Migration Letters

Volume: 20, No: S7(2023), pp. 1276-1303

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)
www.migrationletters.com

Sustainability in the Digital Age: Exploring the Long Term Consequences of Social Media Usage on Executive Functioning Skills of University Students and Professionals

Dr. Sunayna Iqbal[1]

Abstract

This article explores the the potential long term impact of social media usage on executive functioning skills of professionals as well as university students. The objective is to emphasize the importance of sustainable well-being in the digital era. The article examines if the usage of social media for a prolonged number of hours has an impact on significant cognitive skills such as decision making, goal persistence, metacognition, prioritising, sustaining attention among many others. Data was collected via a self-reported questionnaire containing 25 questions. 156 respondents constituting university students (above 18years) and professionals contributed to this survey. Impact of social media usage on seven executive functioning skills such as working memory, task initiation, goal persistence, stress tolerance, sustained attention, planning/prioritising and metacognition skills were examined in this study. A set of three questions each were posed to assess each executive functioning skill of the respondents. Social media usage was measured in terms of the number of hours spent on an average per day. The findings indicate that there exists statistically significant predictive relationship between social media usage and executive function skills in the sample population. Among the seven executive functioning skills examined, social media usage is found to have negative correlation with all of the skills. However, negative predictive significance is observed between social media usage and sustained attention and planning/ prioritising skills. The study highlights the need for a balanced approach to social media usage so as to preserve and prevent significant decline in executive functioning skills of the current and future workforce. This would help in proactively exploring interventions to prevent executive functioning impairment in a country's workforce and thereby ensuring sustainable learning and retention.

Keywords: *Social Media Usage; Executive Functioning; Metacognition; Stress Tolerance; Sustained Attention.*

Introduction

Social media and its usage has become an integral part of everyday life, profoundly influencing how individuals interact, gather information, share, express and engage with people around them. Social media platforms such as Facebook, Twitter, Snapchat, Instagram and TikTok have revolutionised communication and information sharing in today's world. The rapid increase in smart phone ownership has also contributed to this trend worldwide. However, these have also succeeded in creating an unprecedented urge for instant gratification and staying connected. The constant fear of missing out and the

[1] Senior Faculty, Department of Business and Management, Claud Littner Business School, University of West London, RAK Academic Zone, UAE, sunaynaiqbal@gmail.com

well strategized alluring- brief- capsule sized information thrown our way has led to an increase in the number of hours spent on social media at an increasing rate. In a study conducted by Pew Research Centre, 95% of teens own a smartphone or have access to one and 45% of teens reported to be online constantly. An average of nine hours a week are spent by American Teens online as per this study (Smith, 2018). 80% of students in the age group of 12-17years admits to spending their time online on social media (Hur, J. l., & Gupta, M. 2013). A study conducted in 2023 on social media usage statistics by age, US adults between the age of 27 and 42, belonging to the millennial generation, were found to be the highest users. The millennials are closely followed by Generation Z, aged between 11 and 26years (Lin, n.d.).

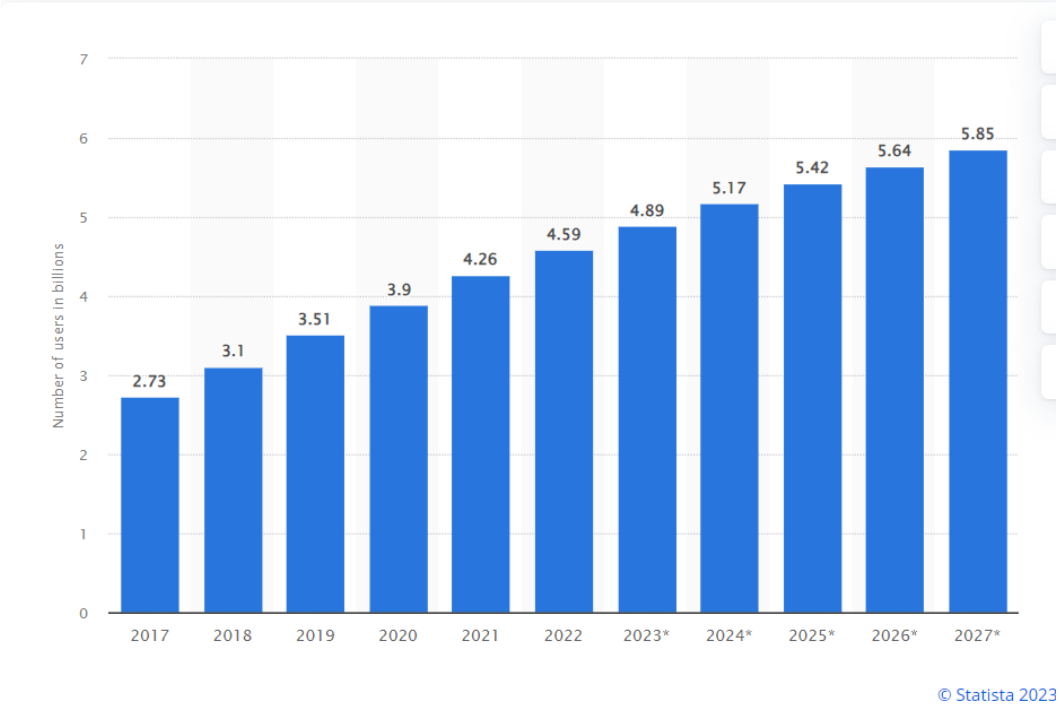


Figure 1: Source: (Internet and social media users in the world 2023, n.d.)

Number of social media users worldwide 2017 to 2027 is illustrated in the diagram above (Internet and social media users in the world 2023, n.d.) . 4.59 billion people were using social media worldwide. This number is projected to increase to 6 billion by 2027. Fall in attention span, decline in working memory, poor stress tolerance and metacognition, owing to social media usage, have become topics of extensive research worldwide.

Executive functions refer to those higher order cognitive abilities or skills that stem from the prefrontal cortex of the brain which facilitate planning, organising, decision making, working memory and goal persistence. In other words, they are a set of skills required by an individual to consciously guide one's behaviour and actions towards a goal (Banich, 2009). Executive functions have been explained as those abilities which helps in goal setting, strategizing, executing and leading to effective performance (Jurado & Rosselli, 2007). According to Tranter and Kerr (What are Executive Functions? - LD@school, 2017), executive function includes "working memory (the ability to hold and work with information with short periods of time), inhibitory control (the ability to manage and filter thoughts and impulses) and cognitive flexibility (ability to switch mental gears)". Existing researches have described executive functioning as a supervisory system which facilitates goal focused efforts (Cartwright, 2012). Executive function is broken down into more specific set of processes as shown in table 1 below.

Process	*Definition*
Attentional control	The ability to focus on particular information or a particular task regardless of distractions or fatigue
Cognitive flexibility	The ability to consider multiple bits of information or ideas at one time and actively switch between them when engaging in a task
Inhibition	The ability to restrain one's normal or habitual responses (also called *response inhibition* or *inhibitory control*)
Initiation	The ability to overcome inertia and begin a task
Metacognition	The ability to take a step back and reflect on thoughts, perspectives, and mental processes and assess their effectiveness
Organization	The ability to impose order on information and objects or to create systems for managing information or objects
Planning	The ability to decide which tasks are necessary to complete a goal, including understanding which ones are most important and the order in which the tasks should be completed to most effectively reach the goal
Response to feedback	The ability to adjust one's behavior or alter one's plans in the face of new information
Self-regulation	The ability to control one's own behavior and emotions in order to achieve goals
Switching or shifting	The ability to change one's attentional focus from an initial idea to a new one (this is related to cognitive flexibility)
Working memory	The ability to hold information in mind to support the completion of tasks

Figure 2 Source: (Cartwright, 2012)

