Examine the Relationship Between Online Learning Students' Screen Time, Digital Fatigue, and Mental Health Issues

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Abstract: The research discusses how Digital technology and education are more closely related. The ability to teach students online and over great distances may continue to grow in popularity. While there are several benefits to this online learning method, there are also numerous drawbacks. The most prevalent drawbacks of the digital learning process for students include excessive screen time and poor mental health outcomes. The way students access material and collaborate on projects has completely altered due to the introduction of the online digital learning process into the traditional education system. As with anything, there are drawbacks to the online learning process, and this one is no exception. Prolonged screen use might disrupt Students' sleep patterns, which is detrimental to their health. This may directly impact students' academic performance. The digital screen's blue light throws off the sleep cycle, causing mood swings and heightened susceptibility. Students' focus and attention spans get shorter due to increased screen use. The research discusses the content theory that helps to better understand the topic. The research has also used the primary quantitative data collection process for the data collection process. The study also used SPSS analysis to analyze the data.

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1. Introduction

During this age of digitalization, the relationship between educational technology and digital technology is growing increasingly robust. There is the potential for a steady increase in the number of online education platforms that give youngsters the opportunity to learn from a distance and online. This method of schooling through the internet has brought about a great deal of benefits; yet, it has also brought about a great deal of drawbacks [16]. One of the most prominent drawbacks of the digital learning process for children is that it can cause kids to screen for an excessive amount of time, which can have a negative impact on their mental health. The frequent usage of digital devices by students may result in specific issues that may transcend beyond the purview of their academic pursuits [17]. These challenges may arise as a result of students participating in virtual classes, assignments, and collaborative projects. In this study, both the problems and the potential solutions pertaining to the subject are discussed [18].

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1.1. Background of the study

The evolution of the 21st century has witnessed the highest development and growth of advanced technology; this development has affected every aspect of human life [19]. Technology always helps to make human life simpler and easier. In the context of this study, technology has also influenced children's education process; in recent times, children have been able to learn and attend class with the help of their phones and tablets. Using the internet, students can attend online classes on online digital platforms [1]. The advent of the online digital learning process has changed the whole system of traditional education in how students access information and do collaborative projects [20]. However, there are many challenges with the online education process, as all good things have some negative points. The issues with students regarding mental health and excessive screen time come from using digital learning platforms [21].
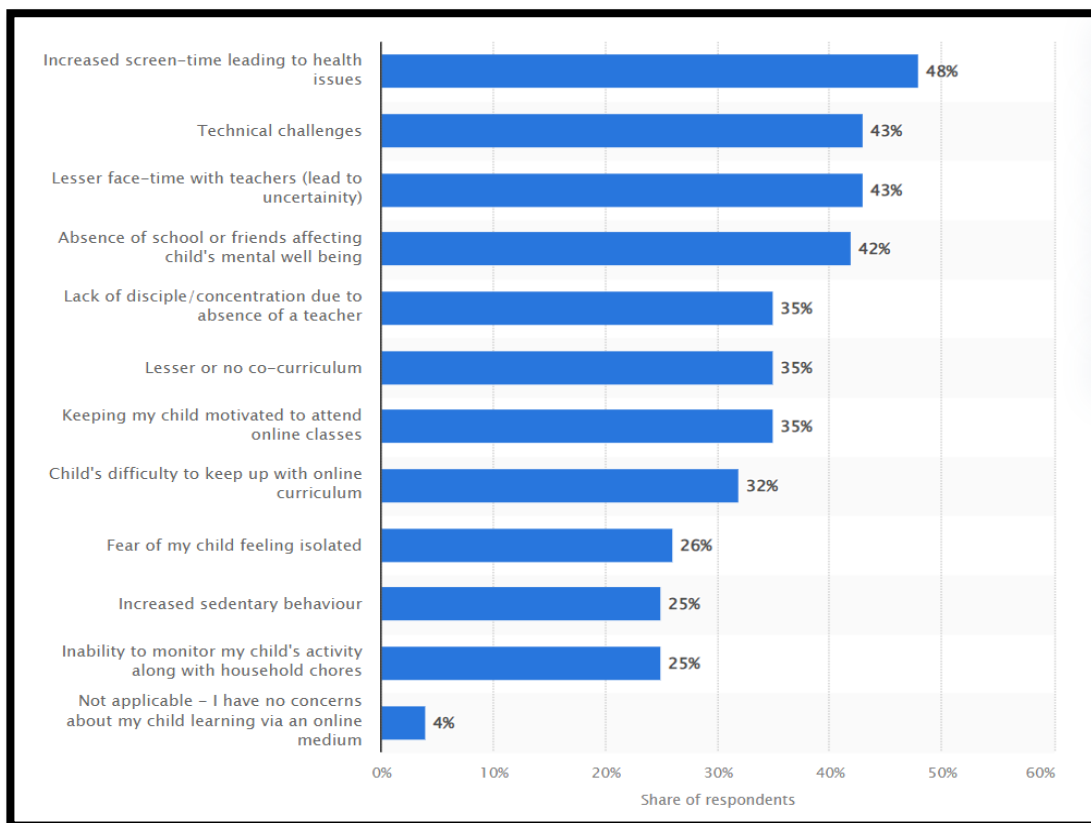
Figure 1: Problems from shifting of classroom education to online learning for students

