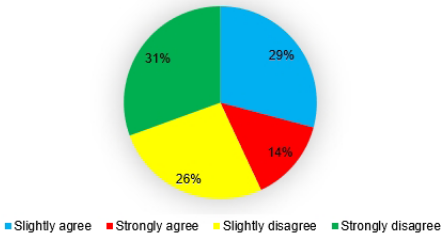
intrusiveness, though Aeronautics students showed slightly higher sensitivity to social cues. When asked if it bothers them to be late for a meeting, Aeronautics students expressed greater concern as can be seen in Graph 10 in comparison to Petroleum Engineering students as seen in Graph 11. This heightened awareness may stem from their training’s focus on clear communication and teamwork, and punctuality. In contrast, Petroleum Engineering students, often engaged in solitary or technical tasks (Lindblom-Ylänne et al., 2006; Turkle, 2015, Borrego & Bernhard, 2011) and potentially more reliant on digital interactions, may have fewer opportunities to develop this social awareness.

It doesn't bother me too much if I am late meeting a friend - AN



Graph 10

It doesn't bother me too much if I am late meeting a friend - RGN

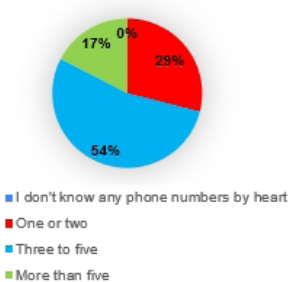


Graph 11

4.8. Cognitive Impact (Memory and Attention)

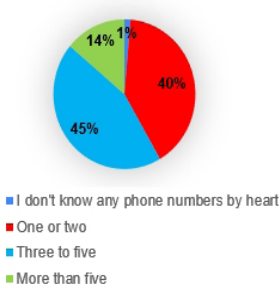
The data suggests that Aeronautics students generally exhibit better memory retention, such as recalling phone numbers as it is seen in Graph 12, compared to Petroleum Engineering students in Graph 13. This advantage may stem from the cognitive demands of aviation training, which emphasize precision and memorization. In contrast, Petroleum Engineering students, who rely more on digital tools for information storage, may experience reduced memorization skills, potentially indicating early signs of digital dementia.

How many phone numbers do you know by heart? - AN



Graph 12

How many phone numbers do you know by heart? - RGN



Graph 13

4.9. Problem solving and creativity

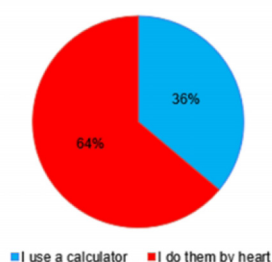
The data gathered by the survey and presented in Graph 14 indicates that Aeronautics students generally exhibit stronger problem-solving and creativity skills, likely reinforced by their training's emphasis on managing high-pressure, real-world scenarios and the need to often calculate by heart. In contrast, Petroleum Engineering students, while proficient in systematic and technical approaches (Litzinger et al., 2011; Threlfall 2002; Boaler, 1997), may have fewer opportunities to develop creative problem-solving skills so they usually use calculators for simple math as seen in Graph 15. Their higher reliance on digital tools might further contribute to a decline in these cognitive abilities, potentially reflecting early symptoms of digital dementia.

Do you do simple math by heart or do you use a calculator? - AN



Graph 14

Do you do simple math by heart or do you use a calculator? - RGN



Graph 15

4.10. Digital media use past and present

The analysis highlights distinct patterns in digital media usage and cognitive impacts between Petroleum Engineering and Aeronautics students. Both groups have increased digital device usage, but it is more pronounced among Petroleum Engineering students as can be seen when comparing Graph 17 and Graph 19 due to their reliance on tools for data analysis, simulations, and research. While essential for academic success, this dependence fosters cognitive challenges such as memory lapses, reduced concentration, and impaired problem-solving—symptoms of digital dementia. Non-educational device use further exacerbates these effects (Risko and Gilbert, 2016; Wilmer, Sherman, and Chein, 2017; Ward et al. 2017). In contrast, Aeronautics students demonstrate more balanced digital habits when comparing its usage in high school and now (Graph 16 and Graph 18). Their training emphasizes hands-on simulations, real-world scenarios, and face-to-face interactions, promoting cognitive engagement and reducing reliance on digital tools (Lateef, 2010; Salas et al., 2006; Turkle, 2015). This immersive approach supports focus and cognitive resilience. These findings underscore how academic environments shape digital habits. Petroleum students' screen-intensive tasks may heighten cognitive risks, while Aeronautics students benefit from physically engaging activities. Balancing digital reliance and integrating

cognitive resilience strategies remain essential in technology-heavy academic fields.