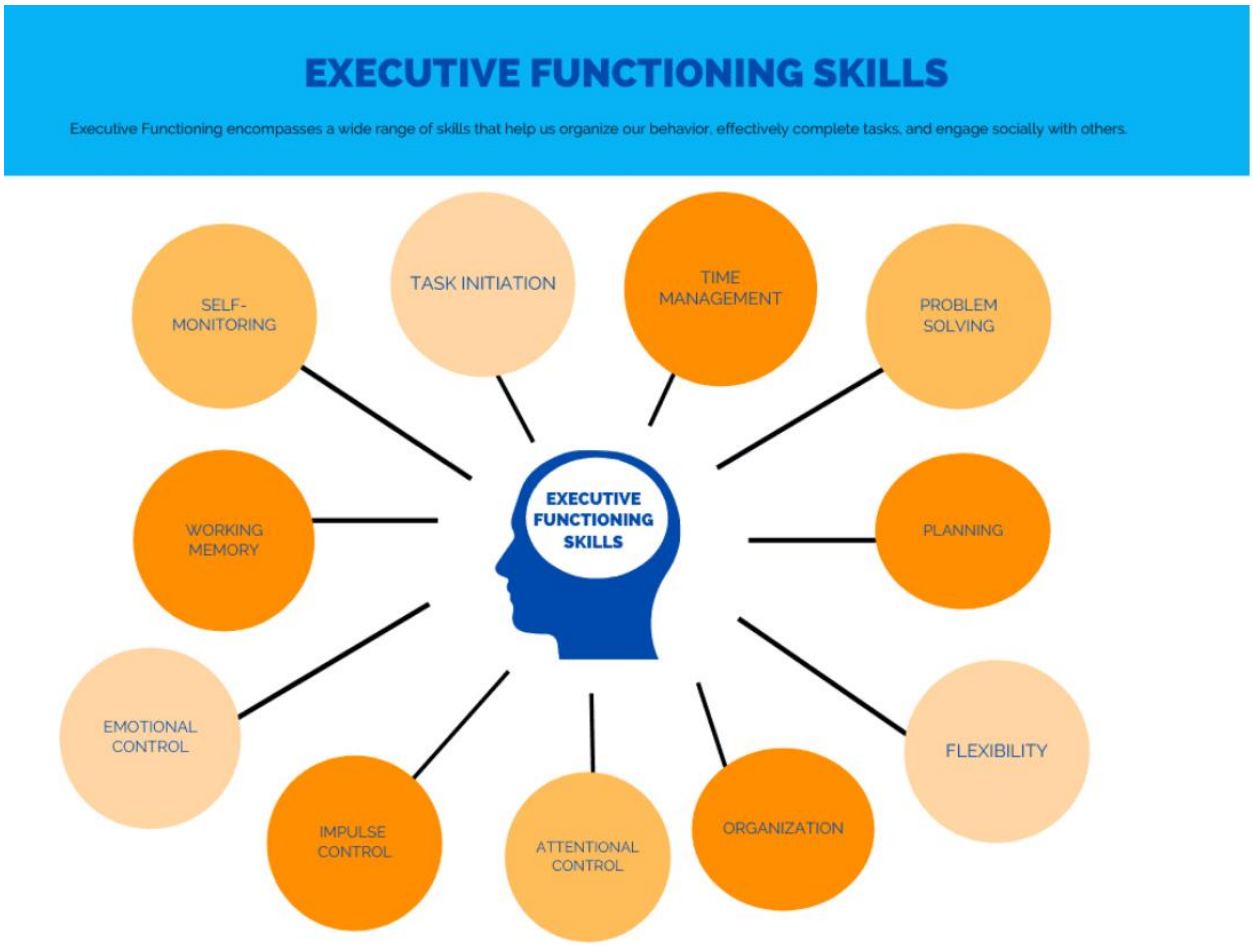


Figure 3 Source: (Sippl, 2020)

For the context of this study, seven executive functioning skills shall be discussed namely; working memory, task initiation, goal directed persistence, planning/ prioritizing, metacognition, stress tolerance and sustained attention.

Working memory is the capacity of an individual to retain and manipulate the information over brief time periods (A. Miyake & Shah, 1999).

Considered one of the main executive functions, it is defined as "a cognitive system that allows us to maintain and manipulate information in mind for short periods of time to guide behavior"

(Vuontela et al., 2013). A large body of research indicates the predictive significance of working memory and executive function on academic achievement of students (Swanson & Alloway, 2012). Tracy and Ross Alloway, in their book titled, The Working Memory Advantage, sheds light on the crucial role played by working memory in achieving success at work and relationships (Alloway & Alloway, 2014)

Task Initiation: An individual's ability to stay motivated, his willingness to take up new tasks, start performing irrespective of whether the task is a preferred or not so preferred is termed as task initiation. Motivation is the focal point of task initiation. Often poor task initiation skills lead to excessive procrastination and is misinterpreted as a behavioural issue or defiance among adolescents. Whereas the truth is that the student simply does not have this skill. Metin et al., (2018) observed in their study that procrastination and performance are negatively correlated. Poor task initiation leading to procrastination is found to have a negative impact on positive occupational constructs like work engagement and performance. Furthermore, its negative impact is evident on academic performance too (Steel, 2007).

Planning/ prioritizing involves proactively taking measures to decide the sequence of operations and following it to the t. This helps in prioritising tasks on the basis of their relevance to goal accomplishment. Researchers have time and again stressed on the statistically significant positive impact of planning on efficient employee performance (The impact of effective planning on the employees' performance efficiency in the Jordanian Health Ministry, 2014).

Effective planning is found to be a predictor of academic performance among students in multiple studies conducted around the world (Cohen et al., 1995), (Shi & Qu, 2022).

Sustained Attention is defined as "the process that enables the maintenance of response persistence and continuous effort over extended periods of time" (Ko et al., 2017) . It refers to the individual's capacity to focus on a task despite factors which lead to the contrary such as fatigue, external distractions etc. Sustained attention enables the person to concentrate on an activity over long duration of time. Psychologists divide sustained attention into two parts: vigilance and concentration. Vigilance involves detecting the appearance of a sensory input whereas concentration involves focusing on the sensory input/ stimulus. Sustained attention among students are cited as a significantly related to academic achievement (Steinmayr et al., 2010), (Gallen et al., 2023). Sustained attention is analysed and given due weightage in assessing 'person-job' fit in many professions and especially the high demand occupations (Münscher et al., 2022).
Goal Directed Persistence: An individual with high level of Goal-Directed Persistence would exhibit the ability to follow through to the completion of the goal, paying no heed to competing interests. This skill gains more relevance when the task at hand turns boring, gets frequently interrupted or when strategies have to be revised to achieve the goal. Undeniable correlation is found between goal oriented behaviour and performance (Seijts et al., 2004). The importance of goal orientation as a predictor of academic achievement is observed in the study conducted by Neroni et al. (2018) and Alasqah (2022)

Metacognition is that aspect of executive functioning which enables a person to reflect upon his/her own actions. This enables to step back and observe a situation objectively. It is enhanced by self-monitoring and self-reflection skills. While cognition involves carrying out a task, metacognition involves the process of analysing how the task can be executed. Research conducted on the topic of metacognition have found that metacognition is a significant predictor of academic achievement of students. Those who have secured higher metacognitive scores in assessments were found to achieve higher grades in academics (Velki, 2012), (Abdelrahman, 2020).

At work, metacognition paves way for better self-reflection and self-monitoring leading to better performance (Clark, 2008). It is observed to significantly influence employee's acquisition of knowledge, self- regulation, engagement and development of a growth mind- set (Lyons & Bandura, 2018).

Stress Tolerance: High stress tolerance levels indicates one's ability to stay calm without succumbing to a sense of helplessness or hopelessness. Individuals with high stress tolerance thrive in stressful situations and work best under pressure. They tap into this innate skill to cope with uncertainty and change. Young adults are invariably found to feel overwhelmed, suffer from emotional ups and downs and experience anxieties (Welle & Graf, 2011). Such emotions they experience have a significant impact on their scholastic performance. (Kamarudin et al., 2009), (Khajeali et al., 2021). Stress being one of the leading causes of absenteeism at work, stress tolerance skills play an important role in ensuring employee well- being and consequently their performance. It was observed by Bellinger (2021) that stress when perceived as a threat results in fall in productivity, however when perceived as a challenge results in higher productivity. These perceptions would influence the stress tolerance level of individuals and thereby their performance at work.

A study conducted among 1051 Chinese young adults aged 18-27 years investigated the impact of social media usage on executive functioning. Data was collected using convenience sampling via a survey and the results showed that social media addiction had a significant negative association with executive functioning in the sample population. Executive functioning was assessed using Webexec; a six item scale. Excessive use of social media was observed to adversely affect physical and mental health of young adults leading to 'problematic social media use' or 'social media addiction'. Emotional disturbance and poor sleep quality were found to be mediating variables in the relation between social media and executive functioning. Intervention programs to reduce the cognitive impairment among young adults were advocated by the study (Zhang et al., 2023).

Gao et al. (2019) in their study titled, 'Inhibitory Control in Excessive Social Networking Users: Evidence from an Event-Related Potential-Based Go-Nogo Task' examined the impairment of inhibitory control, which is a key executive function that suppresses inappropriate behaviour, caused by excessive social networking sites usage. 1431 responses were analysed. The tests revealed that excessive users of social networking sites find it difficulty in inhibitory control compared to non- excessive users.

A rigorous meta- analysis was conducted by Ioannidis et al. (2019) to examine the cognitive performance in problematic internet users. Systematic analysis of peer reviewed studies were carried out to compare the cognition of problematic internet users and others. 2922 participants across 40 studies were included in the meta- analysis. It was found that problematic internet use was associated with significant impairment of inhibitory control, decision making and working memory. Age, gender or geographical location were not found to moderate the observed cognitive effects.

In a study conducted by Ahmed et al. (2023), the impact of social media on students' life during Covid 19 Pandemic was examined. Social media scrolling, video calling and texting, surfing and browsing on google were included in the social media usage activities

of students. Impact of these on physical and cognitive skills of students were examined. Analytical cross- sectional study was conducted over a period of one year in Karachi and data was collected from a sample size of 170 respondents. Excessive use of social media was found to directly affect cognitive skills causing forgetfulness, distractibility, false triggering and increased stress.

The relationship between executive function and mobile social media addiction among female college students were examined in a study by Z. He & Li, (2022). Specific functions such as inhibitory control with respect to eating habits and affective state/ stress were assessed. Structural equation model was used and the data was collected from female college students in China. The study found significant correlation between social media addiction and disordered eating behaviours indicating poor inhibitory control.