Figure 1 discusses the concerns regarding shifting online education to the online education process. According to the data in the above graph, 48% of the participants in the survey have supported increased screen time by the students regarding the education process [22]. Using digital technology for online education has increased mental health issues and other health challenges in children 43% of the participants have supported that the children are facing technical challenges regarding attending the online education process; they have to adapt from the traditional pattern of education system to online pattern of education systems [23].

1.2. Problem Statement

To understand and evaluate the connection between digital fatigue, excessive screen time, and mental health problems among students enrolled in online courses.

1.3. Research Aim

To describe and analyze the connection between excessive screen time, digital fatigue, and mental health issues among students receiving education online.

1.4. Research Objective

RO1: To understand how the online learning process has led to extent to excessive screen timing
RO2: To evaluate the impact of the online education process on the mental health of the students
RO3: To understand the challenges for the students due to using the online education process
RO4: To understand the remedies that can help to solve issues that come with the online education process

1.5. Research Questions

RQ1: How has the online learning process led to excessive screen timing?
RQ2: What is the impact of the online education process on the mental health of the students?
RQ3: Why do students face challenges while using the online education process?
RQ4: What remedies can help solve issues that come with the online education process?

1.6. Research Significance

Understanding the connection between mental health issues and excessive screen time plays a pivotal role for parents, stakeholders, and healthcare professionals [24]. Understanding the context of the topic can help develop educational policies and practices for students [25]. The research also plays an important role in students' well-being and support [2]. The context of the study can aid in taking care of the student's mental health and solve various problems that students face in the digital education process. Understanding the topic can also help to design proper psychological counseling programs for students that can help to solve the psychological challenges of the students [3].

2. Literature Review

2.1. Impact of Excessive Screen Time on Mental Health

The increase in screen time has a direct impact on the mental health of the students. According to Akulwar-Tajane et al. [4], there are certain negative outcomes of students using prolonged hours of screen time for the educational process. On the other hand, it has been added by Syahputri et al. [5] that the long hours of screen time have increased the feeling of depression for the students. Continuous screen time can disturb the sleep patterns of students, which is very important for good health. This can directly impact the academic performance of the students. The blue light of the digital screen disturbs the sleep cycle, leading to mood disturbance and increased vulnerability. Increased screen time also leads to shortening the attention span and concentration of the students [26].

2.2. Digital Fatigue and Learning Environment

Continuously studying from the digital learning platforms leads to digital fatigue in the students. According to Nakshine et al. [6], long hours of using the digital screen lead to technological stress in the students that disturbs their sleep cycle and mental health. As a student joins the online learning platform, digital fatigue becomes pertinent. On the other hand, Majumdar et al. [7] say that understanding students regarding digital stress helps students cope with the demands of digital learning. Students can always communicate with teachers and friends using digital platforms, and direct communication becomes minimal. Direct communication is very important for students to refresh their minds, which is impossible in online communication. Also, direct communication is always effective and better understandable [27].

2.3. Impact of Online Learning on Mental Health

As was found during COVID-19, students' mental health is strongly impacted by their participation in online learning. In the opinion of Bolatov et al. [8], a significant number of students experience a variety of anxiety and depression as a result of spending extended periods of time in front of screens, such as mobile devices and computers, for the goal of obtaining an education online. On the other hand, it is backed by Gupta et al. [9], who state that the traditional educational process is more interesting than the online education process. This fact lends credence to the argument discussed here. Long periods of time spent in front of a screen were found to shorten the attention span of the pupils, which was not the case with the conventional method of education [28]. In addition, students who spend a significant amount of time studying online experience disruptions in their sleep patterns, which in turn leads to issues with their mental health. Students become socially isolated as a result of the online learning process and the long hours they spend in front of screens, which has a negative impact on their mental performance [29].