How much time did you spend using digital devices in high school a day? - AN



Graph 16

How much time did you spend using digital devices in high school a day? - RGN



Graph 17

How much time a day do you spend using your digital device at the moment (smartphones, laptops, tablets...)? - AN



Graph 18

How much time a day do you spend using your digital device at the moment (smartphones, laptops, tablets...)? - RGN



Graph 19

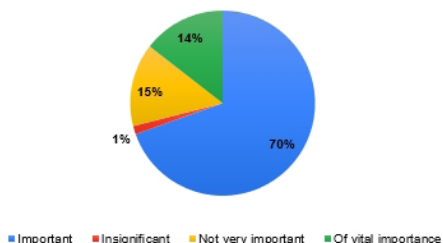
4.11. Emotional impact of digital devices

Petroleum Engineering students report higher levels of stress, anxiety, and digital fatigue, primarily due to their heavy reliance on digital devices for academic tasks, prolonged screen time, and constant connectivity. Their demanding workloads and dependence on digital tools exacerbate emotional strain, leaving them more vulnerable to the negative impacts of excessive digital use.

In contrast, Aeronautics students experience fewer emotional challenges. Their training emphasizes a balanced integration of digital tools with hands-on activities, face-to-face interactions, and real-world engagement. This approach reduces reliance on screens, alleviates emotional fatigue, and fosters better emotional resilience (Prince, 2004; Davidson & McEwen, 2012). When asked how important their phones are to them, the majority of students in both student groups expressed that it is important which Graph 20 and Graph 21 show clearly. These differences underscore how academic structures shape emotional well-being (Pascoe, Hetrick, & Parker, 2020; Yusoff, 2011; Field, Diego and Sanders, 2001). Petroleum Engineering's screen-intensive environment amplifies stress

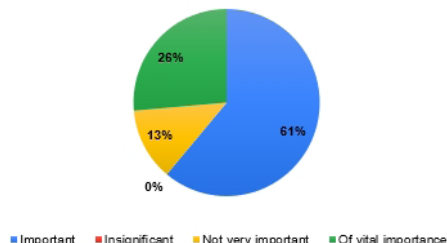
and anxiety, while Aeronautics' balanced approach promotes healthier digital habits and greater emotional stability. These findings highlight the importance of fostering emotional well-being and encouraging sustainable digital practices, especially in fields heavily dependent on technology.

How important is your cell phone to you? - AN



Graph 20

How important is your cell phone to you? - RGN



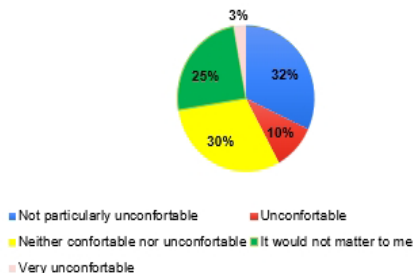
Graph 21

4.12. Self-reported symptoms

Self-reported symptoms such as forgetfulness, difficulty concentrating, and irritability suggest potential signs of digital dementia, often linked to digital media habits. Aeronautics students showed better focus in noisy environments, likely due to their training, which emphasizes concentration under pressure. In contrast, Petroleum Engineering students, accustomed to quieter settings, reported more difficulty maintaining focus when distracted (Montero et al, 2018).

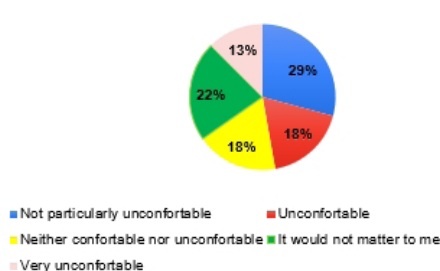
Overall, Aeronautics students were less likely to report cognitive decline symptoms, indicating that their structured, cognitively demanding training supports focus and memory retention. When asked how they would feel if they could not use their phones only 10% of Aeronautics students would feel uncomfortable as seen in Graph 22 in comparison to 18% of Petroleum Engineering students as seen in Graph 23. Petroleum Engineering students, with higher digital media use and less structured routines, exhibited more signs of cognitive decline. These findings highlight the importance of balanced digital habits and cognitive resilience, especially in fields requiring sustained mental performance.

How would you feel if you couldn't use your phone for one full day? - AN



Graph 22

How would you feel if you couldn't use your phone for one full day? - RGN



Graph 23

5. CONCLUSION

The findings highlight digital dementia as a growing concern among students, exacerbated by excessive reliance on digital devices. While Aeronautics students show better cognitive resilience due to structured, hands-on training, Petroleum Engineering students, with heavier digital dependency and less structured routines, face higher risks of cognitive decline. Prolonged screen time and non-educational digital habits contribute to symptoms like forgetfulness, reduced concentration, and irritability. However, engagement in sports, music, and multilingualism appears to offer protective cognitive benefits, enhancing focus, memory retention, and emotional resilience. These insights emphasize the need for proactive measures to address the cognitive risks posed by digital overuse, tailored to different academic disciplines and lifestyles.