Ward et al. (2017) in their study observed that the use of smart phones comes at a cognitive cost. The constant use engages the limited capacity cognitive resources of human brain for attention control thereby leaving very few other resources for other tasks resulting in a decline in cognitive performance. These limited capacity attentional control resources lead to a fall in working memory capacity and fluid intelligence. The study termed this the smart phone induced 'brain drain'. A total of 844 (546 in experiment one and 296 in experiment 2) undergraduates participated in the study over a period of two weeks. Two experiments conducted by the researchers indicated that despite being successful in maintaining sustained attention, the mere presence of these devices reduces the person's cognitive capacity.

The short engaging videos offered on social media platforms have a detrimental impact on the user's Prospective Memory and well- being, as observed by Chiossi et al. (2023). An experiment was conducted among 60 respondents where they were engaged in short Tiktok, Twitter and YouTube videos while performing a Prospective Memory Task. Results indicated that a mix of short videos and rapid context switching had significant negative impact on intention recall and execution.

The relation between social media use and working memory was also examined by Sharifian & Zahodne (2020) by using an 8-day daily diary study among 782 respondents falling in the age group of 25-75 years. Multilevel models examined the relation between social media use and memory. The study found that respondents reported more memory failures on days when social media usage was high. It was also observed that higher social media usage on the previous day led to more memory failures on the subsequent day too.

A study by Harren et al. (2021) examined the association between problematic social media usage and metacognition among 825 respondents aged between 18-75 years. Pearson's correlation indicated that problematic Instagram use and problematic Facebook use were associated with four out of the five metacognition dimensions examined. A multiple linear regression analysis revealed that metacognition among other factors is associated with social media burnout too.

Z.-H. He et al., (2021) in their study examined the relation between family socio-economic status, stress, impulsiveness, inhibitory control and social media addiction. Respondents were Chinese female college students. A structural equation model was used to investigate the model hypothesis. It was found that students from lower socio economic families exhibited increased social media usage which in turn was associated with poor inhibitory control, high levels of stress and high impulsive behaviours.

Aydın et al.(2020) examined the association between executive functions and problematic social networking sites use. Two aspects of executive function; cognitive flexibility and inhibitory control were analysed. Data was collected from 284 respondents using Wisconsin Card Sorting Test and Bergen Social Media Addiction Scale. Regression

analysis revealed that problematic social media use had predictive significance on the two aspects of executive functions.

Contrary to the above studies, research on the social media usage of elderly population indicates that it has a positive impact on cognitive functioning. The study examined the effects of social media usage of 65 years and older individuals on four domains namely; attention, processing speed, working memory and inhibitory control. These findings indicate the benefits of social media usage in old age which extends beyond better social engagement (Quinn, 2018).

An analytical study by Shuna Khoo and Yang Hwajin (No title, n.d.) explored the relation between social media usage and executive functioning in middle age and late adulthood. Panel data of a cohort of 1735 respondents in the age group of 40 to 70 years were collected. Structural equation modeling was conducted to analyse the data gathered. The study found that social media usage of middle and older adults protected against decline in executive functioning caused due to age. In other words, social media usage is beneficial in preserving the cognitive skills among the middle and older aged population, provided it promotes social support through inter-personal interactions.

Relevance of the study: The aspects of generating goals and plans, maintaining focus and motivation, proactively altering the goals in response to external circumstances have made executive function a significant research topic in behavioural science and personality analysis (Suchy, 2009).

Studies have highlighted that executive functions have a positive impact on well-being (Luerssen & Ayduk, 2017) and mindfulness (Łoś et al., 2020). Furthermore, executive functions are key components of self-regulation (Akira Miyake & Friedman, 2012). It plays a crucial role in decision making (n.d.-a), risk taking (Reynolds et al., 2019), development of social trust, time management and emotional regulation as observed in multiple studies.

With the rapidly increasing social media usage among the millennials and generation z (11years to 42 years), as observed by (Lin, n.d.), the impact of such usage on key cognitive and performance skills have to be researched in depth.

Research Gap: Research on internet usage has increased at an increasing rate over the past decade and half. There are multiple studies conducted around the world on problematic internet usage and social media addiction. The impact of social media on several aspects of human life such as physical health, mental health, behavioural aspects, consumerism, academic performance and professional outcomes are being researched regularly. However, there are limited empirical studies focusing on exploring the relationship between social media usage and executive functioning skills of individuals. Furthermore, studies on the topic of executive functioning and its predictors focus more on school students below the age of 15years. With millennials and generation Z found to be the highest users of social media (Lin, n.d.), it is imperative to carry out research in this field. Thorough analysis of the impact of social media usage on each significant component of executive function would facilitate developing proactive strategies to promote and preserve the cognitive skills and thereby human well- being and overall performance.

Limitations of the Study: In this study, social media usage has been quantified in terms of the average number of hours spent on a daily basis. The type of usage; whether active or passive could also be explored as studies have highlighted correlation between passive usage and executive functioning skills such as stress tolerance. Furthermore, it would be useful to examine the period for which the respondents have had exposure to social media at the self-reported daily rates. This would help in examining the impact at a more comprehensive level.

Research Questions

Following are the questions which this research sought to find answers for.

1. Does the extent of social media usage have an impact on working memory?
2. Does the extent of social media usage have an impact on task initiation?
3. Does the extent of social media usage have an impact on planning/prioritising?
4. Does the extent of social media usage have an impact on metacognition?
5. Does the extent of social media usage have an impact on sustained attention?
6. Does the extent of social media usage have an impact on goal directed persistence?
7. Does the extent of social media usage have an impact on stress tolerance?
8. Does the extent of social media usage have an impact on overall executive function of university students and professionals?

Research Methodology and Model

The researcher has focused on seven important executive function skills which would play significant roles in the work performance and scholastic performance of the target population. The following seven skills have been chosen:

1. Working Memory
2. Task Initiation
3. Sustained Attention
4. Planning/prioritising
5. Metacognition
6. Goal Directed persistence
7. Stress Tolerance

Over and above these skills being analysed individually, the impact of social media usage on executive functioning as a whole is also assessed. These seven skills along with executive function constitute the dependent variables of this study. The number of hours of social media usage on a daily basis has been taken as the independent variable.

This study has developed a questionnaire adapted from Executive Skills Questionnaire by Peg Dawson & Richard Guare (Guare et al., n.d.). The questionnaire includes assessment of the chosen seven executive functioning skills.

Questionnaire was administered via Google Forms (Questionnaire shall be produced on demand). The questionnaire carries 25 questions including questions on demographic profile of the respondents. Each skill has been assessed based on the responses to a set of three questions. Responses to these are marked on a 5 point Likert Scale. The average of the scores constitute an individual’s score for that specific skill. No students below 8years of age have been included. 156 respondents, including both students and professionals have taken the survey. Respondents were informed about the objective of the survey and was assured that their responses would be kept confidential. Data has been analysed with SPSS.

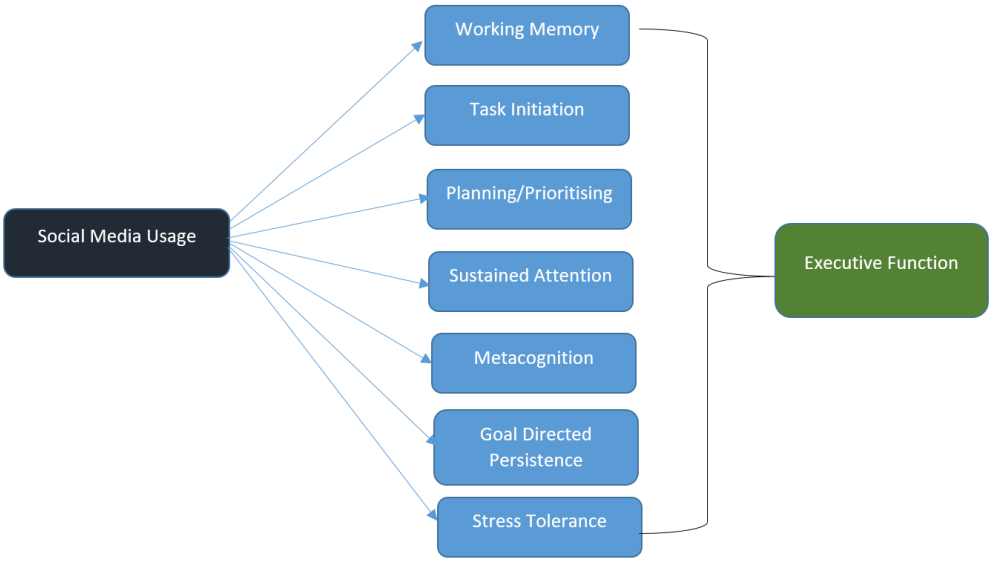


Figure 4: Model developed by the Researcher

Results

Reliability

Reliability of the data was tested with Cronbach Alpha test (Table 1.b). The test included all the variables and revealed a reliability score of 0.845. As this score is above the acceptable standard of 0.7, data is considered reliable for conducting further tests and analysis.

Table 1.a

Case Processing Summary

		N	%
Cases	Valid	156	100.0
	Excluded[a]	0	.0
	Total	156	100.0

a. List wise deletion based on all variables in the procedure.

Table 1.b.