2.4. Strategies and Techniques for Coping

Online education and long hours of screen time lead to many challenges for students; however, certain strategies can help students avoid depression and other mental health challenges [30]. According to the view of Cheung et al. [10], the break between screen time and offline activities can help students avoid anxiety and depression. Also, there is a need for a particular hour of online screen time for the students, which can help the students maintain better mental health and avoid any depression. Based on the opinion of Van et al. [11], mindfulness and relaxation techniques also play an important role in avoiding depression and different mental health challenges. Meditation and exercise in daily activities can help students manage stress and improve focus.

2.5. Theoretical Framework

The content theory is connected to the motivational theory used to motivate people. In the context of this topic, content theory is a relevant concept that can help to understand the topic better. Content theory describes certain systems that help to motivate people's actions [31]. The content theory in the context of this topic refers to the analysis of certain factors within the digital learning environment that contribute to the experience and outcome of the students [12]. The content theory may investigate the design of an online learning process that influences their online screen engagement timing. Including the online interactive learning process, such as quizzes and games, leads to more time engagement for students on digital platforms [32].

2.6. Research Gap

Many points have not been touched on in this research, nor the previous research in the context of online education and their impact on mental health and increased screen time, which can be discussed in future research. There can be more investigation regarding solutions that can help students mitigate the challenges of long hours of screen time and challenges regarding their mental health [13]. Future research can also shed light on the future of this technological modification and innovation and how it can impact students.

2.7. Research Methodology

The research methodology plays a pivotal role in the research as it describes the collection and analysis of the research data. In this particular research, the primary quantitative research data collection process includes a survey process for data collection. In this research, 60 participants took part in the survey process. This research also follows the quantitative data analysis process. The research used SPSS software for the data analysis process. SPSS software is a statistical tool that helps analyze the data collected for the research.
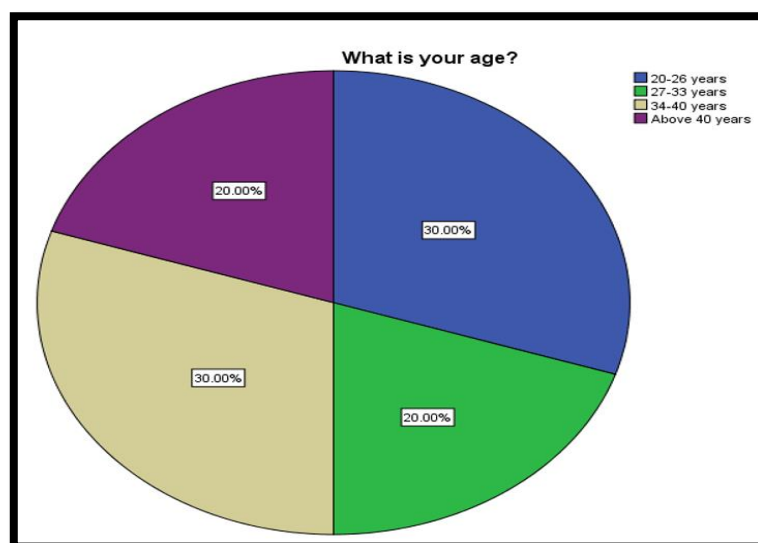
2.8. Finding and Analysis