To mitigate these risks, students should strive to limit non-educational screen time by setting specific boundaries for social media and entertainment use while adopting tools to monitor daily digital habits. Incorporating regular physical activity, such as participating in sports, outdoor exercises, or structured fitness routines, can significantly boost cognitive health and counterbalance the effects of prolonged screen exposure. Mindful device use is equally important, which includes avoiding multitasking across screens and dedicating device-free hours to rest the mind. Creative and cognitively engaging activities, such as playing musical instruments, solving puzzles, or reading, can also serve as effective tools for cognitive stimulation.

Fostering face-to-face social connections is another crucial step, as real-world interactions help maintain social cognition and emotional well-being. Joining study groups, attending social events, or engaging in collaborative academic projects can strengthen these connections. Establishing structured daily routines that balance screen time, study, physical activity, and relaxation can further enhance focus and mental clarity. Adequate sleep and consistent rest patterns are essential for memory retention and cognitive restoration.

Multilingualism, with its cognitive benefits, also plays a protective role. Practicing existing language skills or learning new languages can sharpen cognitive flexibility and strengthen mental adaptability. Cultural engagement and exposure to diverse social environments similarly provide mental stimulation and emotional resilience.

On an institutional level, universities should consider introducing workshops on digital well-being and cognitive resilience, alongside integrating screen-free, hands-on activities into academic curricula. These proactive measures can create a more balanced approach to digital engagement, fostering healthier habits and protecting students' cognitive health in an increasingly technology-driven academic environment.

While the focus on university students is valuable, it is the authors' opinion that it would be beneficial to explicitly link the survey's findings to students in

Language for Specific Purposes (LSP) contexts, particularly in specialized academic and professional disciplines like Aeronautics and Petroleum Engineering. These contexts demand not only subject-specific language proficiency but also high levels of cognitive focus, memory retention, and communication accuracy—skills that may be compromised by excessive digital device use. As Hutchinson and Waters (1987) observe, “LSP learners are often required to develop a communicative competence in a restricted domain of knowledge, under conditions that demand precise understanding and rapid recall.” Given that symptoms of digital dementia include forgetfulness and reduced attention span (Spitzer, 2023), the findings on cognitive decline due to digital overuse carry practical implications for foreign language instruction. Moreover, in LSP settings, the integration of domain-specific vocabulary and real-time problem-solving is crucial. As Basturkmen (2010) notes, “LSP instruction must address not only linguistic form but also the cognitive processes that underpin professional communication.” If digital media habits interfere with these processes—as suggested by the higher cognitive resilience observed in Aeronautics students due to structured, immersive training—then LSP programs should consider incorporating strategies to mitigate the cognitive risks of digital overuse, such as emphasizing memorization, face-to-face tasks, and active, context-rich language use. Integrating these insights into language instruction could improve learning outcomes in discipline-specific settings where both linguistic and cognitive performance are critical.

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DIGITALNA DEMENCIJA KOD STUDENATA: STVARNOST ILI MIT?

Rezime

Ovo istraživanje bavi se fenomenom digitalne demencije – kognitivnog slabljenja povezanog s prekomernom upotrebom digitalnih uređaja – među univerzitetskim studentima, s posebnim naglaskom na pamćenje, pažnju i emocionalnu otpornost. Cilj je bio ispitati da li digitalna demencija ima merljiv uticaj na kognitivne sposobnosti studenata, kao i identifikovati faktore koji mogu ublažiti njene efekte, naročito u kontekstu usvajanja stranih jezika i akademskog uspeha. Strukturirana onlajn anketa sa 34 pitanja sprovedena je među 141 studentom dva fakulteta Sveučilišta u Zagrebu: Rudarsko-geološko-naftnog fakulteta i Fakulteta prometnih znanosti – smer Aeronautika. Anketa je procenjivala navike u korišćenju digitalnih tehnologija, sposobnost pamćenja, rešavanje problema, emocionalno stanje i obrasce socijalne interakcije. Rezultati pokazuju da su studenti Aeronautike, zahvaljujući strukturiranoj, praktičnoj nastavi i većem učešću u aktivnostima koje štite kognitivne sposobnosti, poput sporta, muzike i višejezičnosti, pokazivali manje simptoma digitalne demencije u poređenju sa kolegama sa Naftnog inženjerstva, koji su izvestili o većem oslanjanju na digitalne alate i izraženijem kognitivnom i emocionalnom opterećenju. Ovi nalazi ukazuju na to da akademska struktura, stil života i vannastavne aktivnosti mogu igrati ključnu ulogu u jačanju kognitivne otpornosti. Istraživanje zagovara uravnoteženu upotrebu digitalnih tehnologija, promovisanje aktivnog učenja i prilagođavanje nastavnih programa radi podrške mentalnom zdravlju i efikasnosti učenja u obrazovnim okruženjima koje predvodi tehnologija.

Ključne reči: digitalna demencija, atrofija pamćenja, prekomerna upotreba tehnologije, zaboravnost.