Reliability Statistics

Cronbach's Alpha	N of Items
.845	25

Normality of Distribution

Normality of distribution has been checked before proceeding with analysis of the collected data. The skewness and Kurtosis SE values are observed to be within the acceptable standard range of +1.96 and -1.96 as shown in tables 2.a and 3.a. It is therefore concluded that data pertaining to the chosen variables are normally distributed.

Table 2.a.

Descriptives

			Statistic	Std. Error
Number of hours spent on social media daily	Mean		2.65	.081
	95% Confidence Interval for Mean	Lower Bound	2.49	
		Upper Bound	2.81	
	5% Trimmed Mean		2.61	
	Median		3.00	
	Variance		1.030	
	Std. Deviation		1.015	
	Minimum		1	
	Maximum		5	
	Range		4	
	Interquartile Range		1	
	Skewness		.680	.194
	Kurtosis		.247	.386

2.b.

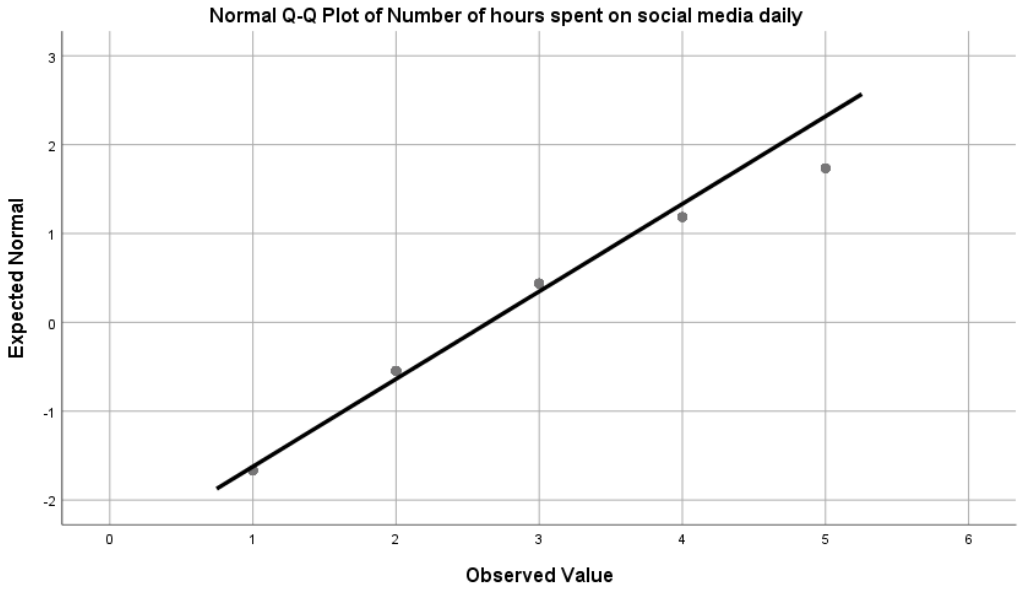


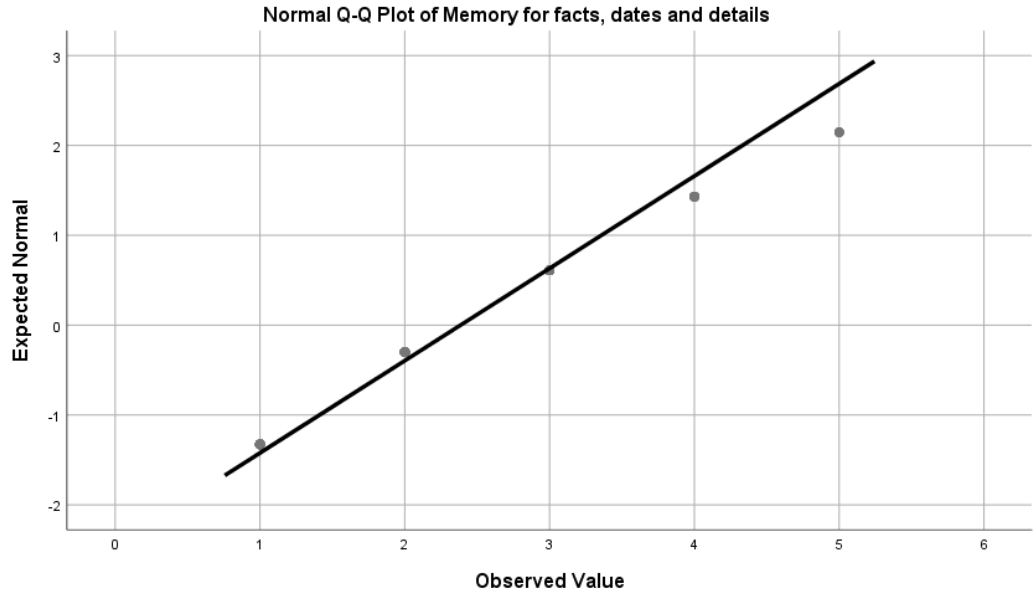
Table 3.a

Descriptives

			Statistic	Std. Error
Memory for facts, dates and details	Mean		2.38	.078
	95% Confidence Interval for Mean	Lower Bound	2.23	
		Upper Bound	2.54	

	5% Trimmed Mean	2.34	
	Median	2.00	
	Variance	.948	
	Std. Deviation	.974	
	Minimum	1	
	Maximum	5	
	Range	4	
	Interquartile Range	1	
	Skewness	.479	.194
	Kurtosis	-.072	.386

3.b.



Frequency Distribution

Out of 156 respondents, 83 of them were male and 73 of them were females. 18-24 age group constituted the largest segment among the respondents, followed by those above 30 years. 61% of the respondents were students. Maximum number of respondents indicated social media usage of 2 to 3 hours in a day. This was followed by users for 4 to 5 hours.

Statistical Analysis: ANOVA

Scores obtained by respondents for each of the executive function skills have been tabulated and presented in the following tables.

Gender wise distribution of executive functioning skills scores

Table 4.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Meanworkingmemory	Between Groups	1.113	1	1.113	2.907	.090
	Within Groups	58.963	154	.383		

	Total	60.076	155			
Meantaskinitiation	Between Groups	.091	1	.091	.169	.682
	Within Groups	83.541	154	.542		
	Total	83.632	155			
Meansustainedattention	Between Groups	8.026	1	8.026	11.901	.001
	Within Groups	103.862	154	.674		
	Total	111.888	155			
Meanplanningprioritising	Between Groups	.206	1	.206	.382	.538
	Within Groups	83.167	154	.540		
	Total	83.373	155			
Meanmetacognition	Between Groups	1.279	1	1.279	3.472	.064
	Within Groups	56.746	154	.368		
	Total	58.025	155			
Meangoaldirectedpersistence	Between Groups	1.201	1	1.201	3.155	.078
	Within Groups	58.617	154	.381		
	Total	59.818	155			
Meanstresstolerance	Between Groups	6.476	1	6.476	9.998	.002
	Within Groups	99.738	154	.648		
	Total	106.214	155			

From the above table, it is evident that gender wise there is no statistically significant difference between scores obtained in working memory, task initiation, planning/prioritizing, metacognition or goal directed persistence. However, it is observed that there is statistically significant difference between genders in terms of stress tolerance scores (P value for ANOVA 0.002. Significant at 5% level) and sustained attention scores (P value for ANOVA 0.001. Significant at 5% level). Females have reported higher sustained attention scores when compared to males. Stress tolerance also shows higher scores secured by females.

Age wise distribution of executive functioning skills scores

Table 5.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Meanworkingmemory	Between Groups	2.567	2	1.284	3.415	.035
	Within Groups	57.509	153	.376		
	Total	60.076	155			
Meantaskinitiation	Between Groups	5.502	2	2.751	5.387	.005
	Within Groups	78.131	153	.511		
	Total	83.632	155			
Meansustainedattention	Between Groups	8.451	2	4.225	6.250	.002

	Within Groups	103.437	153	.676		
	Total	111.888	155			
Meanplanningprioritising	Between Groups	8.649	2	4.324	8.854	.000
	Within Groups	74.725	153	.488		
	Total	83.373	155			
Meanmetacognition	Between Groups	3.335	2	1.668	4.665	.011
	Within Groups	54.690	153	.357		
	Total	58.025	155			
Meangoaldirectedpersistence	Between Groups	2.088	2	1.044	2.767	.066
	Within Groups	57.730	153	.377		
	Total	59.818	155			
Meanstresstolerance	Between Groups	6.149	2	3.074	4.701	.010
	Within Groups	100.065	153	.654		
	Total	106.214	155			

Statistically significant difference is observed in executive functioning skills scores between age groups. Except for goal directed persistence, all the other executive functioning skills indicate statistically significant difference between the age groups considered. Working memory (P value for ANOVA 0.035. Significant at 5% level), task initiation (P value for ANOVA 0.005. Significant at 5% level), planning/ prioritizing (P value for ANOVA 0.000. Significant at 5% level), metacognition (P value for ANOVA 0.011. Significant at 5% level), sustained attention (P value for ANOVA 0.002. Significant at 5% level) and stress tolerance (P value for ANOVA 0.010. Significant at 5% level). In all the executive functioning skills analysed, 25 to 30 age group was found to indicate highest scores when compared to all other age groups. The lowest scores in terms of working memory, metacognition, goal directed persistence (not statistically significant) and stress tolerance were indicated by the 18-24 age group. However, respondents who belonged to above 30years group indicated lowest scores in terms of task initiation, sustained attention and planning/ prioritizing.