Figure 2: Age Group of participants

The age range of the individuals who took part in the survey is broken down between Figures 2 and 4, which can be found below. 30 percent of the total participants are between the ages of 20 and 26, making up the entire number of participants. Twenty percent of the total respondents were in the age range of 27 to 33 years old, and they were the ones who participated in the survey. The overall population of participants who are above the age of 40 accounts for twenty percent of the total population.
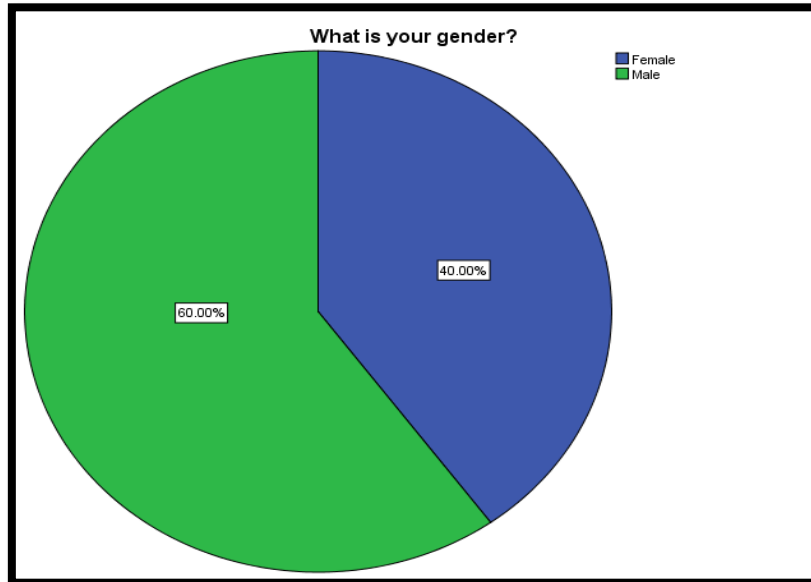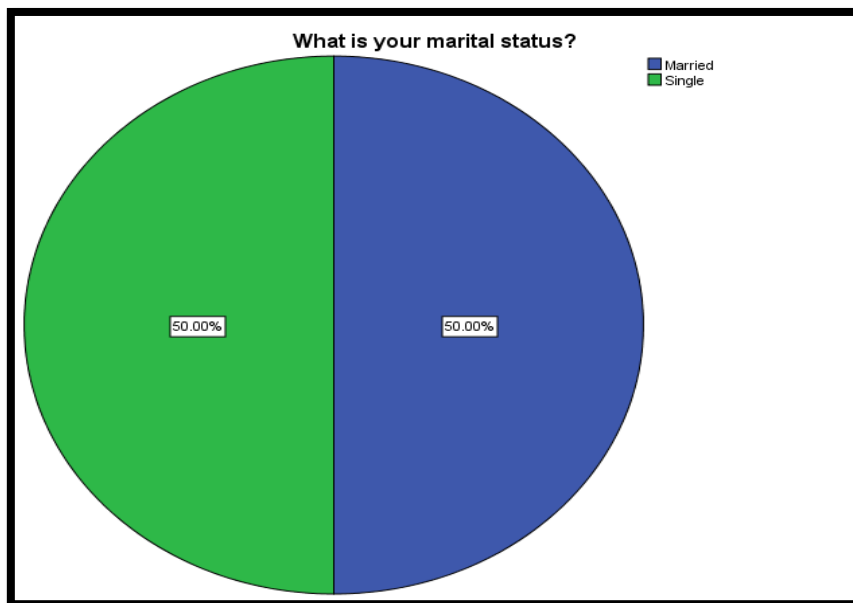

Figure 3: Gender of participants

Figure 4: Marital status

2.9. Statistical Analysis and Descriptive Analysis

Table 1: Descriptive analysis of the variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Skewness	Kurtosis	Kurtosis
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Timestamp	10	22-Dec-23	22-Dec-23	22-Dec-23	00:01:12.723	0.14	0.687	-1.417	1.334
DV	60	6	9	8.3	1.01347	-1.249	0.309	0.288	0.608
IV1	60	6	10	8.8	1.08612	-1.557	0.309	2.183	0.608
IV2	60	5	10	8.4	1.29143	-1.676	0.309	2.545	0.608
IV3	60	5	10	8.6	1.36791	-1.697	0.309	2.501	0.608
Valid N (listwise)	10								

The descriptive analysis describes the relation between each variable in the survey (Table 1). In this study, the DV chosen is the students' health. On the other hand, IVs are screen time on phones and tablets and engagement of the students in the learning process. The analysis also helps to analyze data quality through kurtosis and skewness values (Tables 2 and 3).

Hypothesis 1

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	314a	0.099	0.083	0.97043	0.099	6.349	1	58	0.015	2.611

Table 3: Linear regression analysis of hypothesis 1

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	5.979	1	5.979	6.349	.015 b
Residual	54.621	58	0.942		
Total	60.6	59			

The hypothesis analysis facilitates comparing the relationship between the research's independent and dependent variables. The significance of the value of the regression analysis demonstrates this. The analysis's regression result of 0 indicates the positive relationship between the variables.