Occupation wise distribution of executive functioning skills scores

Table 6.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Meanworkingmemory	Between Groups	1.498	1	1.498	3.937	.049
	Within Groups	58.579	154	.380		
	Total	60.076	155			
Meantaskinitiation	Between Groups	1.858	1	1.858	3.498	.063
	Within Groups	81.775	154	.531		
	Total	83.632	155			
Meansustainedattention	Between Groups	.064	1	.064	.088	.767
	Within Groups	111.824	154	.726		

	Total	111.888	155			
Meanplanningprioritising	Between Groups	.080	1	.080	.148	.701
	Within Groups	83.293	154	.541		
	Total	83.373	155			
Meanmetacognition	Between Groups	2.231	1	2.231	6.159	.014
	Within Groups	55.794	154	.362		
	Total	58.025	155			
Meangoaldirectedpersistence	Between Groups	.992	1	.992	2.596	.109
	Within Groups	58.826	154	.382		
	Total	59.818	155			
Meanstresstolerance	Between Groups	3.494	1	3.494	5.239	.023
	Within Groups	102.719	154	.667		
	Total	106.214	155			

From the above table, it is evident that there is no statistically significant difference between students and professionals with respect to scores obtained in task initiation, sustained attention, planning/prioritizing or goal directed persistence. However, it is observed that there is statistically significant difference between students and professionals in terms of working memory (P value for ANOVA 0.049. Significant at 5% level), metacognition (P value for ANOVA 0.014. Significant at 5% level) and stress tolerance scores (P value for ANOVA 0.023. Significant at 5% level). Professionals reported higher scores with respect to working memory, metacognition and stress tolerance as against students.

Gender wise distribution of social media usage hours' mean

Table 7.

ANOVA

Number of hours spent on social media daily

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.592	1	5.592	5.591	.019
Within Groups	154.017	154	1.000		
Total	159.609	155			

Age wise distribution of social media usage hours mean

Table 8.

ANOVA

Number of hours spent on social media daily

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	13.633	2	6.817	7.145	.001
Within Groups	145.976	153	.954		

Total	159.609	155			

Occupation wise distribution of social media usage hours mean

Table 9.

ANOVA

Number of hours spent on social media daily

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.801	1	6.801	6.854	.010
Within Groups	152.808	154	.992		
Total	159.609	155			

The above tables illustrate the difference in terms of social media usage between genders, age groups and occupations. Male and female respondents showed statistically significant difference in social media usage (P value for ANOVA 0.019. Significant at 5% level). Females indicate higher social media usage. The difference between different age groups (P value for ANOVA 0.001. Significant at 5% level) and occupations (P value for ANOVA 0.010. Significant at 5% level) are also found to be statistically significant. 18-24year group was found to be highest consumers of social media. Between professionals and students, unfortunately students indicate higher usage.

Correlation

Table 10.

Correlations

			Number of hours spent on social media daily	Working memory mean	Taskinitiation mean	Sustainedattention mean	Planningprioritising	Metacognition mean	Goaldirectedpersistence	Stresstolerance mean	Executivefunction
Spearman's rho	Number of hours spent on social media daily	Correlation Coefficient	1.000	-.123	-.109	-.302**	-.215**	-.067	-.062	-.089	-.198*
		Sig. (2-tailed)	.	.127	.174	.000	.007	.406	.440	.269	.013

	N	156	156	156	156	156	156	156	156	156
Working memory mean	Correlation Coefficient	-.123	1.000	.419**	.464**	.481**	.297**	.332**	.287**	.672**
	Sig. (2-tailed)	.127	.	.000	.000	.000	.000	.000	.000	.000
	N	156	156	156	156	156	156	156	156	156
Taskinitiationmean	Correlation Coefficient	-.109	.419**	1.000	.418**	.350**	.162*	.314**	.072	.588**
	Sig. (2-tailed)	.174	.000	.	.000	.000	.043	.000	.369	.000
	N	156	156	156	156	156	156	156	156	156
Sustainedattentionmean	Correlation Coefficient	-.302**	.464**	.418**	1.000	.525**	.324**	.327**	.339**	.753**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
	N	156	156	156	156	156	156	156	156	156
Planning prioritising	Correlation Coefficient	-.215**	.481**	.350**	.525**	1.000	.460**	.495**	.238**	.741**
	Sig. (2-tailed)	.007	.000	.000	.000	.	.000	.000	.003	.000

	N	156	156	156	156	156	156	156	156	156
Metacognitionmean	Correlation Coefficient	-.067	.297**	.162*	.324**	.460**	1.000	.443**	.243**	.588**
	Sig. (2-tailed)	.406	.000	.043	.000	.000	.	.000	.002	.000
	N	156	156	156	156	156	156	156	156	156
Goaldirectedpersistence	Correlation Coefficient	-.062	.332**	.314**	.327**	.495**	.443**	1.000	.395**	.666**
	Sig. (2-tailed)	.440	.000	.000	.000	.000	.000	.	.000	.000
	N	156	156	156	156	156	156	156	156	156
Stresstolerancemean	Correlation Coefficient	-.089	.287**	.072	.339**	.238**	.243**	.395**	1.000	.568**
	Sig. (2-tailed)	.269	.000	.369	.000	.003	.002	.000	.	.000
	N	156	156	156	156	156	156	156	156	156
Executivefunction	Correlation Coefficient	-.198*	.672**	.588**	.753**	.741**	.588**	.666**	.568**	1.000
	Sig. (2-tailed)	.013	.000	.000	.000	.000	.000	.000	.000	.

	N	156	156	156	156	156	156	156	156	156

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation between social media usage and 7 executive functioning skills individually and executive functioning skill in totality was analysed. The dependent variables were the 7 executive functioning skills such as working memory, task initiation, planning/prioritizing, sustained attention, goal directed persistence, metacognition and stress tolerance. Independent variable was the social media usage of the respondents. Spearman's coefficient of correlation has been calculated and presented in table 10 above. Results indicate that there exists significant negative correlation between social media usage and sustained attention and planning and prioritizing skill. The social media usage is also found to have significant negative correlation with overall executive function. This indicates that higher the social media usage, more negatively impacted would be sustained attention skill, planning/ prioritizing skill and overall executive functioning.

However, it is noted that the other executive functioning skills such as working memory, task initiation, metacognition, goal directed persistence and stress tolerance were not found to have a statistically significant correlation with social media usage of the individual.

Regression

Regression analysis was conducted to examine the predictive significance of social media usage on the executive functioning skills. The results are presented in the tables below.

Table 11.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.234[a]	.055	.049	.47368

a. Predictors: (Constant), Number of hours spent on social media daily

Table 12.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.998	1	1.998	8.904	.003[b]
	Residual	34.554	154	.224		
	Total	36.551	155			

a. Dependent Variable: Executivefunction

b. Predictors: (Constant), Number of hours spent on social media daily

Table 13.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.862	.106		36.349	.000
	Number of hours spent on social media daily	-.112	.037	-.234	-2.984	.003

a. Dependent Variable: Executivefunction

The above tables show that social media usage has a negative predictive significance on executive functioning skills in an individual. Result shows that independent variable, social media usage, statistically significantly predict the dependent variable, executive functioning at p less than 0.05.

Further the predictive significance of social media usage on each of the executive functioning skills were examined. It was found that social media usage is found to be a statistically significant negative predictor of sustained attention at p less than 0.05 (Table 16). The same observation was also made with respect to planning/prioritizing skills. Social media usage is found to be a statistically significant negative predictor of planning/ prioritizing skills (Table 19).

Table 14.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.312[a]	.097	.092	.80978

a. Predictors: (Constant), Number of hours spent on social media daily

Table 15.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10.903	1	10.903	16.627	.000[b]
	Residual	100.985	154	.656		
	Total	111.888	155			

a. Dependent Variable: Sustainedattentionmean

b. Predictors: (Constant), Number of hours spent on social media daily

Table 16.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.194	.182		23.088	.000

	Number of hours spent on social media daily	-.261	.064	-.312	-4.078	.000

a. Dependent Variable: Sustainedattentionmean

Table 17

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.229[a]	.053	.046	.71618

a. Predictors: (Constant), Number of hours spent on social media daily

Table 18

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.384	1	4.384	8.548	.004[b]
	Residual	78.989	154	.513		
	Total	83.373	155			

a. Dependent Variable: Planningprioritising

b. Predictors: (Constant), Number of hours spent on social media daily

Table 19

Coefficients[a]

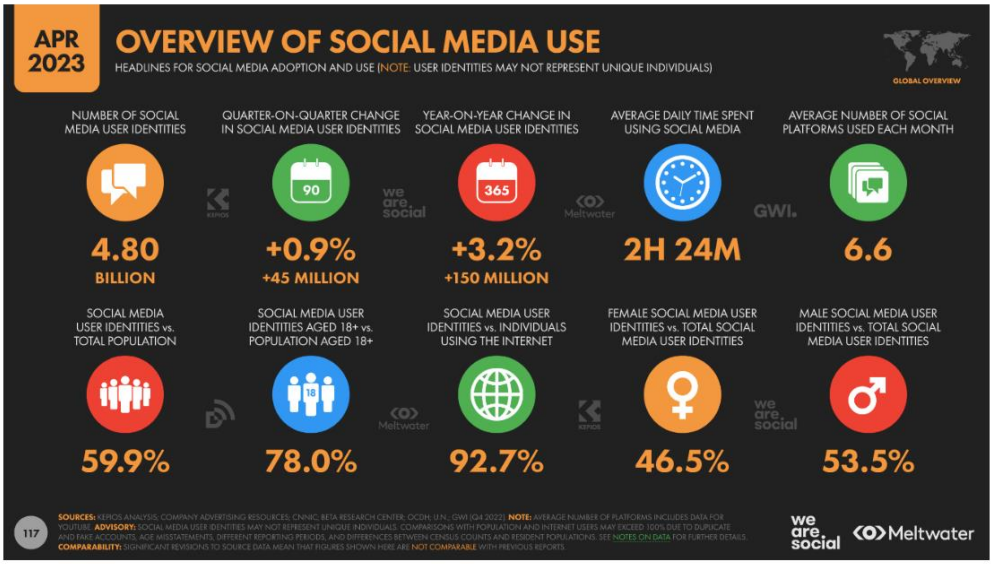
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	4.140	.161		25.766	.000
	Number of hours spent on social media daily	-.166	.057	-.229	-2.924	.004

a. Dependent Variable: Planningprioritising

Discussion

The relevance of executive functioning skills in scholastic performance and work productivity has been established by a number of studies around the world. Studies have established the importance of executive functions in enhancing employee performance and employee engagement (Castellano et al., n.d.), (Pluck et al., 2020). The executive function skills are found to be highly important for successful social living, academic and professional success and good health (Mann et al., 2017), (Borella et al., 2010), (Miller, 2011).

This study aimed at examining the impact of social media usage on executive functioning of university students and professionals. With 60% of the world population being social media users and the number of users increasing at the rate of 45million quarter to quarter (Kemp, 2023) the impact of such increasing usage on the productivity and mental wellbeing has emerged as a matter of concern.



Source: (Kemp, 2023)

It has been observed in this study that social media usage is highest among females as also in the age group of 18- 24 years. Students reported the highest social media usage in hours. These differences were found to be statistically significant as observed via ANOVA tests. Executive functioning skills were assessed using an adapted questionnaire covering 7 significant executive functioning skills. A set of three questions were used to assess each of the executive function skills. The social media usage was calculated on the basis of self-reported hourly usage per day. An examination of the demographic differences with respect to each of these executive functioning skills shed light on certain interesting findings. There exists statistically significant difference between males and females with respect to stress tolerance and sustained attention with females recording higher scores. 25-30 year olds were found to have better executive functioning skills such as working memory, sustained attention, planning/prioritizing, stress tolerance, metacognition and task initiation. 18- 24 year olds have shown lowest scores in terms of working memory, stress tolerance and metacognition. Professionals scoring statistically significantly higher than students in working memory, metacognition and stress tolerance is also a notable observation.

The statistically significant negative correlation between social media usage and executive function and specifically sustained attention and planning/prioritizing skills have been established in this study. It is to be noted that social media use exhibits a negative correlation with all of the seven executive functioning skills included in this study. However, statistically significant relations are found between social media use and sustained attention, planning/prioritizing skills. The findings indicate not just a significant negative correlation, but statistically significant negative predictive relation between the dependent (executive function) and independent variables (social media usage). These findings are aligned with the observations of the study titled, ‘Executive Function Changes According to Media Addiction Severity: A Population-Based Cohort Study with a Longitudinal Design’, researchers examined the impact of social media exposure on executive function difficulty of respondents. 1219 respondents from Korea participated in the study. Executive Function Difficulty Screening Questionnaire was administered. Executive functions of the respondents were compared between low exposure (media exposure less than 1 hour), medium exposure (media exposure of 1 hour to 3.5 hours) and high exposure groups. Among the 1219 respondents, high media exposure group exhibited higher levels of executive function difficulty as compared to medium and low exposure groups (Oh et al., 2022).

Warsaw et al.(2021) conducted a systematic review to examine if increased smartphone use affected executive functioning among healthy adults aged between 18-35 years. 6079 articles were screened in total for this purpose and eight articles were finalized covering 438 participants. These chosen studies examined executive functions such as decision making, working memory and inhibitory control. It was found that smartphone use had a negative impact on inhibition and decision making. Working memory was found to be impacted negatively by increased smartphone use prior to bedtime.

Sustained attention among students are cited as a significantly related to academic achievement (Steinmayr et al., 2010), (Gallen et al., 2023). Sustained attention is analysed and given due weightage in assessing 'person-job' fit in many professions and especially the high demand occupations (Münscher et al, 2022). This executive skill is found to be negatively impacted by increase in social media usage, in this study. This finding is in line with the findings of the study conducted by Baumgartner et al. (2018) where longitudinal studies conducted on 2390 respondents highlighted the strong relation between media usage and problems in maintaining attention. The use of social media creates a dopamine rush in our brains with every like, follow or notification. The need for this sensation keeps strengthening with increased usage. It is found that now an individual loses focus after eight seconds. Social media users are found to frequently switch tasks (media multi-tasking) to check the social media sites. This entails a 'switch cost' which refers to the negative impact of re-engaging with a task on an individual's cognition. People who engage in multiple forms of social media are prone to suffer from decrease in sustained attention (PTI, 2023). A study by Luo et al. (2021) which examined the association between social media multi- tasking and executive function among 61 adolescents found that media multi-tasking would lead to impairment of the brain areas which is responsible for executive function. By depriving the attention resources for very important life activities such as education and employment, social media would significantly hamper an individual's growth and development.

Studies by Cohen et al. (1995), (Shi & Qu, 2022) have emphasized the importance of effective planning on academic performance of students. A study conducted in the Jordanian Health Ministry (The impact of effective planning on the employees performance efficiency in the Jordanian Health Ministry, 2014) shed light on the statistically significant positive effect of planning on employee performance. The findings of this study indicate how significantly this skill gets impaired by constant social media usage. At the same time, it is to be noted that social media usage does not have predictive significance on the other executive functioning skills such as working memory, task initiation, goal directed persistence, metacognition or stress tolerance in the sample population. Though there are studies to the contrary, certain studies support this finding too. Researchers were unable to find significant relation between these variables in a study conducted among 70 respondents (Lara & Bokoch, 2021). This goes on to prove that among the executive function skills analysed, the social media usage is found to negatively influence all the 7 skills though not significantly. Sustained attention and planning/ prioritising skills were found to be significantly impaired by reported social media use of respondents. In conclusion, social media usage has a strong negative predictive impact on executive function of individuals.

Conclusion

Often referred to as the 'management system of the human brain', the impact executive functioning skills have on an individual's performance, be it scholastic or at work, is undeniable. These are higher-order skills which help a person in getting things done or planning and achieving goals. Poor executive functioning would interfere with a person's ability to gather information, organize it, plan tasks, initiate tasks, complete the task and maintain cognitive flexibility to change the process based on external cues. In a working

population, this would mean serious repercussions in terms of failing to meet deadlines, inadequate internal and external monitoring and fall in credibility. Among students, this would mean fall in grades and poor learning outcomes as observed in multiple studies. Both categories would face difficulty in forging and maintaining healthy relationships, suffer from mood swings, poor self- esteem, inability to manage stress and poor motivation.

We need to take cues from our day to day functioning and notice any dip in our executive functioning skills. Common indicators are difficulty in sustaining attention, poor memory, inability to manage time well, difficulty in planning, prioritizing and organizing tasks, difficulty in managing responses, poor impulse control, inability in self-monitoring and management. Executive dysfunction has a long list of predictors such as depression, Alzheimer's disease, ADHD, behavioural disorders, to name a few. With increasing evidence shedding light on the negative impact of social media usage on a wide range of areas of human life, it is imperative that its impact too on executive functioning is examined. A dip in these might not be solely due to social media usage. However, as observed in the study, it could also be a predictor of fall in executive functioning.

A fact to be noted is that executive functioning skills develop over time. People are not born with them but has the potential to develop these skills. It develops during childhood, well into teens and early twenties. This fact makes it all the more important to identify the factors which are causing impairment in executive functioning. This knowledge would empower an individual to take course correction measures before the alarm bells go off.

Having observed that increase in social media usage could hamper executive functioning, a self- reflection on the causes for such increased usage is recommended.

There is an array of applications available to monitor one's social media usage along with inbuilt systems on android and apple devices. Systematic monitoring would help in identifying the time of the day when the usage spikes and the reasons for the same. A self-reflection exercise helps in identifying the main triggers and impulses to spend time on social media. It also helps in identifying the distraction pattern. As recommended in the Journal of Social and Clinical Psychology, social media usage should be ideally limited to 30minutes a day for better mental and physical health. Developing a social media schedule and setting reminders when the allotted time is exceeded have found to work in restricting the usage.