Hypothesis 2

Table 4: Regression analysis for Hypothesis 2

ANOVA ᵃ					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.979	1	5.979	6.349	.015 b
Residual	54.621	58	0.942		
Total	60.6	59			
a. Dependent Variable: DV					
b. Predictors: (Constant), IV1					

The regression analysis of this study's second hypothesis is shown in Table 4. The significance value of the regression analysis, which is less than 0.5, is 0, indicating the effective relationship between the hypothesis's variables (Tables 5 and 6).

Hypothesis 3

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.559a	0.313	0.301	0.84725	0.313	26.421	1	58	0	2.447

Table 6: Regression analysis for Hypothesis 3

ANOVAa					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	18.966	1	18.966	26.421	.000b
Residual	41.634	58	0.718		
Total	60.6	59			

a. Dependent Variable: DV

b. Predictors: (Constant), IV2

Coefficients a					
Model	**Unstandardized Coefficient: B**	**Unstandardized Coefficients: Std. Error**	**Standardized Coefficients: Beta**	**T**	**Sig.**
(Constant)	11.988	0.726		16.518	0
IV2	1.439	0.085	-0.559	-5.14	0
a.Dependent Variable: DV					

3. Pearson Correlation Test

Table 7: Correlation test of the research

Correlation		Timestamp	DV	IV1	IV2	IV3
Timestamp	Person Correlation	1	-.085	.048	.392	-.041
	Sig.(2-tailed)		-.816	.896	.262	.911
	N	10	10	10	10	10
DV	Person Correlation	-.085	1	-.314*	-.559**	-.352**
	Sig.(2-tailed)	-.816		.015	.000	.006
	N	10	60	60	60	60
IV1	Person Correlation	.048	-.314*	1	.856**	-.055
	Sig.(2-tailed)	.896	.015		.000	.678
	N	10	60	60	60	60
IV2	Person Correlation	.392	-.559**	.856**	1	.207
	Sig.(2-tailed)	.262	.000	.000		.122
	N	10	60	60	60	60

IV3	Person Correlation	-.041	-.352**	-.055	.207	1
	Sig.(2-tailed)	.911	.006	.678	.122	
	N	10	60	60	60	60

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

The correlation analysis of the variables is shown in the table above. Understanding how variables relate to one another is crucial (Table 7).

4. Discussion

The relationship between extended periods of time spent in front of a screen and the mental health of kids who are participating in online learning platforms is a complicated subject of concern that requires the attention of both parents and educators [14]. Certain aspects can be discussed in order to gain a deeper comprehension of the subject matter [15]. A significant amount of time is spent in front of electronic screens; students spend a significant amount of time using their laptops and tablets, which disrupts their natural sleeping pattern. The disruption of the normal sleeping cycle also contributes to the mental difficulties that these pupils experience. These pupils' connections with their parents and peers in society are also impacted as a result of the increased amount of time they spend in front of screens.

5. Conclusion

It is possible to draw the conclusion that the research of the connection between the amount of time spent in front of a computer and mental health problems among students who are participating in the process of online learning requires careful consideration. Despite the fact that the digital learning process has altered the way in which students acquire knowledge, there are a few drawbacks associated with the method. One of the challenges that students have in the process of digital learning is an increase in the amount of time they spend in front of screens, which can lead to mental health concerns. Students who spend an excessive amount of time in front of screens experience disruptions in their normal sleeping patterns, which in turn are associated with a variety of mental health issues that they may experience. Several coping mechanisms, such as meditation and physical activity, have been highlighted in the study as a means of assisting students in managing the challenges that are associated with the digital learning process.

Appendices

Appendices 1: Questionnaires

1. What is your age?
2. What is your gender?
3. What is your marital status?

DV: Health of students

4. The engagement in the online education process has impacted the students' health.
5. The mental health of the students is affected by disturbance in the sleeping pattern of the students

IV1: Screen time of the students

6. Screen time of the students decreases the students' attention span in the long run.
7. Students must reduce screen time and focus on offline activities to manage mental challenges.

IV2: Engagement in the online learning process

8. Engagement in the online learning process leads to effective development of the students compared to traditional educational processes.
9. The online education process leads to increased screen time for students, which leads to mental health challenges.

IV3: Sleep pattern

10. The sleeping pattern of the students has also been disturbed by the engagement of the online educational process.
11. The sleeping pattern of the student leads to mental health challenges in the students.

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