Fixing specific time slots in a day would help anchor social media usage with self-discipline. Better impulse control skill can be developed by following this strategy. This also fosters an appreciation for delayed gratification. Learning delayed gratification is found to have positive effects on sustaining attention on the task at hand for longer periods of time.

A calm, relaxed and stress free mind facilitates better cognition and attention span. Attention resources of the mind should be used majorly by cognitive skills. However, constant social media usage exhausts these resources with sensory overload. Sensory overload causes difficulties in processing the information one takes in effectively.

Maintaining stimulus free environment is recommended to help tackle excessive social media usage. Keeping smartphones/ devices out of reach while working on important tasks could help retain attention. Removing social apps from the home screen and muting notifications would also help in this regard. Psychologists advise avoiding social media usage immediately before bed and after waking up based on researches done in this regard.

A comparative analysis of the impact of social media usage on students and professionals could be carried out to explore these findings further. Impact of active and passive usage of social media is also a field which requires further exploration. These would be the recommendations for further studies in the area.

When individuals should be offered opportunities to develop executive functioning/ higher order cognitive skills, parallelly, aspects which inhibit this development should be identified and curtailed. Conscious efforts taken in this direction would help develop students and working population who are more productive and efficient. This undeniably has lifelong benefits for the individual and the society at large.

This study is all the more relevant as the 2030 Agenda for Sustainable Development aims to promote universal access to Internet to even the least developed countries. Cautious steps and well informed strategies would help in minimising the perils of increased exposure to the internet and subsequently to social media (Blazhevska, 2017).

References

Abdelrahman, R. M. (2020). Metacognitive awareness and academic motivation and their impact on academic achievement of Ajman University students. Heliyon, 6(9), e04192. https://doi.org/10.1016/j.heliyon.2020.e04192

Ahmed, F., Siddiqui, D. Q., Khan, A., Khan, D. A., Akhter, J., & Parvez, A. (2023). From Entertainment to Agnoisation: Social Media Impact on Students' Life during COVID 19 Pandemic. European Journal of Sociology.

Alasqah, S. S. (2022). Goal orientation and its impact on university students' academic achievement during the COVID-19 pandemic. SAGE Open, 12(2), 215824402210936. https://doi.org/10.1177/21582440221093617

Alloway, T., & Alloway, R. (2014). The working memory advantage: Train your brain to function stronger, smarter, faster. Simon & Schuster.

Aydın, O., Obućа, F., Boz, C., & Ünal-Aydın, P. (2020). Associations between executive functions and problematic social networking sites use. Journal of Clinical and Experimental Neuropsychology, 42(6), 634–645. https://doi.org/10.1080/13803395.2020.1798358

Banich, M. T. (2009). Executive function: The search for an integrated account. Current Directions in Psychological Science, 18(2), 89–94. https://doi.org/10.1111/j.1467-8721.2009.01615.x

Baumgartner, S. E., van der Schuur, W. A., Lemmens, J. S., & te Poel, F. (2018). The relationship between media multitasking and attention problems in adolescents: Results of two longitudinal studies. Human Communication Research, 44(1), 3–30. https://doi.org/10.1093/hcre.12111

Bellinger, M. W. (2021). Workplace performance is affected by employees' perception of stress. Sacredheart.edu. https://digitalcommons.sacredheart.edu/cgi/viewcontent.cgi?article=1853&context=acadfest

Blazhevska, V. (2017, June 20). Sustainable Development Goal 9: Investing in ICT access and quality education to promote lasting peace. United Nations Sustainable Development; United Nations: Sustainable Development Goals. https://www.un.org/sustainabledevelopment/blog/2017/06/sustainable-development-goal-9-investing-in-ict-access-and-quality-education-to-promote-lasting-peace/

Borella, E., Carretti, B., & Pelegrina, S. (2010). The specific role of inhibition in reading comprehension in good and poor comprehenders. Journal of Learning Disabilities, 43(6), 541–552. https://doi.org/10.1177/0022219410371676

Cartwright, K. B. (2012). Insights from cognitive neuroscience: The importance of executive function for early reading development and education. Early Education and Development, 23(1), 24–36. https://doi.org/10.1080/10409289.2011.615025

Castellano, E., Muñoz-Navarro, R., Toledo, M. S., Spontón, C., & Medrano, L. A. (n.d.). Cognitive processes of emotional regulation, burnout and work engagement. https://doi.org/10.7334/psicothema2018.228

Chiossi, F., Haliburton, L., Ou, C., Butz, A. M., & Schmidt, A. (2023). Short-form videos degrade our capacity to retain intentions: Effect of context switching on prospective memory. Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems.

Clark, R. C. (2008). Metacognition and human performance improvement. Performance Improvement Quarterly, 1(1), 33–45. https://doi.org/10.1111/j.1937-8327.1988.tb00005.x

Cohen, G. N., Bronson, M. B., & Casey, M. B. (1995). Planning as a factor in school achievement. Journal of Applied Developmental Psychology, 16(3), 405–428. https://doi.org/10.1016/0193-3973(95)90027-6

Gallen, C. L., Schaerlaeken, S., Younger, J. W., Younger, J. W., O'Laughlin, K. D., Anguera, J. A., Bunge, S. A., Ferrer, E. E., Hoeft, F., McCandliss, B. D., Mishra, J., Rosenberg-Lee, M., Gazzaley, A., Uncapher, M. R., Anguera, J. A., Gazzaley, A., & Project iLEAD Consortium. (2023). Contribution of sustained attention abilities to real-world academic skills in children. Scientific Reports, 13(1). https://doi.org/10.1038/s41598-023-29427-w

Gao, Q., Jia, G., Zhao, J., & Zhang, D. (2019). Inhibitory control in excessive social networking users: Evidence from an event-related potential-based Go-Nogo task. Frontiers in Psychology, 10, 1810. https://doi.org/10.3389/fpsyg.2019.01810

Guare, D., Dawson, P., & Guare, R. (n.d.). Executive Skills Questionnaire. Ocali.org. Retrieved August 31, 2023, from https://www.ocali.org/up_archive_doc/EF_QUESTIONAIRRES-8-13-15.pdf

Harren, N., Walburg, V., & Chabrol, H. (2021). Studying Social Media Burnout and Problematic Social Media use: The implication of perfectionism and metacognitions. Computers in Human Behavior Reports, 4(100117), 100117. https://doi.org/10.1016/j.chbr.2021.100117

He, Z., & Li, M. (2022). Executive function and social media addiction in female college students: The mediating role of affective state and stress. The Journal of Genetic Psychology, 183(4), 279–293. https://doi.org/10.1080/00221325.2022.2025757

He, Z.-H., Li, M.-D., Ma, X.-Y., & Liu, C.-J. (2021). Family socioeconomic status and social media addiction in female college students: The mediating role of impulsiveness and inhibitory control. The Journal of Genetic Psychology, 182(1), 60–74. https://doi.org/10.1080/00221325.2020.1853027

Hunt, M. G., Marx, R., Lipson, C., & Young, J. (2018). No more FOMO: Limiting social media decreases loneliness and depression. Journal of Social and Clinical Psychology, 37(10), 751–768. https://doi.org/10.1521/jscp.2018.37.10.751

Hur, J. l., & Gupta, M. (2013). Growing Up in the Web of Social Networking Adolescent Development and Social Media. Adolescent psychiatry, 3, 233-244. - references - scientific research publishing. (n.d.). Scirp.org. Retrieved August 31, 2023, from https://scirp.org/reference/referencespapers.aspx?referenceid=2918904

Internet and social media users in the world 2023. (n.d.). Statista. Retrieved August 31, 2023, from https://www.statista.com/statistics/617136/digital-population-worldwide/

Ioannidis, K., Hook, R., Goudriaan, A. E., Vlies, S., Fineberg, N. A., Grant, J. E., & Chamberlain, S. R. (2019). Cognitive deficits in problematic internet use: meta-analysis of 40 studies. The British Journal of Psychiatry: The Journal of Mental Science, 215(5), 639–646. https://doi.org/10.1192/bjp.2019.3

Jurado, M. B., & Rosselli, M. (2007). The elusive nature of executive functions: A review of our current understanding. Neuropsychology Review, 17(3), 213–233. https://doi.org/10.1007/s11065-007-9040-z

Kamarudin, R., Azizah, M., Mohd, M., Mohd, & Siong, M. (2009). STRESS AND ACADEMIC PERFORMANCE: EMPIRICAL EVIDENCE FROM UNIVERSITY STUDENTS. STRESS AND ACADEMIC PERFORMANCE: EMPIRICAL EVIDENCE FROM UNIVERSITY STUDENTS. Academy of Education Leadership Journal.

Kemp, S. (2023). Digital 2023 April Global Statshot Report. April Global Statshot Report." DataReportal - Global Digital Insights.

Khajeali, N., Ahmady, S., Kalantarion, M., Sharifi, F., & Yaseri, M. (2021). Relation between stress, time management, and academic achievement in preclinical medical education: A systematic review and meta-analysis. Journal of Education and Health Promotion, 10(1), 32. https://doi.org/10.4103/jehp.jehp_600_20

Ko, L.-W., Komarov, O., Hairston, W. D., Jung, T.-P., & Lin, C.-T. (2017). Sustained attention in real classroom settings: An EEG study. Frontiers in Human Neuroscience, 11. https://doi.org/10.3389/fnhum.2017.00388

Lara, R. S., & Bokoch, R. (2021). Cognitive functioning and social media: Has technology changed us? Acta Psychologica, 221(103429), 103429. https://doi.org/10.1016/j.actpsy.2021.103429

Lin, Y. (n.d.). Social media usage statistics by age. Oberlo.com. Retrieved August 31, 2023, from http://www.oberlo.com/statistics/social-media-usage-statistics-by-age

Łoś, K., Chmielewski, J., & Łuczyński, W. (2020). Relationship between executive functions, mindfulness, stress, and performance in pediatric emergency simulations. International Journal of Environmental Research and Public Health, 17(6), 2040. https://doi.org/10.3390/ijerph17062040

Luerssen, A., & Ayduk, O. (2017). Executive functions promote well-being: Outcomes and mediators. In M. D. Robinson & M. Eid (Eds.), The Happy Mind: Cognitive Contributions to Well-Being (pp. 59–75). Springer International Publishing AG.

Luo, J., Li, H., Yeung, P.-S., & Chang, C. (2021). The association between media multitasking and executive function in Chinese adolescents: Evidence from self-reported, behavioral and fNIRS data. Cyberpsychology, 15(2). https://doi.org/10.5817/cp2021-2-8

Lyons, P. R., & Bandura, R. P. (2018). Understanding metacognition: concepts supporting employee learning and growth. Human Resource Management International Digest, 26(6), 44–46. https://doi.org/10.1108/hrmid-07-2018-0155

Mann, T. D., Hund, A. M., Hesson-McInnis, M. S., & Roman, Z. J. (2017). Pathways to school readiness: Executive functioning predicts academic and social-emotional aspects of school readiness: Executive functioning and school readiness. Mind, Brain and Education: The Official Journal of the International Mind, Brain, and Education Society, 11(1), 21–31. https://doi.org/10.1111/mbe.12134

Metin, U. B., Peeters, M. C. W., & Taris, T. W. (2018). Correlates of procrastination and performance at work: The role of having "good fit." Journal of Prevention & Intervention in the Community, 46(3), 228–244. https://doi.org/10.1080/10852352.2018.1470187

Miller, H. (2011). Self-control and health outcomes in a nationally representative sample. American Journal of Health Behavior, 35(1). https://doi.org/10.5993/ajhb.35.1.2

Miyake, A., & Shah, P. (1999). Models of working memory: Mechanisms of active maintenance and executive control. Cambridge University Press.

Miyake, Akira, & Friedman, N. P. (2012). The nature and organization of individual differences in executive functions: Four general conclusions. Current Directions in Psychological Science, 21(1), 8–14. https://doi.org/10.1177/0963721411429458

Münscher, J.-C., Bürger, M., & Herzberg, P. Y. (2022). Parameters of attention at work (PAW36)—construction of a questionnaire. Trends in Psychology, 30(1), 146–171. https://doi.org/10.1007/s43076-021-00086-y

Neroni, J., Meijs, C., Leontjevas, R., Kirschner, P. A., & De Groot, R. H. M. (2018). Goal orientation and academic performance in adult distance education. The International Review of Research in Open and Distributed Learning, 19(2). https://doi.org/10.19173/irrodl.v19i2.3440

No title. (n.d.). Edu.Sg. Retrieved August 31, 2023, from https://research.smu.edu.sg/news/2021/feb/17/social-media-use-middle-aged-and-older-adults-may-protect-against-mental-decline

Oh, Y., Joung, Y.-S., & Baek, J. H. (2022). 2.93 executive function changes according to media addiction severity: A population-based cohort study with a longitudinal design. Journal of the American Academy of Child and Adolescent Psychiatry, 61(10), S213–S214. https://doi.org/10.1016/j.jaac.2022.09.237

Pluck, G., Crespo-Andrade, C., Parreño, P., Haro, K. I., Martínez, M. A., & Pontón, S. C. (2020). Executive functions and intelligent goal-directed behavior: A neuropsychological approach to

understanding success using professional sales as a real-life measure. Psychology & Neuroscience, 13(2), 158–175. https://doi.org/10.1037/pne0000195

PTI. (2023, April 7). Social media impeding our ability to focus. Economic Times. https://economictimes.indiatimes.com/industry/miscellaneous/social-media-impeding-our-ability-to-focus/articleshow/99325551.cms

Quinn, K. (2018). Cognitive effects of social media use: A case of older adults. Social Media + Society, 4(3), 205630511878720. https://doi.org/10.1177/2056305118787203

Reynolds, B. W., Basso, M. R., Miller, A. K., Whiteside, D. M., & Combs, D. (2019). Executive function, impulsivity, and risky behaviors in young adults. Neuropsychology, 33(2), 212–221. https://doi.org/10.1037/neu0000510

Seijts, G. H., Latham, G. P., Tasa, K., & Latham, B. W. (2004). Goal setting and goal orientation: An integration of two different yet related literatures. Academy of Management Journal, 47(2), 227–239. https://doi.org/10.2307/20159574

Sharifian, N., & Zahodne, L. B. (2020). Social Media Bytes: Daily Associations between Social Media Use and Everyday Memory Failures across the Adult Lifespan. The journals of gerontology. Series B, Psychological sciences and social sciences.

Shi, Y., & Qu, S. (2022). The effect of cognitive ability on academic achievement: The mediating role of self-discipline and the moderating role of planning. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.1014655

Sippl, A. (2020, October 1). Executive functioning skills 101: Task initiation. Life Skills Advocate. https://lifeskillsadvocate.com/blog/executive-functioning-skills-101-the-basics-of-task-initiation/.

Smith, A. (2018, March 1). Social media use in 2018. Pew Research Center: Internet, Science & Tech. https://www.pewresearch.org/internet/2018/03/01/social-media-use-in-2018/

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. Psychological Bulletin, 133(1), 65–94. https://doi.org/10.1037/0033-2909.133.1.65

Steinmayr, R., Ziegler, M., & Träuble, B. (2010). Do intelligence and sustained attention interact in predicting academic achievement? Learning and Individual Differences, 20(1), 14–18. https://doi.org/10.1016/j.lindif.2009.10.009

Suchy, Y. (2009). Executive functioning: Overview, assessment, and research issues for non-neuropsychologists. Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine, 37(2), 106–116. https://doi.org/10.1007/s12160-009-9097-4

Swanson, H. L., & Alloway, T. P. (2012). Working memory, learning, and academic achievement. In K. R. Harris, S. Graham, T. C. Urdan, C. B. Mccormick, G. M. Sinatra, & J. Sweller (Eds.), Theories, constructs, and critical issues (Vol. 1, pp. 327–366). American Psychological Association.

The impact of effective planning on the employees performance efficiency in the Jordanian Health Ministry. (2014, July 22). European Journal of Business and Innovation Research (EJBIR). https://eajournals.org/ejbir/vol-2issue-4-august-2014/impact-effective-planning-employees-performance-efficiency-jordanian-health-ministry/

Velki, T. (2012). Metacognition and Intelligence as Predictors of Academic Success. Croatian Journal of Education, 14, 799–815

Vuontela, V., Carlson, S., Troberg, A.-M., Fontell, T., Simola, P., Saarinen, S., & Aronen, E. T. (2013). Working memory, attention, inhibition, and their relation to adaptive functioning and behavioral/emotional symptoms in school-aged children. Child Psychiatry and Human Development, 44(1), 105–122. https://doi.org/10.1007/s10578-012-0313-2

Ward, A. F., Duke, K., Gneezy, A., & Bos, M. W. (2017). Brain drain: The mere presence of one's own smartphone reduces available cognitive capacity. Journal of the Association for Consumer Research, 2(2), 140–154. https://doi.org/10.1086/691462

Warsaw, R. E., Jones, A., Rose, A. K., Newton-Fenner, A., Alshukri, S., & Gage, S. H. (2021). Mobile technology use and its association with executive functioning in healthy young adults: A systematic review. Frontiers in Psychology, 12. https://doi.org/10.3389/fpsyg.2021.643542

Welle, P. D., & Graf, H. M. (2011). Effective lifestyle habits and coping strategies for stress tolerance among college students. American Journal of Health Education, 42(2), 96–105. https://doi.org/10.1080/19325037.2011.10599177

What are Executive Functions? - LD@school. (2017, April 6). LD@school. https://www.ldatschool.ca/learning-modules/executive-functions/what-are-executive-functions/

Zhang, K., Li, P., Zhao, Y., Griffiths, M. D., Wang, J., & Zhang, M. X. (2023). Effect of social media addiction on executive functioning among young adults: The mediating roles of emotional disturbance and sleep quality. Psychology Research and Behavior Management, 16, 1911–1920. https://doi.org/10.2147/prbm.s414625

(N.d.-a). Buildingbetterprograms.org. Retrieved August 31, 2023, from http://www.buildingbetterprograms.org/wp-content/uploads/2014/04/Defining-and-Measuring-Executive-Functions-in-Adults-Applications-for-Practice-and-Policy-Carlock.pdf

(N.d.-b). Nyspta.org. Retrieved August 31, 2023, from https://nyspta.org/wp-content/uploads/2017/08/Conv17-305-dawson-executive-skills-questionnaire.pdf